# TECHNICAL MEMORANDUM

**To:** **Ian McAllister, Ashleigh Crompton, Mike Champion, Jackie Boruch and Ryan Schucroft (Woodfibre LNG)** **Date: 23 Aug 2024**

**From:** **Cheng Kuang, Holly Pelletier and Patrick Mueller (Lorax)** **Project #: A633-7**

**Subject:** **PE-111578 Weekly Discharge and Compliance Report #27 for August 11 – 17**

Waste Discharge Authorization Effluent Permit PE-111578 was issued by the British Columbia Energy Regulator (BCER) to Woodfibre LNG on February 9, 2024. The permit specifies monitoring and reporting requirements that are required to be met by Woodfibre LNG during construction of the LNG Export Facility. Reporting is required on a weekly basis.

Discharge and compliance monitoring is conducted by on-site Environmental Monitors (Roe Environmental) that are sub-contracted to the civil works contractor (LB LNG). Analytical samples are submitted by Roe Environmental to ALS Environmental in Burnaby, BC, for testing. Lorax Environmental provides water quality database management and WDA compliance reporting services for Woodfibre LNG.

This technical memorandum (Report #27) was prepared by Lorax Environmental and summarizes monitoring conducted the week of August 11 – 17 for contact waters directed to a WWTP or a sedimentation pond. Monitoring data and pending results from prior reporting periods available at the time of reporting are tabulated and included as appendices. Report #27 has been prepared to meet the requirements specified in Condition 4.2 of WDA Effluent Permit PE-111578:

> "The Permittee shall summarize the results of the discharge and compliance monitoring program in a report that shall be submitted to the BCER weekly over the term of this permit. Reports must include suitable tabulated data. The table must include any applicable regulatory limits/guidelines e.g. permit limits, BC Water Quality Guidelines etc. Any exceedances of respective regulatory limits/guidelines must be clearly highlighted. Any missed sampling events/missing data must be identified with an explanation provided. Reporting frequency may be reduced upon a history of compliance and by written confirmation from the BCER. These reports shall be submitted to Waste.Management@bc-er.ca. A copy of the reports shall be provided to each First Nation consulted with regarding this subject permit, and also made publicly available on the Woodfibre LNG Environmental Reporting webpage."

The site layout is shown in Figure 1 at the end of this memorandum. Sedimentation pond photographs are included in Appendix A, and monitoring results are tabulated in Appendix B through Appendix D for contact water and receiving environment samples.

# 1. Current Conditions

The Construction Phase of the Woodfibre LNG Export Facility commenced in October 2023. Early stage civil works are ongoing, and these include site grading, levelling, overburden and bedrock excavation, and construction of contact water management facilities. Shoring works along the shoreline and foreshore areas were initiated in December 2023, and in early 2024 construction of water management infrastructure was initiated and has continued through the August 11 – 17 monitoring period. The East WWTP and East Sedimentation Pond are commissioned for operation and discharge since April 15, 2024. The West WWTP and West Sedimentation Pond are constructed. The PE- 111578 water management facilities that are completed or were under construction during the reporting period are shown in Figure 1. Established contact water collection and dewatering locations and photographs of the sedimentation ponds are shown in Appendix A, Figure 2 through Figure 5.

The completed non-contact water diversion ditch west of Mill Creek was commissioned for use on April 7 and discharges to Mill Creek at station OUT-06 (Figure 1). Monitoring stations OUT-01, OUT-02, and OUT-11 at pre-existing culvert outlets have been established noting that the culverts and associated non-contact water ditching will be upgraded and extended later in the construction schedule. The East and West catchments contact water conveyance ditches described in PE-111578 were designed to transport non-contaminated contact water to the East and West sedimentation ponds and will be constructed following completion of site preparation activities (*e.g.*, site grading, bedrock excavation) along the ditch lines. Until the ditches are operational, non-contaminated contact waters are managed to remain on site or are directed by pumping to the East Sedimentation Pond or East WWTP. Contaminated contact waters are contained and directed to the East WWTP for treatment.

A revised schedule is being developed to complete the installation of the East and West Sedimentation Ponds permanent outfall structures. A temporary discharge system (*i.e.*, pump, hosing and diffusor) is used to convey East Sedimentation Pond effluent to the authorized discharge location when necessary for the discharge of excess water, and if the effluent water quality meets the requirements set out in PE-111578. The West Sedimentation Pond is not commissioned for discharge.

Pilot testing of the East WWTP continued during the monitoring period (August 11 – 17). Contaminated and potentially contaminated contact waters from the 1100 excavation and small amounts of concrete wash water were directed to the East WWTP for treatment, as well as water recirculated from the East Sedimentation Pond (Appendix A, Figure 2). A total of 3,919 $m^3$ of treated WWTP effluent was discharged to the East Sedimentation Pond during the reporting period (August 11 – 17). Daily WWTP effluent flows are provided in Appendix C (Table C-4). There were no discharges from the East Sedimentation Pond during the reporting period.

The West Sedimentation Pond is complete, except for the outfall structure, and has not been commissioned for discharge. However, the pond has been used to store contact water that was subsequently directed to the East WWTP for treatment. The West WWTP was commissioned for pilot trials during the monitoring period (August 11 – 17) using the water stored in the West Sedimentation Pond. The pond received treated effluent from the West WWTP from August 14 to 16 as part of commissioning. There were no discharges from the West Sedimentation Pond during the monitoring period.

The weather was warm and sunny during the monitoring period (August 11 – 17). Small amounts of precipitation (<1 mm) were recorded at the Woodfibre site weather station on August 11 and 12. The daily weather conditions are summarized in Table 1.

**Table 1: Summary of Certified Project Area (CPA) Daily Weather Conditions.**

| Date | Precipitation (mm) | Max. Temp (°C) | Min. Temp (°C) | Weather Description |
|---|---|---|---|---|
| 08-11-2024 | 0.4 | 23.5 | 16.5 | Sun and cloud |
| 08-12-2024 | 0.8 | 19.2 | 16.3 | Sun and cloud |
| 08-13-2024 | 0 | 20.1 | 15.0 | Sun |
| 08-14-2024 | 0 | 23.1 | 16.2 | Sun |
| 08-15-2024 | 0 | 22.9 | 15.1 | Sun |
| 08-16-2024 | 0 | 22.8 | 15.6 | Sun |
| 08-17-2024 | 0 | 25.3 | 14.8 | Sun |

Note: Data retrieved from the Stantec Woodfibre site weather station.

## 2. Monitoring Summary

The PE-111578 authorized works were under construction during the August 11 – 17 monitoring period. Compliance monitoring stations are progressively established as water management infrastructure is completed. Monitoring is conducted by the on-site Environmental Monitors (Roe Environmental). Analytical samples are submitted by Roe Environmental to ALS Environmental in Burnaby, BC, for testing.

The following monitoring stations have been established (Figure 1):

- Creek water (SW-01, SW-02, SW-03, SW-04, SW-07).
- Howe Sound reference and initial dilution zone (IDZ) locations (WQR1, WQR2, IDZ-E1 and IDZ-E2).
- Non-contact diversion ditch outlets (OUT-01, OUT-02, OUT-06, and OUT-11).
- Contact water monitoring locations (WWTP-E-IN, WWTP-E-OUT, SP-E-IN-2, SP-E-OUT, SP-E-NE, SP-E-NW, WWTP-W-IN, WWTP-W-OUT, SP-W-W, and SP-W-E).

East Sedimentation Pond influent and effluent stations SP-E-NW and SP-E-NE, respectively, are in-pond stations that may be monitored in place of stations SP-E-IN-2 and SP-E-OUT when there is no influent to, or discharge from the East Sedimentation Pond. In-pond monitoring stations have been established for the West Sedimentation Pond at locations SP-W-W and SP-W-E (previously named SP-W-NW and SP-W-NE) and will be used for pond water quality monitoring during the West WWTP pilot trials.

Water quality was monitored at stations IDZ-E1, IDZ-E2, WWTP-E-IN, WWTP-E-OUT, SP-E-NE, WWTP-W-IN, WWTP-W-OUT, SP-W-W, and SP-W-E during the monitoring period (August 11 – 17). Sampling dates and parameters tested are summarized in Table 2. Overall, the PE-111578 monitoring requirements that were applicable during the monitoring period (August 11 – 17) were met. Daily field parameters and weekly analytical samples were not collected at influent station SP-E-IN-2 and effluent station SP-E-OUT as the East Sedimentation Pond did not receive contact water inflows and did not discharge during the monitoring period.

## Table 2: Summary of PE-111578 Monitoring Samples Collected August 11 – 17.

| Sampling Date | Sample | Description | Parameters Tested | Monitoring Frequency |
|---|---|---|---|---|
| August 11, 2024 | SP-E-NE [1] | East Sedimentation Pond, in-pond sample, represents effluent quality | Field Parameters. | P |
| | WWTP-E-OUT | East WWTP effluent | Field Parameters. | D |
| | WWTP-E-IN | East WWTP influent | | |
| August 12, 2024 | SP-E-NE [1] | East Sedimentation Pond, in-pond sample, represents effluent quality | Field Parameters. | P |
| | WWTP-E-OUT | East WWTP effluent | Field Parameters. | D |
| | WWTP-E-IN | East WWTP influent | | |
| | SP-W-W | West Sedimentation Pond, in-pond sample, represents influent quality | Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, Methylmercury, Dioxins & Furans, Glycols, Oil and Grease. | P |
| | SP-W-E | West Sedimentation Pond, in-pond sample, represents effluent quality | | |
| | WWTP-W-OUT | West WWTP effluent | Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, Methylmercury, Dioxins & Furans, Glycols, Oil and Grease. | P |
| | WWTP-W-IN | West WWTP influent | | |
| August 13, 2024 | SP-E-NE [1] | East Sedimentation Pond, in-pond sample, represents effluent quality | Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, Methylmercury, Dioxins & Furans, Glycols, Oil and Grease. | P |
| | WWTP-E-OUT | East WWTP effluent | Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, Methylmercury, Dioxins & Furans, Glycols, Oil and Grease. | D, $W_1$, $W_2$ |
| | WWTP-E-IN | East WWTP influent | | |
| August 14, 2024 | WWTP-E-OUT | East WWTP effluent | Field Parameters. | D |
| | WWTP-E-IN | East WWTP influent | | |
| August 15, 2024 | SP-E-NE [1] | East Sedimentation Pond, in-pond sample, represents effluent quality | Field Parameters. | P |
| | WWTP-E-OUT | East WWTP effluent | Field Parameters. | D |
| | WWTP-E-IN | East WWTP influent | | |
| August 16, 2024 | SP-E-NE [1] | East Sedimentation Pond, in-pond sample, represents effluent quality | Field Parameters. | P |
| | WWTP-E-OUT | East WWTP effluent | Field Parameters. | D |
| | WWTP-E-IN | East WWTP influent | | |
| | WWTP-W-OUT | West WWTP effluent | Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, Methylmercury, Dioxins & Furans, Glycols, Oil and Grease. | P |
| | WWTP-W-IN | West WWTP influent | | |
| August 17, 2024 | SP-E-NE [1] | East Sedimentation Pond, in-pond sample, represents effluent quality | Field Parameters. | P |
| | WWTP-E-OUT | East WWTP effluent | Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, Methylmercury, Dioxins & Furans, Glycols, Oil and Grease. | D, $W_1$, $W_2$ |
| | WWTP-E-IN | East WWTP influent | | |
| | IDZ-E1-0.5 | Howe Sound IDZ station E1; 0.5 m below surface | Field and Physical Parameters. | $W_3$ |
| | IDZ-E1-2m | Howe Sound IDZ station E1; 2 m below surface | | |
| | IDZ-E1-SF | Howe Sound IDZ station E1; 2 m above the seafloor | | |
| | IDZ-E2-0.5 | Howe Sound IDZ station E2; 0.5 m below surface | | |
| | IDZ-E2-2m | Howe Sound IDZ station E2; 2 m below surface | | |
| | IDZ-E2-SF | Howe Sound IDZ station E2; 2 m above the seafloor | | |

**Notes:**
Monitoring frequency requirements under PE-111578 are indicated as follows:
D – daily monitoring of field parameters at WWTP and sedimentation pond influent and effluent stations.
M – Monthly monitoring for all parameters at WWTP, sedimentation pond and receiving environment stations.
$W_1$ – initial high frequency monitoring for physical parameters at WWTP and sedimentation pond influent and effluent stations (weekly for the first 6 months of monitoring).
$W_2$ - initial high frequency monitoring for all parameters at WWTP and sedimentation pond influent and effluent stations (weekly for the first 5 weeks of monitoring).
$W_3$ – initial high frequency monitoring for physical parameters at IDZ stations (weekly for the first 5 weeks of monitoring).
P - periodic monitoring for targeted parameters that is supplementary to PE-111578 requirements.
[1] In-Pond stations SP-E-NW and SP-E-NE may be monitored in place of stations SP-E-IN-2 and SP-E-OUT, respectively, when there is no influent to, or discharge from the East Sedimentation Pond at the time of monitoring. The monitoring of in-pond stations is not a PE-111578 requirement and is conducted at the discretion of field staff.

# 3. Water Quality Results

## 3.1 Screening and Reporting Overview

Water quality and flow monitoring results are screened against field quality control (QC) criteria, benchmark values, PE-111578 discharge limits as well as Canadian, Federal and BC water quality guidelines (WQGs). The screening results are discussed in the following sections and items outside the screening criteria are also summarized in the Section 4 tracking table (Table 6). All water quality results are stored in the Woodfibre LNG environmental monitoring database. However, for brevity, a sub-set of the results are presented in the weekly report appendices. Results are reported for parameters with a freshwater, estuarine or marine water quality guideline for the protection of aquatic life, parameters with a discharge limit, parameters of potential concern (*i.e.*, dioxins and furans), as well as other parameters that are relevant for water quality characterization.

Canadian, Federal and BC WQGs are not specified for dioxins and furans. The general term "dioxins and furans" refers to a grouping of hundreds of individual compounds with similar chemical composition and properties. To simplify result presentation and interpretation, the results of individual compounds are converted to a total toxic equivalent (TEQ) value and are summed to produce single TEQ values for each sample by the laboratory. Consistent with the pre-construction baseline monitoring program, a lower-bound TEQ value is reported. The lower-bound TEQ is calculated assuming a concentration of zero for results reported as not detected, therefore, if individual compounds are not detected the TEQ will equal zero.

## 3.2 Summary of Reported Results

Field measurements and analytical results available at the time of reporting for samples collected during the monitoring period (August 11 – 17) and for other samples that have not been previously reported are listed below in Table 3. Analytical results not available at the time of reporting will be included in future weekly reports when testing is completed. Field measurements collected from the West Sedimentation Pond and West WWTP during the monitoring period (August 11 – 17) will be reported when the corresponding results for analytical samples are available. Testing for methylmercury, dioxins and furans typically requires approximately four weeks to complete. Results are pending for the following samples and parameters:

- SP-E-NE collected August 13 (dioxins and furans)
- WWTP-W-IN, WWTP-W-OUT, SP-W-W, and SP-W-E collected August 12 (field measurements and all analytical parameters)
- WWTP-E-IN and WWTP-E-OUT collected August 13 (dioxins and furans)

- WWTP-W-IN and WWTP-W-OUT collected August 16 (field measurements and all analytical parameters)
- WWTP-E-IN and WWTP-E-OUT collected August 17 (all analytical parameters)
- IDZ-E1 and IDZ-E2 collected August 17 (physical parameters)

**Table 3: Summary of Analytical Results Included in Weekly Discharge and Compliance Report #27**.

| Sample | Description | Sampling Date | Parameters Reported |
|---|---|---|---|
| IDZ-E1-0.5 | Howe Sound IDZ station E1; 0.5 m below surface | July 13, 2024 | Dioxins and Furans. |
| IDZ-E1-2m | Howe Sound IDZ station E1; 2 m below surface | | |
| IDZ-E1-SF | Howe Sound IDZ station E1; 2 m above the seafloor | | |
| IDZ-E2-0.5 | Howe Sound IDZ station E2; 0.5 m below surface | | |
| IDZ-E2-2m | Howe Sound IDZ station E2; 2 m below surface | | |
| IDZ-E2-SF | Howe Sound IDZ station E2; 2 m above the seafloor | | |
| SP-E-NE | East Sedimentation Pond, in-pond sample, represents effluent quality | July 16, 2024 | Dioxins and Furans. |
| SP-E-NW | East Sedimentation Pond, in-pond sample, represents influent quality | | |
| WWTP-E-IN | East WWTP influent | | |
| WWTP-E-OUT | East WWTP effluent | | |
| SP-E-OUT | East Sedimentation Pond effluent (compliance point) | July 18, 2024 | Dioxins and Furans. |
| IDZ-E1-0.5 | Howe Sound IDZ station E1; 0.5 m below surface | July 19, 2024 | Methylmercury, Dioxins and Furans. |
| IDZ-E1-2m | Howe Sound IDZ station E1; 2 m below surface | | |
| IDZ-E1-SF | Howe Sound IDZ station E1; 2 m above the seafloor | | |
| IDZ-E2-0.5 | Howe Sound IDZ station E2; 0.5 m below surface | | |
| IDZ-E2-2m | Howe Sound IDZ station E2; 2 m below surface | | |
| IDZ-E2-SF | Howe Sound IDZ station E2; 2 m above the seafloor | | |
| WQR1-0.5 | Reference site 1; 0.5 m below surface. | July 20, 2024 | Methylmercury, Dioxins and Furans. |
| WQR1-2m | Reference site 1; 2 m below surface. | | |
| WQR1-SF | Reference site 1; 2 m above the seafloor. | | |
| WQR2-0.5 | Reference site 2; 0.5 m below surface. | | |
| WQR2-2m | Reference site 2; 2 m below surface. | | |
| WQR2-SF | Reference site 2; 2 m above the seafloor. | | |
| IDZ-E1-0.5 | Howe Sound IDZ station E1; 0.5 m below surface | August 2, 2024 | Field and Physical Parameters. |
| IDZ-E1-2m | Howe Sound IDZ station E1; 2 m below surface | | |
| IDZ-E1-SF | Howe Sound IDZ station E1; 2 m above the seafloor | | |
| IDZ-E2-0.5 | Howe Sound IDZ station E2; 0.5 m below surface | | |
| IDZ-E2-2m | Howe Sound IDZ station E2; 2 m below surface | | |
| IDZ-E2-SF | Howe Sound IDZ station E2; 2 m above the seafloor | | |
| IDZ-E1-0.5 | Howe Sound IDZ station E1; 0.5 m below surface | August 9, 2024 | Field and Physical Parameters. |
| IDZ-E1-2m | Howe Sound IDZ station E1; 2 m below surface | | |
| IDZ-E1-SF | Howe Sound IDZ station E1; 2 m above the seafloor | | |
| IDZ-E2-0.5 | Howe Sound IDZ station E2; 0.5 m below surface | | |
| IDZ-E2-2m | Howe Sound IDZ station E2; 2 m below surface | | |
| IDZ-E2-SF | Howe Sound IDZ station E2; 2 m above the seafloor | | |
| WWTP-E-IN | East WWTP influent | | Methylmercury. |
| WWTP-E-OUT | East WWTP effluent | | |
| SP-E-NE | East Sedimentation Pond, in-pond sample, represents effluent quality | August 13, 2024 | Field, Physical and General Parameters, Total and Dissolved Metals, Hexavalent Chromium, PAHs, VOCs, and Methylmercury. |
| WWTP-E-IN | East WWTP influent | | |
| WWTP-E-OUT | East WWTP effluent | | |

### *3.3 East Sedimentation Pond*

The East Sedimentation Pond influent and effluent results are screened against PE-111578 discharge limits. Parameters without a discharge limit are screened against Canadian, Federal and BC WQGs for the protection of marine water aquatic life. Influent water is not discharged from site, therefore only effluent water quality is assessed for exceedances. The analytical results, daily field parameters, discharge limits and WQGs are summarized in Table B-1 and Table B-2 (analytical results) and Table B-3 (field measurements) of Appendix B. Screening results are summarized in Table 4 for parameter concentrations that exceeded a WQG.

During the monitoring period (August 11 – 17), the East Sedimentation Pond received East WWTP treated effluent each day. The sedimentation pond did not receive contact water during the monitoring period; therefore, field measurements and analytical samples at station SP-E-IN-2 were not collected. Field measurements were taken daily at the in-pond effluent quality station (SP-E-NE) during the monitoring period except on August 14 due to low water level in the pond.

Field pH ranged from 6.4 to 9.0 at SP-E-NE during the monitoring period (August 11 – 17), while dissolved oxygen ranged from 4.51 to 10.13 mg/L, and turbidity ranged from 4.74 to 9.73 NTU (Appendix B, Table B-4). The field measurement of dissolved oxygen collected at station SP-E-NE on August 11 was lower than the WQG (≥8 mg/L). Low dissolved oxygen has been observed in sedimentation pond effluent and a field investigation is planned to confirm that effluent with low dissolved oxygen concentrations will meet the WQG for dissolved oxygen within the initial dilution zone defined in PE-111578 (Table 6).

An analytical sample was collected at station SP-E-NE on August 13. Field measurements and analytical results for the August 13 in-pond sample met PE-111578 discharge limits and WQGs except for nitrate. The nitrate concentration measured at SP-E-NE (3.85 mg/L) was above the WQG (3.7 mg/L).

Dioxins and furans analytical results were available at the time of reporting for two in-pond samples collected at SP-E-NE and SP-E-NW on July 16, as well as an effluent sample collected at SP-E-OUT on July 18 (discussed in Weekly report #23). The lower bound polychlorinated dibenzodioxins/dibenzofurans (PCDD/F; dioxins and furans) toxic equivalency (TEQ) ranged from 0.018 pg/L to 0.0415 pg/L.

A methylmercury analytical result was available at the time of reporting for the SP-E-NE sample collected on August 13, with a reported concentration of 0.000111 µg/L.

**Table 4:**
**Summary of Parameters Exceeding WQGs at the In-Pond Effluent Quality Station SP-E-NE**

| Parameter | Units | WQG | N | N >WQG | Commentary |
|---|---|---|---|---|---|
| Field Dissolved Oxygen | mg/L | ≥8 | 6 | 1 | Field dissolved oxygen measured at the in-pond location SP-E-NE on August 11 (4.51 mg/L) was below the lower limit of the WQG. A field investigation is planned to confirm that effluent with low dissolved oxygen will meet the WQG within the initial dilution zone defined in PE-111578. The East Sedimentation Pond did not discharge on August 11. |
| Nitrate | mg/L | 3.7 | 1 | 1 | The nitrate concentration measured at the in-pond station SP-E-NE on August 13 (3.85 mg/L) was 1.04 times above the WQG. The East Sedimentation Pond did not discharge on August 13. |

### *3.4 East Wastewater Treatment Plant*

The East WWTP influent and effluent results are screened against the minimum discharge objectives (MDOs) which the WWTP was designed to meet. Contaminated contact water is directed to the WWTP influent, and it is expected that influent water is unlikely to meet the design MDOs. The analytical results, daily field measurements, and the design MDOs are summarized in Table C-1 through Table C-3 (analytical results) and Table C-4 (field measurements) of Appendix C. Screening results are summarized in Table for parameter concentrations that do not meet the design MDOs.

The East WWTP received contact water and recirculated East Sedimentation Pond water each day August 11 – 17 (Section 2). The influent waters were treated by the East WWTP and discharged to the East Sedimentation Pond. Field measurements were collected each day at the influent and effluent stations, WWTP-E-IN and WWTP-E-OUT, respectively. Field pH ranged from 6.8 to 7.2 at WWTP-E-IN during the monitoring period (August 11 – 17), while dissolved oxygen ranged from 5.68 to 9.22 mg/L, and turbidity ranged from 0.70 to 7.37 NTU (Appendix C, Table C-4). Field pH, dissolved oxygen, and turbidity in the East WWTP effluent (WWTP-E-OUT) ranged from pH 5.9 to 8.2, 3.50 to 6.74 mg/L, and 0 to 10.78 NTU, respectively.

Field measurements for pH did not meet the design MDOs in the August 13 – 15, and 17 WWTP-E-OUT samples collected during the monitoring period. However, all pH measurements met the sedimentation pond discharge limits for pH that are specified in PE-111578, since the WWTP is being operated to meet discharge limits. Pilot testing of the East WWTP is underway and the deviations in pH are attributed to WWTP process adjustments during the monitoring period.

Analytical samples were collected from East WWTP influent and effluent stations on August 13. Effluent quality monitored at WWTP-E-OUT achieved design MDOs for all parameters except for nitrate (4.05 mg/L), total copper (0.00309 mg/L), and total zinc (0.0125 mg/L) (Table 5).

Methylmercury analytical results were available at the time of reporting for the East WWTP samples collected on August 9 (discussed in Weekly report #26) and August 13. Methylmercury concentrations ranged from 0.000118 – 0.000174 µg/L at WWTP-E-IN, and from 0.000082 – 0.000179 µg/L at WWTP-E-OUT.

Dioxins and furans analytical results were available at the time of reporting for the WWTP influent and effluent samples collected on July 16 (discussed in Weekly report #23). The lower bound polychlorinated dibenzodioxins/dibenzofurans (PCDD/F; dioxins and furans) toxic equivalency (TEQ) was 0.00882 pg/L at WWTP-E-IN; and 0.000669 pg/L at WWTP-E-OUT.

**Table 5:**
**Summary of Parameters Outside Design Minimum Discharge Objectives (MDOs) at East WWTP Effluent Station WWTP-E-OUT.**

| Parameter | Units | MDO | N | N >MDO | Commentary |
|---|---|---|---|---|---|
| Field pH | s.u. | 7.0-8.7 | 7 | 4 | Field pH ranged from was pH 5.9 and 6.7 in effluent samples collected from August 13-15, and 17, which was below the lower design MDO. The WWTP is being operated to meet the sedimentation pond discharge limits for pH that are specified in PE-111578. |
| Total Copper | mg/L | 0.002 | 1 | 1 | The total copper concentration in the August 13 sample (0.00309 mg/L) was 1.6 times above the design MDO. |
| Total Zinc | mg/L | 0.01 | 1 | 1 | The total zinc concentration in the August 13 sample (0.0125 mg/L) was 1.3 times above the design MDO. |
| Nitrate | mg N/L | 3.7 | 1 | 1 | The nitrate concentration in the August 13 sample (4.05 mg/L) was 1.1 times above the design MDO. Although a design MDO is specified, the WWTP was not designed to treat nitrate. |

MDO = Minimum discharge objective which the East WWTP was designed to meet.
N = number of samples.
Non-detect results are screened using the detection limit value.

### *3.5 Non-Contact Water Diversion Ditch Outlets*

Water quality results were not available for the non-contact water diversion ditch outlets at the time of reporting. There are no outstanding results for diversion ditch stations.

### *3.6 Freshwater and Estuarine Water Receiving Environment*

Water quality results were not available for the freshwater and estuarine water receiving environment stations at the time of reporting.

### *3.7 Marine Water Receiving Environment*

Marine water receiving environment samples are screened against Canadian, Federal and BC WQGs for the protection of marine water aquatic life. Parameter concentrations above a WQG value, but within the range of values observed in the baseline monitoring program are considered

to represent the natural condition of the water and are not flagged as exceedances. The analytical results, field parameters and WQGs are summarized in Appendix D.

Analytical results were available for August 2 and 9 marine receiving environment samples (discussed in Weekly Reports #24 and #25, respectively) and collected at stations IDZ-E1 and IDZ-E2 at 0.5 and 2 m below the water surface and 2 m above the seafloor. The August 2 and 9 samples were tested for field and physical parameters. Field measurements for samples collected August 2 are limited to field pH and turbidity due to a field probe malfunction. Field salinity values for IDZ-E1 and IDZ-E2 samples collected on August 9 were not available due to a field probe configuration error. Field and physical parameter concentrations met WQGs.

Dioxins and furans analytical results were available at the time of reporting for the July 13, 19 and 20 samples discussed in Weekly Reports #22 and #23 for marine receiving environment stations IDZ-E1 and IDZ-E2 (July 13 and 19) as well as reference stations WQR1 and WQR2 (July 20). The water column at each station was sampled at 0.5 and 2 m below the water surface and 2 m above the seafloor. The laboratory reported the dioxin and furan sample bottles for the July 19 IDZ-E1 sample from 2 m below the surface were damaged during trans-shipment between testing facilities while the sample was under laboratory custody, therefore results for this sample are not available and further investigation is underway (Table 6 and Appendix D Table D-6).

For the July 13 samples, the lower bound PCDD/F TEQ concentrations ranged from 0.000574 to 0.0148 pg/L at station IDZ-E1 and from 0 to 0.0374 pg/L at station IDZ-E2. The lower bound PCDD/F TEQ concentrations for the July 19 samples ranged from 0 to 0.0000903 pg/L at station IDZ-E1 and 0 to 0.0111 pg/L at station IDZ-E2. For the July 20 samples from marine reference stations, the lower bound PCDD/F TEQ concentrations ranged from 0.0216 to 0.355 pg/L at station WQR1 and from 0 to 0.0943 pg/L at station WQR2.

Methylmercury analytical results were available at the time of reporting for water quality samples discussed in Weekly Report #23 and collected at stations IDZ-E1 and IDZ-E2 (July 19) and WQR1 and WQR2 (July 20). Samples were collected at 0.5 and 2 m below the water surface and 2 m above the seafloor. Methylmercury concentrations for the July 19 samples ranged from <0.000020 to 0.000023 µg/L at IDZ-E1 and from <0.000020 to 0.000021 µg/L at IDZ-E2. Methylmercury concentrations for the July 20 samples collected from marine reference stations WQR1 ranged from <0.000020 to 0.000022 µg/L. The methylmercury concentration was 0.000021 µg/L in the sample from WQR2 at 0.5 m below surface while the analytical detection limit was raised for samples collected from WQR2 at 2 m below surface and 2 m above the seafloor. An investigation conducted by the laboratory confirmed the detection limits were raised due to analytical interferences in these samples. This item is tracked in Table 6. The detectable methylmercury

values observed in the marine water samples are within the concentrations ranges observed in the pre-construction baseline monitoring program.

# 4. Quality Control

This section presents the results of the quality control (QC) evaluation for the PE-111578 weekly report (Table 6). The evaluation includes a review of field and lab QC, completeness of the weekly report (*e.g.*, pending data), completeness of the monitoring program, confirmation of recordkeeping, evaluation of compliance and review of water management activities. Items flagged for follow-up in Section 3 are also tracked in Table 6. Any items flagged for follow-up in Table 6 are carried forward to future reports until they are closed.

## Table 6: Weekly Report QC Evaluations and Ongoing Items

| QC Procedure | Observation | Investigation/Resolution |
|---|---|---|
| **Reporting Period (August 11 – 17, Report #27)** | | |
| **Monitoring Program Evaluation** | PE-111578 contact water, non-contact water and initial dilution zone monitoring stations have not been fully established. | The PE-111578 authorized works were under construction during the reporting period. Monitoring stations are progressively established as water management infrastructure is completed. The East Sedimentation Pond and East WWTP are completed, and pilot testing of the East WWTP is ongoing. The East Sedimentation Pond was commissioned for discharge on April 15. The West Sedimentation Pond is complete, except the outfall structure and West WWTP is undergoing pilot testing. The West Sedimentation Pond is not commissioned for discharge. The non-contact water diversion ditch that discharges at station OUT-06 has been commissioned, and stations for pre-existing outfalls OUT-01, OUT-02, and OUT-11 have also been established. |
| **Pending Data** | Analytical results for samples collected August 12, 16, and 17 and dioxins and furans results for samples collected August 13 were not reported. | Analytical results for samples collected August 12, 16, and 17 and dioxin and furan results for samples collected August 13 were not complete at the time of Report #27 preparation. Testing of dioxins and furans typically requires up to 4 weeks to complete. The pending results will be included in future weekly reports when available. This item remains open. |
| **Data QA/QC** | Detection limits for methylmercury were raised above the typically reported detection limit for marine reference station samples collected July 20 | Analytical detection limits for methylmercury were raised above the typically reported detection limit (<0.00002 µg/L) in samples collected from 2 m below surface (<0.00008 µg/L) and 2 m above the seafloor (<0.00016 µg/L) at marine reference station WQR2 on July 20. An investigation with the laboratory was initiated and reanalysis confirmed sample matrix effects that required sample dilution to achieve a passing matrix spike result that met data quality objectives for completion of the analysis. This item is closed. |
| **Monitoring Program Evaluation** | Incomplete monitoring at East IDZ stations. | Field measurements for samples collected August 2 at IDZ-E1 and IDZ-E2 are limited to field pH and turbidity due to a field probe malfunction. Field salinity values for IDZ-E1 and IDZ-E2 samples collected on August 9 were not available due to a field probe configuration error. Follow-up with site staff was conducted and the field probe has been exchanged to ensure proper configuration and functionality. This item is closed. |
| **Sample Integrity** | Dioxin and furans could not be tested in the July 19 IDZ-E1 sample from 2 m below surface. | The laboratory reports that the sample bottles for dioxin and furans were broken during trans-shipment between testing facilities while the sample was under laboratory custody, therefore results for this sample are not available. Root cause investigation is underway. This item remains open. |
| **Ongoing Items from Previous Weekly Reports** | | |
| **Report #21: WWTP Performance Evaluation** | Dissolved oxygen is frequently outside the treatment MDO | Previous weekly reports have indicated there was a design MDO for dissolved oxygen, this was incorrect, rather the marine WQG for dissolved oxygen water was evaluated as an MDO. This has been clarified in Appendix C, Table C-1 beginning with Report #24. However, low dissolved oxygen has been observed in sedimentation pond effluent. It is speculated warm weather conditions led to the depletion of oxygen in contact water stored in baker tanks and in the East Sedimentation Pond. As of August 10, a field investigation is planned to be conducted during the next discharge event to confirm that East Sedimentation Pond effluent with low dissolved oxygen concentrations will mix with Howe Sound at the top of the water column and meet the WQG for dissolved oxygen within the initial dilution zone defined in PE-111578. This item remains open. |
| **Report #22: Pending Data** | Analytical results for samples collected July 9 and July 13 were not reported. | Available analytical results for marine receiving environment samples collected July 9 and 13 are discussed in Section 3.7 of Report #24. Dioxin and furans results for samples collected July 13 are discussed un Section 3.7 of Report #27. This item is closed. |
| **Report #23: Pending Data** | Analytical results for samples collected July 17, 19, and 20 were not reported. | Available analytical results for marine receiving environment samples collected July 17 are discussed in Section 3.7 of Report #24. Analytical results for samples collected July 19 and 20 are discussed in Section 3.7 of Report #26. Methyl mercury, dioxins and furans results are discussed in Section 3.7 or Report #27. This item is closed. |
| **Report #23: Pending Data** | Methyl mercury, dioxin and furan results for samples collected July 16 and July 18 were not reported. | The methylmercury result for July 18 SP-E-OUT sample is discussed in Section 3.3 of Report #24. Dioxins and furans results for samples collected July 16 and July 18 are discussed in Sections 3.3 and 3.4 of Report #27. This item is closed. |
| **Report #24: Pending Data** | Methyl mercury, dioxin and furan results for samples collected July 24, 26, and 27 were not reported. | Methylmercury results for samples collected July 26 and 27 are discussed in Section 3.4 of Report #25. Methylmercury results for samples collected July 24 are discussed in Sections 3.3 and 3.4 of Report #26. Dioxin and furan results for samples collected July 24, 26, and 27 were not complete at the time of Report #27 preparation. Testing of these parameters typically requires up to 4 weeks to complete. The pending results will be included in future weekly reports when available. This item remains open. |
| **Report #25: Pending Data** | Analytical results for samples collected August 2 and 3 were not reported. | Available analytical results for IDZ-E1 and IDZ-E2 samples collected August 2 are discussed in Section 3.7 of Report #27 and results for samples collected on August 3 are discussed in Sections 3.3 and 3.4 of Report #26. This item is closed. |
| **Report #25: Pending Data** | Methyl mercury, dioxin and furan results for samples collected July 31 and August 2 were not reported. | Methylmercury results for samples collected August 2 are discussed in Section 3.4 of Report #26. Dioxin and furan results for samples collected July 31 were not complete at the time of Report #27 preparation. Testing of these parameters typically requires up to 4 weeks to complete. The pending results will be included in future weekly reports when available. This item remains open. |
| **Report #26: Pending Data** | Analytical results for samples collected August 9 at IDZ-E1, IDZ-E2 WWTP-E-IN and WWTP-E-OUT were not reported. | Analytical results for IDZ-E1 and IDZ-E2 samples collected August 9 are discussed in Section 3.7 of Report #27. Methylmercury results for WWTP-E-IN and WWTP-E-OUT samples collected August 9 are discussed in Section 3.4 of Report #27. This item is closed. |
| **Report #26: Data Review** | Elevated TSS at SP-E-NW in the August 3 sample. | This item was initiated in Report #25. TSS was elevated (68.9 mg/L) in the July 28 SP-E-NE sample and was suspected to be erroneous given the low field turbidity (6.38 NTU) measured in the sample, and low level of TSS (< 3 mg/L) measured at the other in-pond station (SP-E-NW). As noted in Report #26, TSS was elevated (35.1 mg/L) in the August 3 SP-E-NW sample and was also suspected to be erroneous given the low field turbidity (8.08 NTU) measured in the sample. Investigation (*i.e.* reanalysis) with the laboratory was completed and reanalysis confirmed the originally reported TSS values. This item is closed. |

**Notes**:

Result QA/QC screening includes the evaluation of field and lab QC results, comparison of total and dissolved metal results and review for modified detection limits.
Pending data are outstanding results from monitoring samples reported in the current or previous weekly reports.
Monitoring program evaluation is an assessment of the completeness of the monitoring program compared to PE-111578 specified or implied requirements.
WWTP performance evaluation is an assessment of WWTP effluent quality compared to design MDO's and WQG (for dissolved oxygen and total vanadium only).
Data review under QC Procedure indicates an evaluation of data trends or inter-parameter relationships that suggest a test result may not be representative of water quality at the time of monitoring.

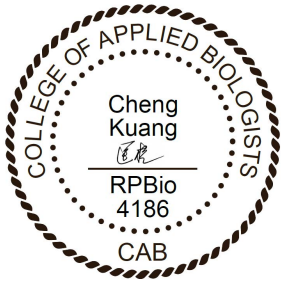
# 5. Closure

This weekly report is a desktop review by Lorax of the PE-111578 discharge and compliance monitoring program records, reports and results provided by Woodfibre LNG and prime contractor McDermott International and their sub-contractors. The records reviewed and analyzed by Lorax include ALS Environmental laboratory test reports and site reports (from Roe Environmental, LB LNG, McDermott and Woodfibre LNG). Verbal or electronic communications between Lorax, and Roe Environmental, LB LNG, McDermott, and Woodfibre LNG staff are conducted as needed to confirm the information presented in this report.

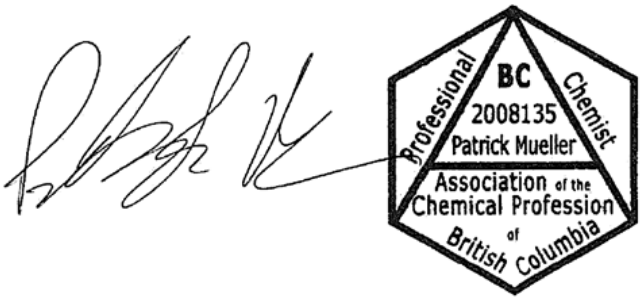
Regards,

**LORAX ENVIRONMENTAL SERVICES LTD.**

**Holly Pelletier, B.Sc., GIT.**
**Environmental Geoscientist**




**Cheng Kuang, M.Sc., RPBio.**
**Environmental Scientist**




**Patrick Mueller, B.Sc., P.Chem.**
**Environmental Chemist**


## LEGEND

- Freshwater Monitoring Station
- Marine Water Monitoring Station
- Certified Project Area
- Watercourse
- Non-Contact Diversion Ditch
- Outfall
- Culvert Pipe
- Clean Water Diversion Discharge Station
- Sediment Pond Monitoring Stations (Water Quality)
- Wastewater Treatment Plant (WWTP)

| | |
|---|---|
| DATE SAVED: | Aug 23, 2024 |
| DRAWN BY: | DM |
| REVIEWED: | PM |
| VERSION: | 1 |

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

**1:6,000**

0 50 100 150 Metres

CLIENT: Woodfibre LNG

LORAX ENVIRONMENTAL

PROJECT:

# Woodfibre LNG Project Construction Phase

TITLE: Completed or Under Construction Water Management Facilities and Established PE-111578 Monitoring Stations (August 17, 2024)

PROJECT #: A633-7

FIGURE: 1

P:\@Drafting\Woodfibre\Drafting Figures\APRX\WLNG Construction Phase 2024\WLNG Construction Phase 2024 - Weekly Reporting.aprx Figure 1 Monitoring and Compliance Locations

# *Appendix A: East and West Catchment Photographs*

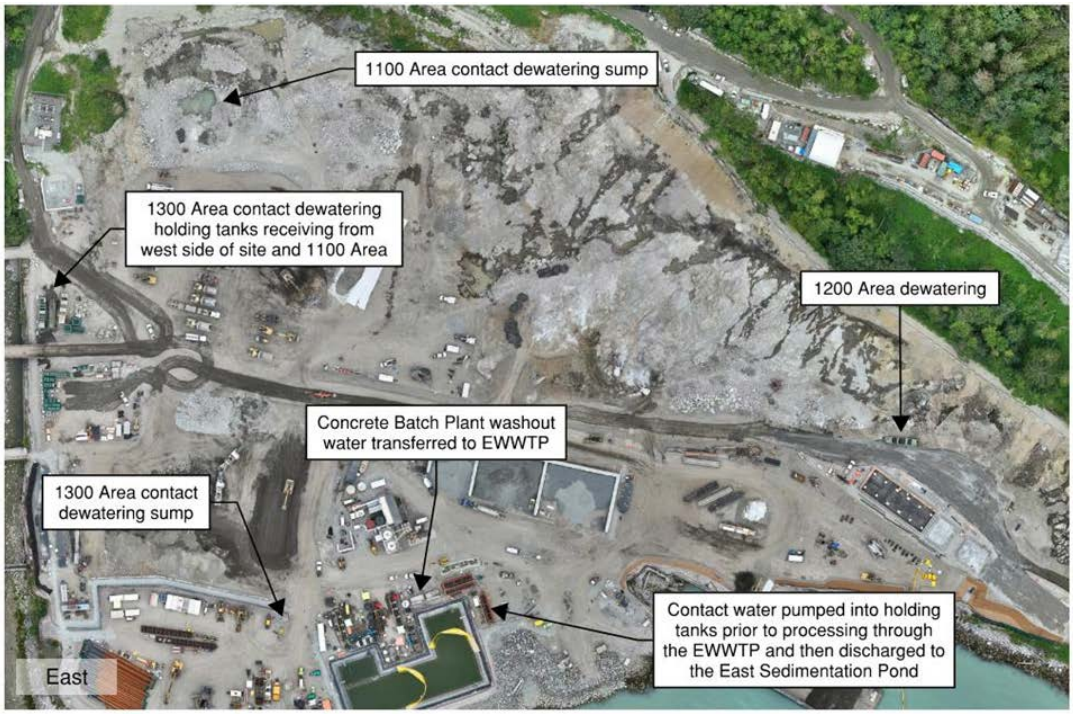



**Figure 2: East Catchment dewatering areas. Potentially contaminated contact waters from the 1100 excavation and small amounts of concrete wash water were directed to the East WWTP for the August 11 – 17, 2024 monitoring period.**

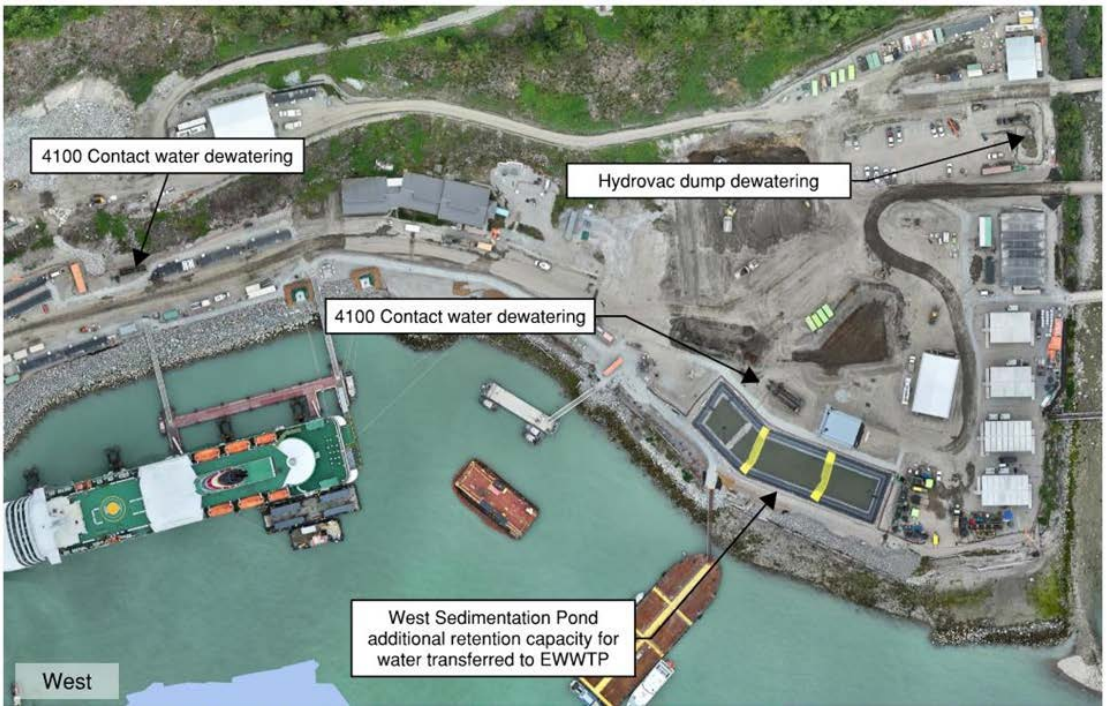



**Figure 3: West Catchment dewatering areas. Dewatering of the West Catchment did not occur during the August 11 – 17, 2024 monitoring period.**

**Figure 4: Aerial view of the East Sedimentation Pond showing the placement of two sediment curtains (August 16, 2024). The East WWTP is located on the left side of the pond.**

**Figure 5: Aerial view of the West Sedimentation Pond showing the placement of two sediment curtains (August 16, 2024). The West WWTP is located on the right side of the pond.**

# *Appendix B: East Sedimentation Pond Results*

## Table B-1: Summary of East Sedimentation Pond Water Quality Results Received at the Time of Reporting.

| Parameter | Unit | Lowest Applicable Guideline [1] | | PE-111578 Discharge Limit | East Sedimentation Pond |
|---|---|---|---|---|---|
| | | | | | In-Pond at Effluent Location |
| | | | | | SP-E-NE |
| | | | | | VA24C0295-003 |
| | | Long Term | Short Term | | 8/13/24 15:25 |
| **General Parameters** | | | | | |
| pH - Field | pH units | - [2] | - | 5.5 - 9.0 | 7.0 |
| Conductivity - Field | µS/cm | - | - | - | 1350 |
| Temperature - Field | ℃ | - | - | - | 22.3 |
| Salinity - Field | ppt | - | - | - | 0.71 |
| Turbidity - Field | NTU | - | - | - | 4.74 |
| TSS | mg/L | - | - | 25 | 11.8 |
| Dissolved Oxygen - Field | mg/L | >=8 | - | - | 8.43 |
| **Anions and Nutrients** | | | | | |
| Sulphate | mg/L | - | - | - | 65.7 |
| Chloride | mg/L | - | - | - | 112 |
| Fluoride | mg/L | - | 1.5 | - | 0.27 |
| Ammonia ($N\text{-}NH_3$) | mg/L | Variable [3] | Variable [3] | - | 0.0073 |
| Nitrite ($N\text{-}NO_2$) | mg/L | - | - | - | 0.008 |
| Nitrate ($N\text{-}NO_3$) | mg/L | 3.7 | 339 | - | ***3.85*** |
| **Total Metals** | | | | | |
| Aluminum, total (T-Al) | mg/L | - | - | - | 0.13 |
| Antimony, total (T-Sb) | mg/L | - | 0.27 [4] | - | 0.00177 |
| Arsenic, total (T-As) | mg/L | 0.0125 | 0.0125 | - | 0.00186 |
| Barium, total (T-Ba) | mg/L | - | - | - | 0.00986 |
| Beryllium, total (T-Be) | mg/L | 0.1 | - | - | <0.000100 |
| Boron, total (T-B) | mg/L | 1.2 | - | - | 0.318 |
| Cadmium, total (T-Cd) | mg/L | 0.00012 | - | - | <0.0000300 |
| Chromium, total (T-Cr) | mg/L | - | - | - | 0.00062 |
| Cobalt, total (T-Co) | mg/L | - | - | - | <0.00010 |
| Copper, total (T-Cu) | mg/L | - [2] | - [2] | 0.0043 | 0.00228 |
| Iron, total (T-Fe) | mg/L | - | - | - | 0.085 |
| Lead, total (T-Pb) | mg/L | - [2] | - [2] | 0.0035 | 0.000419 |
| Manganese, total (T-Mn) | mg/L | - | - | - | 0.00721 |
| Mercury, total (T-Hg) | mg/L | 0.000016 [5] | - | - | <0.0000050 |
| Molybdenum, total (T-Mo) | mg/L | - | - | - | 0.0867 |
| Nickel, total (T-Ni) | mg/L | 0.0083 | - | - | <0.00050 |
| Selenium, total (T-Se) | mg/L | 0.002 | - | - | 0.000118 |
| Silver, total (T-Ag) | mg/L | 0.0015 | 0.003 | - | <0.000010 |
| Thallium, total (T-Tl) | mg/L | - | - | - | 0.000025 |
| Uranium, total (T-U) | mg/L | - | - | - | 0.0491 |
| Vanadium, total (T-V) | mg/L | - [2] | - | 0.0081 | 0.00481 |
| Zinc, total (T-Zn) | mg/L | - [2] | - [2] | 0.0133 | 0.0115 |
| Hexavalent Chromium, total | mg/L | 0.0015 | - | - | <0.00050 |
| **Dissolved Metals** | | | | | |
| Cadmium, dissolved (D-Cd) | mg/L | - | - | - | <0.0000300 |
| Copper, dissolved (D-Cu) | mg/L | - | - | - | 0.00145 |
| Iron, dissolved (D-Fe) | mg/L | - | - | - | 0.011 |
| Lead, dissolved (D-Pb) | mg/L | - | - | - | 0.000088 |
| Manganese, dissolved (D-Mn) | mg/L | - | - | - | 0.00442 |
| Nickel, dissolved (D-Ni) | mg/L | - | - | - | <0.00050 |
| Strontium, dissolved (D-Sr) | mg/L | - | - | - | 0.169 |
| Vanadium, dissolved (D-V) | mg/L | - | - | - | 0.00108 |
| Zinc, dissolved (D-Zn) | mg/L | - | - | - | 0.0074 |
| **Polycyclic Aromatic Hydrocarbons (PAHs)** | | | | | |
| Acenaphthene | mg/L | 0.006 | - | - | <0.000010 |
| Acridine | mg/L | - | - | - | <0.000010 |
| Anthracene | mg/L | - | - | - | <0.000010 |
| Benz(a)anthracene | mg/L | - | - | - | <0.000010 |
| Benzo(a)pyrene | mg/L | 0.00001 | - | - | <0.0000050 |
| Chrysene | mg/L | 0.0001 | - | - | <0.000010 |
| Fluoranthene | mg/L | - | - | - | <0.000010 |
| Fluorene | mg/L | 0.012 | - | - | <0.000010 |
| 1-methylnaphthalene | mg/L | 0.001 | - | - | <0.000010 |
| 2-methylnaphthalene | mg/L | 0.001 | - | - | <0.000010 |
| Naphthalene | mg/L | 0.001 | - | - | <0.000050 |
| Phenanthrene | mg/L | - | - | - | <0.000020 |
| Pyrene | mg/L | - | - | - | <0.000010 |
| Quinoline | mg/L | - | - | - | <0.000050 |
| **Volatile Organic Compounds (VOCs)** | | | | | |
| Benzene | mg/L | 0.11 | - | - | <0.00050 |
| Ethylbenzene | mg/L | 0.25 | - | - | <0.00050 |
| Methyl-tert-butyl-ether | mg/L | 5 | 0.44 | - | <0.00050 |
| Styrene | mg/L | - | - | - | <0.00050 |
| Toluene | mg/L | 0.215 | - | - | <0.00040 |
| Total Xylenes | mg/L | - | - | - | <0.00050 |
| Chlorobenzene | mg/L | 0.025 | - | - | <0.00050 |
| 1,2-Dichlorobenzene | mg/L | 0.042 | - | - | <0.00050 |

**Notes:** Results ***underlined in bold italics*** exceed the applicable long-term water quality guideline for the protection of marine water aquatic life.
Shaded results exceed the applicable short-term water quality guideline for the protection of marine water aquatic life.
Results in orange text exceeded the PE-11578 East Sedimentation Pond Discharge Limit.
All SP-E-OUT samples collected from May 27 to the time of writing were taken from the sample port which is located near the inlet end of the temporary discharge hose.
The East Sedimentation Pond did not discharge during the monitoring period (August 4 – 10).
[1] The lowest applicable guidelines from approved or working BC WQGs, Canadian (CCME) WQGs and Federal WQGs.
[2] The WQG was not evaluated for parameters with discharge limits.
[3] The BC WQG for total ammonia is salinity, pH and temperature dependent; see Tables 26E and 26F in BC WQG guidance document.
[4] The working BC WQG for trivalent antimony [SB(III)] is 0.27 mg/L and is applied to total antimony results.
[5] When MeHg ⩽ 0.5% of total Hg, the BC WQG = 0.00002 mg/L. The Canadian WQG = 0.000016 mg/L.

## Table B-2: Summary of East Sedimentation Pond Water Quality Results for Methylmercury Received at the Time of Reporting.

| Parameter | Unit | East Sedimentation Pond |
|---|---|---|
| | | In-Pond at Effluent Location |
| | | SP-E-NE |
| | | VA24C0295-003 |
| | | 08/13/2024 |
| **Methylmercury** | **µg/L** | 0.000111 |

## Table B-3: Summary of East Sedimentation Pond Water Quality Results for Dioxins and Furans Received at the Time of Reporting.

| Parameter | Unit | East Sedimentation Pond | | |
|---|---|---|---|---|
| | | In-Pond at Effluent Location | In-Pond at Influent Location | Effluent |
| | | SP-E-NE | SP-E-NW | SP-E-OUT |
| | | L2756677-1 | L2756677-4 | L2756699-1 |
| | | 7/16/2024 | 7/16/2024 | 7/18/2024 |
| **Lower Bound PCDD/F TEQ** | **pg/L** | 0.0180 | 0.0415 | 0.0359 |

**Notes:**
PCDD = polychlorinated dibenzodioxins (dioxins)
PCDF = polychlorinated dibenzofurans (furans)
TEQ = toxic equivalency
Lower bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned a value of zero (0).

## Table B-4: Summary of East Sedimentation Pond Daily Field Parameters August 11 – 17.

| Parameter | | Temperature | Dissolved Oxygen (DO) | Salinity | Turbidity | pH | Conductivity | Visibility of Sheen | Total Daily Discharge from the East Sedimentation Pond to Howe Sound |
|---|---|---|---|---|---|---|---|---|---|
| **Unit** | | **°C** | **mg/L** | **ppt** | **NTU** | **s.u.** | **µS/cm** | | **$m^3$** |
| **PE-111578 Discharge Limit** | | - | - | - | - | 5.5 - 9.0 | - | - | -[3] |
| **Lowest Applicable Guideline [1]** | | - | >=8 | - | - | -[2] | - | - | - |
| **Station ID [4]** | **Date** | | | | | | | | |
| SP-E-NE | 8/11/2024 16:50 | 26.0 | ***4.51*** | 0.70 | 5.39 | 6.4 | 1426 | No | 0 |
| SP-E-NE | 8/12/2024 17:39 | 22.7 | 8.40 | 0.55 | 6.83 | 6.7 | 1066 | No | 0 |
| SP-E-NE | 8/13/2024 15:25 | 22.3 | 8.43 | 0.71 | 4.74 | 7.0 | 1350 | No | 0 |
| -[5] | 8/14/2024 | - | - | - | - | - | - | - | 0 |
| SP-E-NE | 8/15/2024 14:20 | 24.0 | 7.69 | 0.73 | 5.72 | 7.1 | 1429 | No | 0 |
| SP-E-NE | 8/16/2024 13:08 | 22.6 | 10.13 | 0.03 | 7.24 | 9.0 | 1200 | No | 0 |
| SP-E-NE | 8/17/2024 15:42 | 23.0 | 8.51 | 0.73 | 9.73 | 6.9 | 1483 | No | 0 |

**Notes:**
Results ***underlined in bold italics*** exceed the applicable long-term water quality guideline for the protection of marine water aquatic life.
Shaded results exceed the applicable short-term water quality guideline for the protection of marine water aquatic life.
Results in orange text exceeded the PE-11578 East Sedimentation Pond Discharge Limit.
All SP-E-OUT samples collected from May 27 to the time of writing were taken from the sample port which is located near the inlet end of the temporary discharge hose.
The East Sedimentation Pond did not discharge during the monitoring period (August 4 – 10).
[1] The lowest applicable guidelines from approved or working BC WQGs, Canadian (CCME) WQGs and Federal WQGs.
[2] The WQG was not evaluated for parameters with discharge limits.
[3] The annual average authorized discharge rate from the East Sedimentation Pond is 650 $m^3$/day. As noted in PE-111578 Condition 2.1.4, the actual discharge rate may deviate from the annual average rate due to annual variations in precipitation amounts within the catchment area. Therefore, the annual average authorized discharge rate is not evaluated as a discharge limit.
[4] The sedimentation pond did not receive non-contaminated contact water influent August 11 – August 17, therefore daily measurements for station SP-E-IN-2 were not collected. The East Sedimentation Pond did not discharge August 11 – August 17, therefore daily measurements for station SP-E-OUT were not collected. In-Pond stations SP-E-NW and SP-E-NE may be monitored in place of stations SP-E-IN-2 and SP-E-OUT, respectively when there is no influent to, or discharge from the East Sedimentation Pond at the time of monitoring.
[5] Water levels in the East Sedimentation Pond were too low for safe access at the time of monitoring on August 14; therefore, field parameters were not collected. There was no non-contaminated contact water influent to, or discharge of effluent from the East Sedimentation Pond on August 14.

# *Appendix C: East Wastewater Treatment Plant Results*

## Table C-1: Summary of East Wastewater Treatment Plant Water Quality Results Received at the Time of Reporting.

| Parameter | Unit | Minimum Discharge Objective [1] | East WWTP | |
|---|---|---|---|---|
| | | | Influent | Effluent |
| | | | WWTP-E-IN | WWTP-E-OUT |
| | | | VA24C0295-002 | VA24C0295-001 |
| | | | 8/13/2024 15:19 | 8/13/2024 14:10 |
| **General Parameters** | | | | |
| pH - Field | pH units | 7.0 - 8.7 | 7.2 | ***6.7*** |
| Conductivity - Field | µS/cm | - | 212 | 1343 |
| Temperature - Field | °C | - | 22.4 | 22 |
| Salinity - Field | ppt | - | 0.02 | 0.72 |
| Turbidity - Field | NTU | - | 7.37 | 3.75 |
| TSS | mg/L | - | 7.6 | 8.2 |
| Dissolved Oxygen - Field | mg/L | >=8 [2] | 8.81 | ***5.78*** |
| **Anions and Nutrients** | | | | |
| Sulphate | mg/L | - | 66.4 | 66.8 |
| Chloride | mg/L | - | 114 | 114 |
| Fluoride | mg/L | - | 0.273 | 0.256 |
| Ammonia (N-$NH_3$) | mg/L | Variable | 0.0584 | 0.0122 |
| Nitrite (N-$NO_2$) | mg/L | - | 0.0147 | <0.0050 |
| Nitrate (N-$NO_3$) | mg/L | 3.7 | ***4.08*** | ***4.05*** |
| **Total Metals** | | | | |
| Aluminum, total (T-Al) | mg/L | - | 0.102 | 0.0373 |
| Antimony, total (T-Sb) | mg/L | - | 0.00171 | 0.00176 |
| Arsenic, total (T-As) | mg/L | 0.0125 | 0.00168 | 0.00176 |
| Barium, total (T-Ba) | mg/L | - | 0.00936 | 0.00915 |
| Beryllium, total (T-Be) | mg/L | 0.1 | <0.000100 | <0.000100 |
| Boron, total (T-B) | mg/L | 1.2 | 0.322 | 0.306 |
| Cadmium, total (T-Cd) | mg/L | 0.00012 | <0.0000300 | <0.0000200 |
| Chromium, total (T-Cr) | mg/L | - | <0.00050 | <0.00050 |
| Cobalt, total (T-Co) | mg/L | - | 0.0001 | <0.00010 |
| Copper, total (T-Cu) | mg/L | 0.002 | ***0.00431*** | ***0.00309*** |
| Iron, total (T-Fe) | mg/L | - | 0.629 | 0.038 |
| Lead, total (T-Pb) | mg/L | 0.002 | 0.000358 | 0.000184 |
| Manganese, total (T-Mn) | mg/L | - | 0.0143 | 0.00184 |
| Mercury, total (T-Hg) | mg/L | 0.000016 | <0.0000050 | <0.0000050 |
| Molybdenum, total (T-Mo) | mg/L | - | 0.0875 | 0.0828 |
| Nickel, total (T-Ni) | mg/L | 0.0083 | 0.00066 | <0.00050 |
| Selenium, total (T-Se) | mg/L | 0.002 | 0.00023 | 0.000214 |
| Silver, total (T-Ag) | mg/L | 0.0015 | <0.000010 | <0.000010 |
| Thallium, total (T-Tl) | mg/L | - | 0.000021 | 0.000024 |
| Uranium, total (T-U) | mg/L | - | 0.0432 | 0.0416 |
| Vanadium, total (T-V) | mg/L | 0.005 | 0.00473 | 0.005 |
| Zinc, total (T-Zn) | mg/L | 0.01 | ***0.0228*** | ***0.0125*** |
| Hexavalent Chromium, total | mg/L | 0.0015 | <0.00050 | <0.00050 |
| **Dissolved Metals** | | | | |
| Cadmium, dissolved (D-Cd) | mg/L | - | <0.0000250 | <0.0000200 |
| Copper, dissolved (D-Cu) | mg/L | - | 0.00228 | 0.00184 |
| Iron, dissolved (D-Fe) | mg/L | - | 0.299 | 0.026 |
| Lead, dissolved (D-Pb) | mg/L | - | 0.000154 | 0.000103 |
| Manganese, dissolved (D-Mn) | mg/L | - | 0.0143 | 0.00229 |
| Nickel, dissolved (D-Ni) | mg/L | - | 0.00076 | <0.00050 |
| Strontium, dissolved (D-Sr) | mg/L | - | 0.169 | 0.183 |
| Vanadium, dissolved (D-V) | mg/L | - | 0.00151 | 0.00096 |
| Zinc, dissolved (D-Zn) | mg/L | - | 0.0134 | 0.0083 |
| **Polycyclic Aromatic Hydrocarbons (PAHs)** | | | | |
| Acenaphthene | mg/L | 0.006 | <0.000010 | <0.000010 |
| Acridine | mg/L | - | <0.000010 | <0.000010 |
| Anthracene | mg/L | - | <0.000010 | <0.000010 |
| Benz(a)anthracene | mg/L | - | <0.000010 | <0.000010 |
| Benzo(a)pyrene | mg/L | 0.00001 | <0.0000050 | <0.0000050 |
| Chrysene | mg/L | 0.0001 | <0.000010 | <0.000010 |
| Fluoranthene | mg/L | - | <0.000010 | <0.000010 |
| Fluorene | mg/L | 0.012 | <0.000010 | <0.000010 |
| 1-methylnaphthalene | mg/L | 0.001 | <0.000010 | <0.000010 |
| 2-methylnaphthalene | mg/L | 0.001 | <0.000010 | <0.000010 |
| Naphthalene | mg/L | 0.001 | <0.000050 | <0.000050 |
| Phenanthrene | mg/L | - | <0.000020 | <0.000020 |
| Pyrene | mg/L | - | <0.000010 | <0.000010 |
| Quinoline | mg/L | - | <0.000050 | <0.000050 |
| **Volatile Organic Compounds (VOCs)** | | | | |
| Benzene | mg/L | 0.11 | <0.00050 | <0.00050 |
| Ethylbenzene | mg/L | 0.25 | <0.00050 | <0.00050 |
| Methyl-tert-butyl-ether | mg/L | 5 | <0.00050 | <0.00050 |
| Styrene | mg/L | - | <0.00050 | <0.00050 |
| Toluene | mg/L | 0.215 | <0.00040 | <0.00040 |
| Total Xylenes | mg/L | - | <0.00050 | <0.00050 |
| Chlorobenzene | mg/L | 0.025 | <0.00050 | <0.00050 |
| 1,2-Dichlorobenzene | mg/L | 0.042 | <0.00050 | <0.00050 |

**Notes:**
[1] Design minimum discharge objectives (MDOs) for WWTP effluent that are listed in the WWTP design report.
[2] A design MDO for dissolved oxygen was not specified in the WWTP design report. The water quality guideline is provided in place of an MDO for reference purposes only.
Results ***underlined in bold italics*** exceed the applicable minimum discharge objective.

## Table C-2: Summary of East Wastewater Treatment Plant Water Quality Results for Methylmercury Received at the Time of Reporting.

| Parameter | Unit | East WWTP | | | |
|---|---|---|---|---|---|
| | | Influent | Effluent | Influent | Effluent |
| | | WWTP-E-IN | WWTP-E-OUT | WWTP-E-IN | WWTP-E-OUT |
| | | VA24C0038-001 | VA24C0038-002 | VA24C0295-002 | VA24C0295-001 |
| | | 08/09/2024 | 08/09/2024 | 08/13/2024 | 08/13/2024 |
| **Methylmercury** | **µg/L** | 0.000174 | 0.000179 | 0.000118 | 0.000082 |

## Table C-3: Summary of East Wastewater Treatment Plant Water Quality Results for Dioxins and Furans Received at the Time of Reporting.

| Parameter | Unit | East WWTP | |
|---|---|---|---|
| | | Influent | Effluent |
| | | WWTP-E-IN | WWTP-E-OUT |
| | | L2756677-3 | L2756677-2 |
| | | 7/16/2024 | 7/16/2024 |
| **Lower Bound PCDD/F TEQ** | **pg/L** | 0.00882 | 0.000669 |

**Notes:**
PCDD = polychlorinated dibenzodioxins (dioxins)
PCDF = polychlorinated dibenzofurans (furans)
TEQ = toxic equivalency
Lower bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned a value of zero (0).

## Table C-4: Summary of East Wastewater Treatment Plant Daily Field Parameters August 11 – 17.

| **Parameter** | | **Temperature** | **Dissolved Oxygen (DO)** | **Salinity** | **Turbidity** | **pH** | **Conductivity** | **Visibility of Sheen** | **Total Daily Discharge from the East WWTP** |
|---|---|---|---|---|---|---|---|---|---|
| **Unit** | | **°C** | **mg/L** | **ppt** | **NTU** | **s.u.** | **µS/cm** | | **$m^3$** |
| **PE-111578 Discharge Limit [1]** | | - | - | - | - | - | - | - | 1,100 |
| **Minimum Discharge Objective [2]** | | - | >=8 [3] | - | - | 7.0 - 8.7 | - | - | - |
| **Station ID** | **Date** | | | | | | | | |
| WWTP-E-IN | 8/11/2024 16:53 | 25.4 | 9.22 | 0.72 | 6.50 | ***6.9*** | 1451 | No | - |
| WWTP-E-OUT | 8/11/2024 16:55 | 26.4 | ***6.74*** | 0.71 | 10.78 | 7.1 | 1451 | No | 560 |
| WWTP-E-IN | 8/12/2024 17:43 | 21.6 | ***5.68*** | 0.72 | 6.14 | 7.0 | 1347 | No | - |
| WWTP-E-OUT | 8/12/2024 17:48 | 22.8 | ***3.96*** | 0.64 | 4.19 | 7.1 | 1223 | No | 520 |
| WWTP-E-IN | 8/13/2024 15:19 | 22.4 | 8.81 | 0.02 | 7.37 | 7.2 | 212[5] | No | - |
| WWTP-E-OUT | 8/13/2024 14:10 | 22 | ***5.78*** | 0.72 | 3.75 | ***6.7*** | 1343 | No | 577 |
| WWTP-E-IN | 8/14/2024 17:04 | 25.1 | ***7.61*** | 0.74 | 0.70 | 7.2 | 1477 | No | - |
| WWTP-E-OUT | 8/14/2024 17:07 | 23.9 | ***4.69*** | 0.68 | 0 | ***6.1*** | 1332 | No | 524 |
| WWTP-E-IN | 8/15/2024 14:17 | 23.9 | 9.04 | 0.73 | 5.80 | ***6.8*** | 1424 | No | - |
| WWTP-E-OUT | 8/15/2024 14:10 | 23.8 | 5.29 | 0.69 | 5.42 | ***6.3*** | 1353 | No | 539 |
| WWTP-E-IN | 8/16/2024 13:10 | 22.9 | ***7.52*** | 0.73 | 5.35 | 7.2 | 1403 | No | - |
| WWTP-E-OUT | 8/16/2024 13:15 | 22.3 | ***3.50*** | 0.68 | 5.05 | 8.2 | 1403 | No | 597 |
| WWTP-E-IN | 8/17/2024 15:47 | 25.2 | 7.18 | 0.74 | 4.63 | 7.1 | 1488 | No | - |
| WWTP-E-OUT | 8/17/2024 15:36 | 24.5 | -[4] | 0.71 | 3.69 | ***5.9*** | 1405 | No | 602 |

**Notes:**
[1] PE-111578 East WWTP Discharge Limit is applied to effluent compliance station WWTP-E-OUT.
[2] Design minimum discharge objectives (MDOs) for WWTP effluent that are listed in the WWTP design report.
[3] A design MDO for dissolved oxygen was not specified in the WWTP design report. The water quality guideline is provided in place of an MDO for reference purposes only.
[4] Suspected erroneous DO value on Augst 17 from station WWTP-E-OUT (19.93 mg/L) has been removed from the table.
[5] Suspected data transcription error, follow up in progress.
Results ***underlined in bold italics*** do not meet the applicable minimum discharge objective (except DO).

# *Appendix D: Marine Water Receiving Environment Results*

## Table D-1: Summary of Marine Water Quality Results Received at the Time of Reporting

| Parameter | Unit | Lowest Applicable Guideline [1] | | Station IDZ-E1 | | | Station IDZ-E2 | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 0.5 m Below Surface | 2 m Below Surface | 2 m Above Seafloor | 0.5 m Below Surface | 2 m Below Surface | 2 m Above Seafloor |
| | | | | IDZ-E1-0.5 | IDZ-E1-2m | IDZ-E1-SF | IDZ-E2-0.5 | IDZ-E2-2m | IDZ-E2-SF |
| | | | | VA24B9315-001 | VA24B9315-002 | VA24B9315-003 | VA24B9315-004 | VA24B9315-005 | VA24B9315-006 |
| | | Long Term | Short Term | 8/2/2024 14:45 | 8/2/2024 14:52 | 8/2/2024 15:10 | 8/2/2024 15:13 | 8/2/2024 15:17 | 8/2/2024 15:23 |
| **General Parameters** | | | | | | | | | |
| pH - Field | pH units | 7.0 - 8.7 | - | 7.9 | 8.1 | 7.9 | 8.2 | 8.2 | 7.9 |
| Specific Conductivity - Field | µS/cm | - | - | -[6] | -[6] | -[6] | -[6] | -[6] | -[6] |
| Temperature - Field | °C | - | - | -[6] | -[6] | -[6] | -[6] | -[6] | -[6] |
| Salinity - Field | ppt | Narrative[2] | - | -[6] | -[6] | -[6] | -[6] | -[6] | -[6] |
| Turbidity - Field | NTU | Narrative[2] | Narrative[2] | 0.47 | 1.42 | 0 | 2.98 | 1.20 | 0 |
| TSS | mg/L | Narrative[2] | Narrative[2] | 11 | 5.2 | 5.9 | 3.9 | 4.0 | 5.7 |
| Dissolved Oxygen - Field | mg/L | >=8 | - | -[6] | -[6] | -[6] | -[6] | -[6] | -[6] |
| **Anions and Nutrients** | | | | | | | | | |
| Sulphate | mg/L | - | - | - | - | - | - | - | - |
| Chloride | mg/L | - | - | - | - | - | - | - | - |
| Fluoride | mg/L | - | 1.5 | - | - | - | - | - | - |
| Ammonia (N-$NH_3$) | mg/L | Variable [3] | Variable [3] | - | - | - | - | - | - |
| Nitrite (N-$NO_2$) | mg/L | - | - | - | - | - | - | - | - |
| Nitrate (N-$NO_3$) | mg/L | 3.7 | 339 | - | - | - | - | - | - |
| **Total Metals** | | | | | | | | | |
| Aluminum, total (T-Al) | mg/L | - | - | - | - | - | - | - | - |
| Antimony, total (T-Sb) | mg/L | - | 0.27 [4] | - | - | - | - | - | - |
| Arsenic, total (T-As) | mg/L | 0.0125 | 0.0125 | - | - | - | - | - | - |
| Barium, total (T-Ba) | mg/L | - | - | - | - | - | - | - | - |
| Beryllium, total (T-Be) | mg/L | 0.1 | - | - | - | - | - | - | - |
| Boron, total (T-B) | mg/L | 1.2 | - | - | - | - | - | - | - |
| Cadmium, total (T-Cd) | mg/L | 0.00012 | - | - | - | - | - | - | - |
| Chromium, total (T-Cr) | mg/L | - | - | - | - | - | - | - | - |
| Cobalt, total (T-Co) | mg/L | - | - | - | - | - | - | - | - |
| Copper, total (T-Cu) | mg/L | 0.002 | 0.003 | - | - | - | - | - | - |
| Iron, total (T-Fe) | mg/L | - | - | - | - | - | - | - | - |
| Lead, total (T-Pb) | mg/L | 0.002 | 0.14 | - | - | - | - | - | - |
| Manganese, total (T-Mn) | mg/L | - | - | - | - | - | - | - | - |
| Mercury, total (T-Hg) | mg/L | 0.000016 [5] | - | - | - | - | - | - | - |
| Molybdenum, total (T-Mo) | mg/L | - | - | - | - | - | - | - | - |
| Nickel, total (T-Ni) | mg/L | 0.0083 | - | - | - | - | - | - | - |
| Selenium, total (T-Se) | mg/L | 0.002 | - | - | - | - | - | - | - |
| Silver, total (T-Ag) | mg/L | 0.0015 | 0.003 | - | - | - | - | - | - |
| Thallium, total (T-Tl) | mg/L | - | - | - | - | - | - | - | - |
| Uranium, total (T-U) | mg/L | - | - | - | - | - | - | - | - |
| Vanadium, total (T-V) | mg/L | 0.005 | - | - | - | - | - | - | - |
| Zinc, total (T-Zn) | mg/L | 0.01 | 0.055 | - | - | - | - | - | - |
| Hexavalent Chromium, total | mg/L | 0.0015 | - | - | - | - | - | - | - |
| **Dissolved Metals** | | | | | | | | | |
| Cadmium, dissolved (D-Cd) | mg/L | - | - | - | - | - | - | - | - |
| Copper, dissolved (D-Cu) | mg/L | - | - | - | - | - | - | - | - |
| Iron, dissolved (D-Fe) | mg/L | - | - | - | - | - | - | - | - |
| Lead, dissolved (D-Pb) | mg/L | - | - | - | - | - | - | - | - |
| Manganese, dissolved (D-Mn) | mg/L | - | - | - | - | - | - | - | - |
| Nickel, dissolved (D-Ni) | mg/L | - | - | - | - | - | - | - | - |
| Strontium, dissolved (D-Sr) | mg/L | - | - | - | - | - | - | - | - |
| Vanadium, dissolved (D-V) | mg/L | - | - | - | - | - | - | - | - |
| Zinc, dissolved (D-Zn) | mg/L | - | - | - | - | - | - | - | - |
| **Polycyclic Aromatic Hydrocarbons (PAHs)** | | | | | | | | | |
| Acenaphthene | mg/L | 0.006 | - | - | - | - | - | - | - |
| Acridine | mg/L | - | - | - | - | - | - | - | - |
| Anthracene | mg/L | - | - | - | - | - | - | - | - |
| Benz(a)anthracene | mg/L | - | - | - | - | - | - | - | - |
| Benzo(a)pyrene | mg/L | 0.00001 | - | - | - | - | - | - | - |
| Chrysene | mg/L | 0.0001 | - | - | - | - | - | - | - |
| Fluoranthene | mg/L | - | - | - | - | - | - | - | - |
| Fluorene | mg/L | 0.012 | - | - | - | - | - | - | - |
| 1-methylnaphthalene | mg/L | 0.001 | - | - | - | - | - | - | - |
| 2-methylnaphthalene | mg/L | 0.001 | - | - | - | - | - | - | - |
| Naphthalene | mg/L | 0.001 | - | - | - | - | - | - | - |
| Phenanthrene | mg/L | - | - | - | - | - | - | - | - |
| Pyrene | mg/L | - | - | - | - | - | - | - | - |
| Quinoline | mg/L | - | - | - | - | - | - | - | - |
| **Volatile Organic Compounds (VOCs)** | | | | | | | | | |
| Benzene | mg/L | 0.11 | - | - | - | - | - | - | - |
| Ethylbenzene | mg/L | 0.25 | - | - | - | - | - | - | - |
| Methyl-tert-butyl-ether | mg/L | 5 | 0.44 | - | - | - | - | - | - |
| Styrene | mg/L | - | - | - | - | - | - | - | - |
| Toluene | mg/L | 0.215 | - | - | - | - | - | - | - |
| Total Xylenes | mg/L | - | - | - | - | - | - | - | - |
| Chlorobenzene | mg/L | 0.025 | - | - | - | - | - | - | - |
| 1,2-Dichlorobenzene | mg/L | 0.042 | - | - | - | - | - | - | - |

**Notes:**

Results ***underlined in bold italics*** exceed the applicable long-term water quality guideline for the protection of marine water aquatic life.

Shaded results exceed the applicable short-term water quality guideline for the protection of marine water aquatic life.

[1] The lowest applicable guidelines from approved or working BC WQGs, Canadian (CCME) WQGs and Federal WQGs.

[2] Narrative guideline for the evaluation of change from background conditions arising from discharges to the aquatic environment. The water quality data presented in the table were collected when the site was discharging, therefore the guidelines were evaluated.

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

[4] The working BC WQG for trivalent antimony [SB(III)] is 0.27 mg/L and is applied to total antimony results.

[5] When MeHg ⩽ 0.5% of total Hg, BC WQG = 0.00002 mg/L. The Canadian WQG = 0.000016 mg/L.

[6] Only field pH and turbidity measurements are available for the August 2 IDZ samples due to a field probe malfunction.

## Table D-2: Summary of Marine Water Quality Results Received at the Time of Reporting

| Parameter | Unit | Lowest Applicable Guideline [1] | | Reference Station WQR1 | | | Reference Station WQR2 | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 0.5 m Below Surface | 2 m Below Surface | 2 m Above Seafloor | 0.5 m Below Surface | 2 m Below Surface | 2 m Above Seafloor |
| | | | | WQR1-0.5 | WQR1-2m | WQR1-SF | WQR2-0.5 | WQR2-2m | WQR2-SF |
| | | | | VA24C0055-001 | VA24C0055-002 | VA24C0055-003 | VA24C0055-004 | VA24C0055-005 | VA24C0055-006 |
| | | Long Term | Short Term | 8/9/2024 09:54 | 8/9/2024 09:54 | 8/9/2024 09:54 | 8/9/2024 09:45 | 8/9/2024 09:45 | 8/9/2024 09:45 |
| **General Parameters** | | | | | | | | | |
| pH - Field | pH units | 7.0 - 8.7 | - | 8.1 | 8.2 | 7.6 | 8 | 8.2 | 7.6 |
| Specific Conductivity - Field | µS/cm | - | - | 15986 | 25200 | 45077 | 17971 | 26457 | 44681 |
| Temperature - Field | ℃ | - | - | 17.6 | 18.6 | 9.6 | 17.8 | 18.6 | 9.8 |
| Salinity - Field | ppt | Narrative[2] | - | -[6] | -[6] | -[6] | -[6] | -[6] | -[6] |
| Turbidity - Field | NTU | Narrative[2] | Narrative[2] | 7.95 | 4.53 | 1.95 | 7.61 | 5.5 | 2.41 |
| TSS | mg/L | Narrative[2] | Narrative[2] | 5.0 | 7.0 | 2.6 | 6.5 | 7.1 | 5.1 |
| Dissolved Oxygen - Field | mg/L | >=8 | - | -[6] | -[6] | -[6] | -[6] | -[6] | -[6] |
| **Anions and Nutrients** | | | | | | | | | |
| Sulphate | mg/L | - | - | - | - | - | - | - | - |
| Chloride | mg/L | - | - | - | - | - | - | - | - |
| Fluoride | mg/L | - | 1.5 | - | - | - | - | - | - |
| Ammonia (N-$NH_3$) | mg/L | Variable [3] | Variable [3] | - | - | - | - | - | - |
| Nitrite (N-$NO_2$) | mg/L | - | - | - | - | - | - | - | - |
| Nitrate (N-$NO_3$) | mg/L | 3.7 | 339 | - | - | - | - | - | - |
| **Total Metals** | | | | | | | | | |
| Aluminum, total (T-Al) | mg/L | - | - | - | - | - | - | - | - |
| Antimony, total (T-Sb) | mg/L | - | 0.27 [4] | - | - | - | - | - | - |
| Arsenic, total (T-As) | mg/L | 0.0125 | 0.0125 | - | - | - | - | - | - |
| Barium, total (T-Ba) | mg/L | - | - | - | - | - | - | - | - |
| Beryllium, total (T-Be) | mg/L | 0.1 | - | - | - | - | - | - | - |
| Boron, total (T-B) | mg/L | 1.2 | - | - | - | - | - | - | - |
| Cadmium, total (T-Cd) | mg/L | 0.00012 | - | - | - | - | - | - | - |
| Chromium, total (T-Cr) | mg/L | - | - | - | - | - | - | - | - |
| Cobalt, total (T-Co) | mg/L | - | - | - | - | - | - | - | - |
| Copper, total (T-Cu) | mg/L | 0.002 | 0.003 | - | - | - | - | - | - |
| Iron, total (T-Fe) | mg/L | - | - | - | - | - | - | - | - |
| Lead, total (T-Pb) | mg/L | 0.002 | 0.14 | - | - | - | - | - | - |
| Manganese, total (T-Mn) | mg/L | - | - | - | - | - | - | - | - |
| Mercury, total (T-Hg) | mg/L | 0.000016 [5] | - | - | - | - | - | - | - |
| Molybdenum, total (T-Mo) | mg/L | - | - | - | - | - | - | - | - |
| Nickel, total (T-Ni) | mg/L | 0.0083 | - | - | - | - | - | - | - |
| Selenium, total (T-Se) | mg/L | 0.002 | - | - | - | - | - | - | - |
| Silver, total (T-Ag) | mg/L | 0.0015 | 0.003 | - | - | - | - | - | - |
| Thallium, total (T-Tl) | mg/L | - | - | - | - | - | - | - | - |
| Uranium, total (T-U) | mg/L | - | - | - | - | - | - | - | - |
| Vanadium, total (T-V) | mg/L | 0.005 | - | - | - | - | - | - | - |
| Zinc, total (T-Zn) | mg/L | 0.01 | 0.055 | - | - | - | - | - | - |
| Hexavalent Chromium, total | mg/L | 0.0015 | - | - | - | - | - | - | - |
| **Dissolved Metals** | | | | | | | | | |
| Cadmium, dissolved (D-Cd) | mg/L | - | - | - | - | - | - | - | - |
| Copper, dissolved (D-Cu) | mg/L | - | - | - | - | - | - | - | - |
| Iron, dissolved (D-Fe) | mg/L | - | - | - | - | - | - | - | - |
| Lead, dissolved (D-Pb) | mg/L | - | - | - | - | - | - | - | - |
| Manganese, dissolved (D-Mn) | mg/L | - | - | - | - | - | - | - | - |
| Nickel, dissolved (D-Ni) | mg/L | - | - | - | - | - | - | - | - |
| Strontium, dissolved (D-Sr) | mg/L | - | - | - | - | - | - | - | - |
| Vanadium, dissolved (D-V) | mg/L | - | - | - | - | - | - | - | - |
| Zinc, dissolved (D-Zn) | mg/L | - | - | - | - | - | - | - | - |
| **Polycyclic Aromatic Hydrocarbons (PAHs)** | | | | | | | | | |
| Acenaphthene | mg/L | 0.006 | - | - | - | - | - | - | - |
| Acridine | mg/L | - | - | - | - | - | - | - | - |
| Anthracene | mg/L | - | - | - | - | - | - | - | - |
| Benz(a)anthracene | mg/L | - | - | - | - | - | - | - | - |
| Benzo(a)pyrene | mg/L | 0.00001 | - | - | - | - | - | - | - |
| Chrysene | mg/L | 0.0001 | - | - | - | - | - | - | - |
| Fluoranthene | mg/L | - | - | - | - | - | - | - | - |
| Fluorene | mg/L | 0.012 | - | - | - | - | - | - | - |
| 1-methylnaphthalene | mg/L | 0.001 | - | - | - | - | - | - | - |
| 2-methylnaphthalene | mg/L | 0.001 | - | - | - | - | - | - | - |
| Naphthalene | mg/L | 0.001 | - | - | - | - | - | - | - |
| Phenanthrene | mg/L | - | - | - | - | - | - | - | - |
| Pyrene | mg/L | - | - | - | - | - | - | - | - |
| Quinoline | mg/L | - | - | - | - | - | - | - | - |
| **Volatile Organic Compounds (VOCs)** | | | | | | | | | |
| Benzene | mg/L | 0.11 | - | - | - | - | - | - | - |
| Ethylbenzene | mg/L | 0.25 | - | - | - | - | - | - | - |
| Methyl-tert-butyl-ether | mg/L | 5 | 0.44 | - | - | - | - | - | - |
| Styrene | mg/L | - | - | - | - | - | - | - | - |
| Toluene | mg/L | 0.215 | - | - | - | - | - | - | - |
| Total Xylenes | mg/L | - | - | - | - | - | - | - | - |
| Chlorobenzene | mg/L | 0.025 | - | - | - | - | - | - | - |
| 1,2-Dichlorobenzene | mg/L | 0.042 | - | - | - | - | - | - | - |

**Notes:**

Results ***underlined in bold italics*** exceed the applicable long-term water quality guideline for the protection of marine water aquatic life.

Shaded results exceed the applicable short-term water quality guideline for the protection of marine water aquatic life.

[1] The lowest applicable guidelines from approved or working BC WQGs, Canadian (CCME) WQGs and Federal WQGs.

[2] Narrative guideline for the evaluation of change from background conditions arising from discharges to the aquatic environment. The water quality data presented in the table were collected when the site was discharging, therefore the guidelines were evaluated.

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

[4] The working BC WQG for trivalent antimony [SB(III)] is 0.27 mg/L and is applied to total antimony results.

[5] When MeHg ⩽ 0.5% of total Hg, BC WQG = 0.00002 mg/L. The Canadian WQG = 0.000016 mg/L.

[6] Field salinity measurements are not available for the August 9 IDZ samples due to a field probe configuration error. Field dissolved oxygen (DO) measurements were recorded in units of % rather than mg/L and are therefore not included in the table.

## Table D-3: Summary of IDZ Marine Water Quality Results for Methylmercury Received at the Time of Reporting.

| Parameter | Unit | Station IDZ-E1 | | | Station IDZ-E2 | | |
|---|---|---|---|---|---|---|---|
| | | 0.5 m Below Surface | 2 m Below Surface | 2 m Above Seafloor | 0.5 m Below Surface | 2 m Below Surface | 2 m Above Seafloor |
| | | IDZ-E1-0.5 | IDZ-E1-2m | IDZ-E1-SF | IDZ-E2-0.5 | IDZ-E2-2m | IDZ-E2-SF |
| | | VA24B7685-001 | VA24B7685-002 | VA24B7685-003 | VA24B7685-004 | VA24B7685-005 | VA24B7685-006 |
| | | 7/19/2024 | 7/19/2024 | 7/19/2024 | 7/19/2024 | 7/19/2024 | 7/19/2024 |
| **Methylmercury** | **µg/L** | <0.000020 | 0.000023 | 0.000021 | <0.000020 | <0.000020 | 0.000021 |

## Table D-4: Summary of Reference Station Marine Water Quality Results for Methylmercury Received at the Time of Reporting.

| Parameter | Unit | Reference Station WQR1 | | | Reference Station WQR2 | | |
|---|---|---|---|---|---|---|---|
| | | 0.5 m Below Surface | 2 m Below Surface | 2 m Above Seafloor | 0.5 m Below Surface | 2 m Below Surface | 2 m Above Seafloor |
| | | WQR1-0.5 | WQR1-2m | WQR1-SF | WQR2-0.5 | WQR2-2m | WQR2-SF |
| | | VA24B7867-001 | VA24B7867-002 | VA24B7867-003 | VA24B7867-004 | VA24B7867-005 | VA24B7867-006 |
| | | 7/20/2024 | 7/20/2024 | 7/20/2024 | 7/20/2024 | 7/20/2024 | 7/20/2024 |
| **Methylmercury** | **µg/L** | <0.000020 | <0.000020 | 0.000022 | 0.000021 | <0.000080 | <0.000160 |

## Table D-5: Summary of IDZ Marine Water Quality Results for Dioxins and Furans Received at the Time of Reporting.

| Parameter | Unit | Station IDZ-E1 | | | Station IDZ-E2 | | |
|---|---|---|---|---|---|---|---|
| | | 0.5 m Below Surface | 2 m Below Surface | 2 m Above Seafloor | 0.5 m Below Surface | 2 m Below Surface | 2 m Above Seafloor |
| | | IDZ-E1-0.5 | IDZ-E1-2m | IDZ-E1-SF | IDZ-E2-0.5 | IDZ-E2-2m | IDZ-E2-SF |
| | | L2756662-1 | L2756662-2 | L2756662-3 | L2756662-4 | L2756662-5 | L2756662-6 |
| | | 7/13/2024 | 7/13/2024 | 7/13/2024 | 7/13/2024 | 7/13/2024 | 7/13/2024 |
| **Lower Bound PCDD/F TEQ** | **pg/L** | 0.000574 | 0.0148 | 0.000775 | 0 | 0.0190 | 0.0374 |

**Notes:**
PCDD = polychlorinated dibenzodioxins (dioxins)
PCDF = polychlorinated dibenzofurans (furans)
TEQ = toxic equivalency
Lower bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned a value of zero (0).

## Table D-6: Summary of IDZ Marine Water Quality Results for Dioxins and Furans Received at the Time of Reporting.

| Parameter | Unit | Station IDZ-E1 | | | Station IDZ-E2 | | |
|---|---|---|---|---|---|---|---|
| | | 0.5 m Below Surface | 2 m Below Surface | 2 m Above Seafloor | 0.5 m Below Surface | 2 m Below Surface | 2 m Above Seafloor |
| | | IDZ-E1-0.5 | IDZ-E1-2m | IDZ-E1-SF | IDZ-E2-0.5 | IDZ-E2-2m | IDZ-E2-SF |
| | | L2756740-1 | L2756740-2 | L2756740-3 | L2756740-4 | L2756740-5 | L2756740-6 |
| | | 7/19/2024 | 7/19/2024 | 7/19/2024 | 7/19/2024 | 7/19/2024 | 7/19/2024 |
| **Lower Bound PCDD/F TEQ** | **pg/L** | 0 | -[1] | 0.0000903 | 0 | 0.0111 | 0.00405 |

**Notes:**
PCDD = polychlorinated dibenzodioxins (dioxins)
PCDF = polychlorinated dibenzofurans (furans)
TEQ = toxic equivalency
Lower bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned a value of zero (0).
[1] Sample bottles for dioxins and furans were damaged during trans-shipment while the bottles were under laboratory custody, therefore analyses could not be completed for the sample collected from IDZ-E1 at 2 m below the surface.

## Table D-7: Summary of Reference Station Marine Water Quality Results for Dioxins and Furans Received at the Time of Reporting.

| Parameter | Unit | Reference Station WQR1 | | | Reference Station WQR2 | | |
|---|---|---|---|---|---|---|---|
| | | 0.5 m Below Surface | 2 m Below Surface | 2 m Above Seafloor | 0.5 m Below Surface | 2 m Below Surface | 2 m Above Seafloor |
| | | WQR1-0.5 | WQR1-2m | WQR1-SF | WQR2-0.5 | WQR2-2m | WQR2-SF |
| | | L2756754-4 | L2756754-1 | L2756754-2 | L2756754-3 | L2756754-5 | L2756754-6 |
| | | 7/21/2024 | 7/20/2024 | 7/20/2024 | 7/20/2024 | 7/21/2024 | 7/21/2024 |
| **Lower Bound PCDD/F TEQ** | **pg/L** | 0.0216 | 0.0993 | 0.355 | 0.0943 | 0 | 0.000321 |

**Notes:**
PCDD = polychlorinated dibenzodioxins (dioxins)
PCDF = polychlorinated dibenzofurans (furans)
TEQ = toxic equivalency
Lower bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned a value of zero (0).