# Invasive Plant Management Plan

# Woodfibre LNG Project: WLNG-W0001-CM-PLN-0008 Rev 1

July 28, 2023

123221624EN-RPT0014



# Preamble

The Woodfibre Liquefied Natural Gas Project (the Project) is a liquefied natural gas export facility being constructed on the former Woodfibre Pulp and Paper Mill site in Nexwnéwu7ts Átl'ka7tsem (Howe Sound), approximately seven kilometres south of Skwxwú7mesh (Squamish). The Project is on the historical location of a Skwxwú7mesh Úxwumixw (Squamish Nation) village known as Swiỷát. Swiỷát and Nexwnéwu7ts Átl'ka7tsem (Howe Sound) are tied to the cultural well-being of Skwxwú7mesh Úxwumixw (Squamish Nation) members, their ancestors, and their descendants, and to other Indigenous groups as defined in the Project's Environmental Assessment Certificates. Woodfibre LNG Limited recognizes the importance of these areas to the Skwxwú7mesh stélmexw (Squamish People), and other Indigenous groups. Woodfibre LNG General Partner Inc. seeks to construct and operate the Project in a manner that is respectful of Indigenous values. This Invasive Plant Management Plant is primarily written in English with important place names, species, phrases, and passages provided in the Squamish language.

Temíxwiýikw chet wa naantem chet ti temíxw Swiýát Chet wa sméňhemswit kwis ns7éyxnitas chet ti temíxw We7ú chet kwis t'íchimwit iy íwas chet ek' I tti.

Our ancient ancestors named this place Swiỷát We, as their descendants safeguard these lands We will continue to swim and fish in these clear waters.



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1 A draft version of Invasive Plant Management Plan was prepared by Hemmera, a subsidiary of Ausenco. The draft version has been revised and updated by Stantec Consulting Limited (Stantec) at the request of Woodfibre LNG General Partner Inc.



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# **Squamish-English Translation**

| Squamish                      | English   |
|-------------------------------|---|
| Átl' <u>k</u> a7tsem          | Howe Sound  |
| ínexwantas                    | monitoring  |
| <u>K</u> ̆ıík̆elxn            | Port Mellon   |
| Kwtsá7tsutsin                 | Darrell Bay   |
| Shisháyu7ay                   | Britannia Beach   |
| Skwxwú7mesh                   | Squamish  |
| S <u>k</u> wxwú7mesh stélmexw | Squamish people   |
| S <u>k</u> wxwú7mesh Úxwumixw | Squamish Nation   |
| Swiỷát                        | Woodfibre LNG site and historical Skwxwú7mesh Úxwumixw (Squamish Nation) village location |



# Abbreviations

| the Application | Woodfibre LNG's application for an Environmental Assessment Certificate |
|-----------------|---|
| BC              | British Columbia  |
| BC EAO          | BC Environmental Assessment Office                                      |
| BCEAA           | British Columbia Environmental Assessment Act                           |
| BCER            | British Columbia Energy Regulator                                       |
| CEAA            | Canadian Environmental Assessment Act                                   |
| СРА             | Certified Project Area  |
| EAC             | Environmental Assessment Certificate                                    |
| EM              | Environmental Monitor   |
| FLNR            | Ministry of Forests, Lands and Natural Resource Operations              |
| IPMA            | Integrated Pest Management Act  |
| IPMP            | Invasive Plant Management Plan  |
| ISCBC           | Invasive Species Council of British Columbia                            |
| ISMA            | Integrated Species Management Area                                      |
| km              | kilometre   |
| LNG             | liquefied natural gas   |
| m               | meters  |
| m <sup>3</sup>  | cubic metre   |
| MoF             | Ministry of Forests   |
| OGC             | Oil and Gas Commission  |
| OGAA            | Oil and Gas Activities Act  |
| the Project     | Woodfibre Liquefied Natural Gas Project                                 |
| QP              | Qualified Professional  |
| RISC            | Resource Inventory Standards Committee                                  |
| SLRD            | Squamish – Lillooet Regional District                                   |
| SNEAA           | Squamish Nation Environmental Assessment Agreement                      |
| SSISC           | Sea to Sky Invasive Species Council                                     |
| Woodfibre LNG   | Woodfibre LNG General Partner Inc.                                      |



# 1.0 INTRODUCTION

Woodfibre LNG General Partner Inc. (Woodfibre LNG) will construct and operate the Woodfibre Liquefied Natural Gas Project (the Project), which is located on the former Woodfibre Pulp Mill site approximately seven kilometres (km) southwest of Skwxwú7mesh (Squamish), British Columbia (BC) (Figure 1). The Project will have capacity to liquefy up to 2.1 million tonnes per year of natural gas, have a storage capacity of 250,000 cubic metres (m<sup>3</sup>), and export the liquefied natural gas (LNG) via tankers.

The Project underwent a comprehensive environmental assessment process from 2013 to 2015 and Woodfibre LNG received:

- an environmental assessment certificate (EAC) for the Certified Project Area (CPA) under the British Columbia *Environmental Assessment Act* (EAC #E15-02) in 2015;
- an environmental assessment approval from Skwxwú7mesh Úxwumixw (Squamish Nation) through the Squamish Nation Environmental Assessment Agreement (SNEAA) in 2015, and;
- a positive federal Decision Statement under the *Canadian Environmental Assessment Act,* 2012 (CEAA 2012) in 2016.

Two EAC amendments were granted by the BC Environmental Assessment Office (EAO) in 2017 and 2019, and the federal Decision Statement was reissued in 2018 in response to changes to the Designated Project. Woodfibre LNG also received an extension on EAC#15-02 from the BC EAO in October 2020. The provincial, Skwxwú7mesh Úxwumixw (Squamish Nation), and federal environmental assessment processes have each yielded conditions of approval that Woodfibre LNG must address.

Most of the Project is on fee simple, industrially zoned, brownfield lands with more than 100 years of industrial use. There is no road access to the CPA, and all personnel, equipment, and supplies for the Project will be brought in by vessel via Átl'<u>k</u>a7tsem (Howe Sound). The Project will use electrical power sourced from BC Hydro, and gas will be supplied to the facility by Fortis BC.

The CPA and key project components are illustrated in Figure 2. Key project components are:

- land-based natural gas processing and liquefaction facilities
- a floating storage and offloading unit
- construction worker accommodation
- supporting infrastructure

The supporting infrastructure includes buildings (e.g., administration, control rooms, maintenance, dry storage and chemical, fire house, first aid, safety and guardhouse), fencing (temporary and permanent), material storage and laydown areas, utility and loading lines, and boil off gas vapour lines.







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The works and activities that will occur as part of construction include:

- marine early works (e.g., shoreline improvements and armoring, dock replacement or repairs), including improvements to the existing in-service (east and south) barge landing
- vegetation clearing and grubbing
- stripping and grading
- drilling and blasting, including excavation, crushing, screening, and hauling
- grouting and rock stabilization
- road, culvert, and bridge works
- construction of land-based natural gas processing and liquefaction facility
- construction support structures, services, and equipment
- construction of the floating storage and offloading unit
- marine facility construction of mooring dolphin supports and connecting trestles and gangways
- dredging, if required

# 1.1 OBJECTIVE

The purpose of the Invasive Plant Management Plan (IPMP) is to describe the measures to mitigate the establishment and spread of invasive plant species during construction of the Project and to monitor the effectiveness of these measures. An operational IPMP will be prepared after commissioning the LNG facility. For the purposes of this IPMP, invasive plants are defined as follows:

- Noxious weeds, as per Schedule A of the Weed Control Regulation under the Weed Control Act, including both Provincial Weeds listed on Part I and Regional Weeds in the Squamish-Lillooet Regional District (SLRD) listed on Part II. There are currently no regional weeds designated in the SLRD by the Weed Control Act.
- Priority invasive plant species listed on Schedule B of the Noxious Weeds Control Bylaw (Bylaw 1542) of the SLRD.
- Invasive species identified on the Sea to Sky Invasive Species Council (SSISC) Priority Species List. The IPMP was prepared based on the version of the SSISC Priority Species List last updated on April 16, 2022.

The objectives of the IPMP are to:

- Identify the regulatory and Project requirements for the prevention, inexwantas (monitoring), and control of invasive plant species associated with Project activities.
- Describe measures that Woodfibre LNG will implement to meet the regulatory and Project requirements within the CPA, which includes the Project footprint and areas where construction activities will occur, as well as adjacent areas under Woodfibre LNG's control, during construction of the Project.
- Outline the inexwantas (monitoring) that Woodfibre LNG will implement to verify that invasive species mitigation measures are implemented and verify the effectiveness of these mitigation measures.



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This IPMP is a living document and revisions will be made if relevant new information becomes available through the progression of the detailed engineering design of the Project, changes in legislation, if performance objectives are not met, or as required by other regulatory approvals. If the IPMP requires updating, Woodfibre LNG will prepare a red-line version of the document that clearly identifies the changes that were made. The red-line version will be issued to Skwxwú7mesh Úxwumixw (Squamish Nation), Tsleil-Waututh Nation, and regulatory agencies for a 30-day review and comment period. After comments are received, the document will be updated and issued as a clean final revision for submittal to the BC EAO. The IPMP will continue to be implemented unless Woodfibre LNG is advised otherwise by the BC EAO.

# 1.2 PROJECT APPROVALS AND CONDITIONS

The requirements of Section 13.2 of Woodfibre LNG's application for an Environmental Assessment Certificate (the Application) (Woodfibre LNG, 2015) related to the IPMP are as follows:

- Section 13.2.1.12: The Proponent will develop methods to mitigate the introduction, transport, and extent expansion of invasive plant species (including noxious weeds) to and from the Project area during construction and operation. The objectives of this plan will be to detect, control (i.e., remove), and monitor invasive plant species in the Project footprint. Monitoring will be conducted to make sure that mitigation measures are properly implemented and are effective.
- Section 13.2.3.7: The Proponent will develop methods to mitigate the introduction, transport, and extent of expansion of invasive plant species (including noxious weeds) to and from the Project area. The plan developed during construction will be continued in the operation phase.

As referenced in Sections 13.2.2.12 and 13.2.3.7 of the Application, inexwantas (monitoring) for invasive species will be as indicated in Section 13.3.6 of the Application, which commits to a Vegetation Monitoring Program as follows:

Section 13.3.6: Monitoring is proposed to reduce potential effects to vegetation resources as a result
of Project construction activities. Identification and mapping of invasive plant species will be
monitored in and adjacent to the Project footprint in accordance with RISC standards. Follow-up
monitoring of native plant landscaping efforts on the Project site will be needed to manage noxious
weeds and invasive species to confirm that the objectives of the reclamation plan are achieved.
In addition, thresholds or action levels at which control measures will be implemented will be
identified.

The requirements outlined in the bullets above have been included in this plan. In addition, the requirements for the development of an IPMP (supported by the Construction Environmental Management Plan) are set out in EAC #15-02 (Table 1).



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| Condition Number   | Condition   | IPMP Reference                                   |
|--------------------|---|--|
| EAC Condition 10   | The Holder must develop, in consultation with FLNR, OGC and<br>Squamish Nation an invasive plant management plan that<br>describes measures to prevent, monitor and control the<br>establishment and spread of invasive plant species in the<br>terrestrial portions of the Certified Project Area during<br>Construction and Operations.   | Entire plan                                      |
|                    | A Qualified Professional must develop the plan and supervise the implementation of the plan. The Holder must provide the plan to EAO, FLNR, OGC, and Squamish Nation no less than 30 days prior to the Holder's planned date to commence Construction. The Holder must implement the plan to the satisfaction of EAO.   | Entire plan                                      |
| EAC Condition 21   | The Holder must develop, in consultation with FLNR, OGC and<br>Aboriginal Groups, a construction environmental management<br>plan and an operations environmental management plan in<br>accordance with Section 13.2 of the Application.  | Construction<br>Environmental<br>Management Plan |
|                    | A Qualified Professional must develop the plan and supervise the implementation of the plan. The Holder must provide the construction environmental management plan to EAO, FLNR, OGC and Aboriginal Groups no less than 30 days prior to the Holder's planned date to commence Construction. The Holder must provide the operation environmental management plan to EAO, FLNR, OGC and Aboriginal Groups no less than 60 days prior to the Holder must develop and implement the plans to the satisfaction of EAO. | Construction<br>Environmental<br>Management Plan |
| SNEAA Condition 12 | Making certain mitigation measures proposed in its EA application<br>that are considered voluntary measures legally binding under a<br>Squamish Nation Certificate of Project Approval.   | Entire plan                                      |

#### Table 1 Conditions Relevant to the Invasive Plant Management Plan

Note:

The regulator names (i.e., FLNR and OGC) in the conditions reflect the names that were in place when the conditions were written. FLNR (Ministry of Forests, Lands and Natural Resources) is now split into Ministry of Forests and Ministry of Water, Land and Resource Stewardship and OGC (Oil and Gas Commission) is now BC Energy Regulator.

Comments received on the IPMP and Woodfibre LNG's responses to these comments are provided in a Consultation Record, as required by EAC Condition 2.



# 1.3 SKWXWÚ7MESH ÚXWUMIXW (SQUAMISH NATION) ENVIRONMENTAL ASSESSMENT AGREEMENT

The Skwxwú7mesh Úxwumixw (Squamish Nation's) environmental assessment process for the Project was designed to parallel the federal and provincial environmental assessment processes, whereby Project effects on the Skwxwú7mesh stélmexw (Squamish people's) rights and title interests are identified, understood, and properly avoided or mitigated. The process for the Project ultimately resulted in the Skwxwú7mesh Úxwumixw (Squamish Nation) issuing an environmental assessment certificate (#2015-001), which includes conditions described in the SNEAA that was issued on October 14, 2015. Per SNEAA, "Squamish Nation has agreed that Woodfibre may proceed with carrying out the Project, subject to Woodfibre LNG meeting, and (as applicable) continuing to meet, the Squamish Nation Conditions as provided for in this Agreement."

The SNEAA Condition 12, which has applicability to the IPMP, states

#### 4.12 Binding Mitigation Measures - Squamish Condition #12

- (a) Woodfibre LNG identifies approximately 119 distinct mitigation measures in Table 22-1 of Woodfibre LNG's EA application. If Squamish Nation determines that it wishes to monitor any of the mitigation measures, then Squamish Nation will issue a notice to Woodfibre LNG identifying which mitigation measures it intends to monitor ("Monitored Mitigation Measures") and the manner it proposes to undertake such monitoring.
- (b) Where Squamish Nation is of the opinion that any Monitored Mitigation Measure is not being followed, it will notify Woodfibre LNG. Woodfibre LNG will respond to the notification with one of the following (the "Response"):
  - (i) Woodfibre LNG's explanation of how the mitigation measure is being followed;
  - (ii) a written explanation why the mitigation measure is not being followed, and the measure that replaces it (with an explanation of how the new measure provides equal or greater levels of environmental protection);
  - (iii) A written explanation of why the mitigation measure is not being followed, with justification for:
    - a. why it has not been replaced with another measure, or
    - b. why it has been replaced with a measure that provides less levels of environmental protection
- (c) Woodfibre LNG will develop a Monitored Mitigation Measures plan with the Squamish Nation that will include the frequency of guided tours for the Squamish Nation during construction and operations and a budget to implement the plan, which plan will be fully funded by Woodfibre LNG.



(d) Should Squamish Nation not be satisfied with the Response, then the Squamish Nation may submit the matter to the dispute resolution process set out in section 8.1 and if the reasonableness of the Response is at issue the expert or expert panel shall consider the following when making its decision: whether the mitigation measure has a material impact on constructability, cost, operability, safety, environment, or schedule; whether the mitigation measure creates unacceptable risk or legal liability for the Project; whether the mitigation measure conflicts with any legal, regulatory, or pre-existing contractual obligations of Woodfibre LNG; whether the Woodfibre LNG response to the proposed mitigation measure(s) conforms to Good Industry Practice; and any other information the expert or expert panel considers relevant.

The following mitigation measure (M5.11-1) from the Application<sup>2</sup> is enabled by condition 12 of the SNEAA and is addressed by the IPMP:

Woodfibre LNG General Partner Inc. Limited will develop an Invasive Plant Management Plan to
mitigate the introduction, transport, and extent expansion of invasive plant species (including noxious
weeds) to and from the Project area during construction and operation. The objectives of this plan will
be to detect, control (i.e., remove), and monitor invasive plant species in the Project footprint area.
Part of this plan will include mapping invasive plant extent and tracking this extent over the life of the
Project to record invasive species proliferation. Monitoring will be conducted to make sure that
mitigation measures are properly implemented and effective.

<sup>&</sup>lt;sup>2</sup> At the time the Application was submitted, the company name was Woodfibre LNG Limited but it is now Woodfibre LNG General Partner Inc. The commitments as written and presented herein remain unchanged from the Application.



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# 2.0 REGULATORY FRAMEWORK

The Project is to be designed, constructed, and operated in alignment with the requirements of the provincial, federal, and Skwxwú7mesh Úxwumixw (Squamish Nation) environmental assessment processes, including:

- EAC #E15-02 issued on October 26, 2015 and amendments issued on July 12, 2017 and July 19, 2019
- Decision Statement issued under section 54 of the *Canadian Environmental Assessment Act,* 2012 (CEAA, 2012) on March 18, 2016 and a revised Decision Statement on March 7, 2018
- SNEAA certificate issued on October 14, 2015
- Permits, licenses, and authorizations issued for the Project
- Regulatory requirements of federal and provincial legislation and regulations
- SLRD bylaws
- District of Squamish bylaws
- Best management practices regarding reducing the introduction and proliferation of invasive plants

Information applicable to this IPMP is provided in the following sections.

# 2.1 LEGISLATIVE REQUIREMENTS AND CRITERIA

Management of invasive plant species for the Project is regulated provincially under the *Weed Control Act* and *Oil and Gas Activities Act* (OGAA), which are administered by Ministry of Forests (MoF) and the BC Energy Regulator (BCER), respectively. The *Weed Control Act* applies to all provincial Crown and private land in BC; it requires landowners or occupiers to control the spread of noxious weeds, as listed in Schedule A of the Weed Control Regulation. Woodfibre LNG is responsible for compliance with the requirements of the *Weed Control Act*. The Environmental Protection and Management Regulation under the OGAA requires persons carrying out an oil and gas activity on an operating area to make reasonable efforts to not transport invasive plants into the area and prevent invasive plants from becoming established. Amendments made to the OGAA in 2023 require that permit holders prepare and maintain an invasive plant compliance record (BCER 2023). Order M152, issued under section 33 of the Environmental Protection and Management Regulations as invasive plants.

The *Integrated Pest Management Act* (IPMA) and Regulation establish conditions for the sale and use of pesticides in BC through a classification system and regulatory provisions for licenses, certification, permits, and ministry confirmations of receipt of pesticide use notices under Pest Management Plans. The Regulation also contains public notification, consultation, reporting, and record keeping provisions, as well as standards for use of Integrated Pest Management and for human health and environmental protection.



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The SLRD, a local government federation that includes the District of Squamish, has enacted bylaws for the management of invasive species and movement of soil. Squamish-Lillooet Regional District Bylaw No. 1542 defines noxious weeds as all noxious weeds identified in Schedule A of the Weed Control Regulation under the *Weed Control Act*, as well as a list of invasive plant species presented in Schedule B of the Bylaw, which includes species identified as priorities by the SSISC or the Lillooet Regional Invasive Species Society. The bylaw prohibits planting noxious weeds, gives bylaw officers authority to provide written notices requiring control of the noxious weeds, and sets out provisions whereby the regional district can control noxious weeds at the expense of the owner or occupier of the property.

The District of Squamish has three bylaws regarding the management of invasive species: Bylaw No. 2786 (Invasive Species Management), Bylaw No. 2787 (Pesticide and Herbicide Use) and Bylaw No. 1868 (Unsightly Premises and Objectionable Situations). The Invasive Species Management Bylaw requires that property owners do not let invasive species grow or spread on their property. Treatment and disposal of invasive species is required to follow methods that are endorsed, published, or established by the SSISC, Invasive Species Council of BC, or under the direction of a Qualified Professional (QP) and accepted by District of Squamish environmental staff. The Pesticide and Herbicide Use bylaw states that pesticides are only allowed to be used under certain conditions. The Unsightly Premises and Objectionable Situations bylaw does not allow landowners to allow noxious weeds to grow on their property and states that noxious weeds must be removed from the property. The District of Squamish also maintains representation on the board of the regional SSISC and contributes annually to the organization; in turn, the SSISC works in cooperation with the District of Squamish to manage invasive species in the SLRD. The SSISC has issued a Priority Species List that categorizes provincially regulated and unregulated invasive plants into management categories (i.e., prevention watchlist, eradicate, contain, strategic control, no action, and insufficient information) (SSISC, 2020a). The Project occurs in Integrated Species Management Area (ISMA) 1 as defined by the SSISC.

The regulatory framework for the IPMP is summarized in Table 2.



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| Name  | Jurisdiction            | Description  |
|---|-------------------------|--|
| Weed Control Act  | Provincial              | Requires that the occupier of land must control noxious<br>weeds on their property. It is an offense to knowingly<br>contravene this Act or to refuse to comply with an order to<br>control noxious weeds.   |
| Weed Control Regulation   | Provincial              | Prevents the accidental and deliberate spread of noxious species. Supports the <i>Weed Control Act</i> by defining noxious weeds.  |
| Environmental Protection and<br>Management Regulation                                     | Provincial              | Requires a person undertaking an oil and gas activity to make reasonable efforts not to establish or spread invasive plants.   |
| OGAA  | Provincial              | Requires permit holders to prepare and maintain an invasive plant compliance record.   |
| OGAA (Order M152)   | Provincial              | Order M152 is made under the Environmental Protection<br>and Management Regulation, whereby the species of<br>plants listed in Schedule A, Part I – Provincial Weeds of the<br>Weed Control Regulation are established as invasive<br>plants.  |
| IPMA  | Provincial              | Outlines specific requirements for pesticide (herbicide) use for management of noxious weeds and invasive plants.  |
| IPMA  | Provincial              | Specifies licensing around pesticide use and provides requirements around public notification of pesticide use.  |
| Pest Control Products Act   | Federal                 | Specifies required measures to prevent unacceptable risks to individuals and the environment from the use of pest control products   |
| SLRD Invasive Species<br>Management and Control Service<br>Establishment (Bylaw No. 1541) | Regional                | The Regional Board of the SLRD may enter into contracts<br>with external parties to provide invasive species<br>management and control within the service area.  |
| Noxious Weeds Control Bylaw<br>(Bylaw No. 1542)   | Regional                | Prohibits the growth of noxious weeds on private property.<br>The definition of noxious weeds under the bylaw includes<br>those listed on the provincial <i>Weed Control Act</i> , as well as<br>species identified as priorities by the SSISC or the Lillooet<br>Regional Invasive Species Society. |
| Deposit and Removal of Soil<br>(Bylaw No. 1423)   | Regional                | Regulates deposit and removal of soil that specifies weeds<br>to be controlled at all times by mechanical or chemical<br>means.  |
| Invasive Species Management<br>(Bylaw No. 2786, 2020)                                     | Municipal<br>(Squamish) | Regulates invasive species and management within the District. Outlines certain conditions required for treatment and disposal of invasive species.  |
| Pesticide and Herbicide Use<br>(Bylaw No. 2787, 2020)                                     | Municipal<br>(Squamish) | Outlines when and where pesticides can be applied.   |
| Unsightly Premises and<br>Objectionable Situations<br>(Bylaw No. 1868, 2005)              | Municipal<br>(Squamish) | Requires that noxious weeds do not accumulate and are removed from the property, among other conditions.   |
| Soils Management<br>(Bylaw No. 2641, 2018)  | Municipal<br>(Squamish) | Requires a permit for deposit and removal of more than 30 m <sup>3</sup> of soil or other material during a 12-month period.   |

#### Table 2 Regulatory Framework for the Invasive Plant Management Plan



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# 3.0 ROLES AND RESPONSIBILITIES

The Construction Environmental Management Plan describes the roles and responsibilities of the Environmental Manager, Contractor, QP, and Environmental Monitor (EM). Specific to the IPMP, the QP is responsible for:

- Preparing the IPMP
- Preparing and maintaining the invasive plant compliance record required by the BCER
- Providing discipline-specific expertise in management of invasive plants
- Completing an annual review of the priority species list provided by the SSISC and the regulations listed in Table 2
- Providing training to the EM and Contractor on the recognition of invasive plant species and mitigation measures in the Construction Environmental Management Plan
  - This training will include a description of how to report invasive species. Any potential new occurrences of invasive species will be reviewed by the QP prior to being uploaded into the Invasive Alien Plant Program (IAPP) or the InvasivesBC database.
  - It will be made clear that incidental observation of any invasive species or suspected invasive species will be sent to the EM and/or QP for review.
- Supervising surveys to refine mapping of the spatial extent of invasive species after implementation of the IPMP (see Section 6.2)
- Supervising Contractors who are completing invasive plant control treatments
- Supporting development of an Integrated Pest Management Plan for the operations phase
- Attending kickoff, daily, and weekly site meetings to communicate potential environmental and safety concerns and requirements.

The QP will be experienced in the identification and management of invasive species and will be either a registered professional or an accredited practitioner.



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# 4.0 INVASIVE PLANT SPECIES SETTING

Five invasive plant surveys have been conducted within the CPA between 2013 and 2021 to address environmental assessment and EAC conditions requirements. These are summarized below.

In support of the environmental assessment process and based on the historical use and disturbed nature of Swlyat, an invasive species survey was carried in 2013. A total of 26 invasive plant species were observed during the 2013 field program, including three provincially noxious weed species, as defined under the *Weed Control Act*: Canada thistle (*Cirsium arvense*), Japanese knotweed (*Fallopia japonica/Reynoutria japonica*), and perennial sow-thistle species (*Sonchus arvensis*) (Golder, 2014).

Additional invasive plant surveys were conducted in 2017, 2018, 2019, and 2021, in accordance with the guidelines provided by the Invasive Alien Plant Program at the time of each survey (Ministry of Forest and Range, 2010; FLNRORD, 2019). While Section 13.3.6 of the Application specified that Resource Inventory Standards Committee (RISC) standards are to be used for the identification and mapping of invasive plant species, a review of the Province of British Columbia's inventory standards website shows there are no guidance documents for field surveys or mapping of invasive plant species. As such, the Invasive Alien Plant Program Reference guidelines (Ministry of Forests and Range, 2010) are the most applicable for identification and mapping of invasive plant species. The surveys were conducted by biologists who surveyed the CPA by foot and vehicle. The surveys focused on regularly disturbed areas, particularly those being used during existing site activities (i.e., previously disturbed areas, access roads, and the transmission line corridor within the fee simple boundaries). When a single site supported multiple invasive plant species, all species associated with a point or polygon were documented (Hemmera, 2017, 2018, 2019).

A total of 16 invasive plant species were documented during the 2017 survey (Figure 3; Hemmera, 2017), including provincially regulated noxious plants and other unregulated invasive species of concern (Table 3). Japanese knotweed, thistle (*Cirsium* spp.), and sow-thistle (*Sonchus* spp.) were the only noxious weed species identified in the survey area that are regulated by the *Weed Control Act*.

Surveys were repeated in 2018 and 16 invasive plant species were again observed. Common burdock (*Arctium minus*) was observed but common periwinkle (*Vinca major*) was not as the sites where it had been previously documented were not resurveyed due to time constraints (Hemmera, 2018).

Surveys in 2019 identified 20 invasive plant species. Species not documented in 2017 or 2018 included: common foxglove (*Digitalis purpurea*), common St. John's-wort (*Hypericum perforatum*), creeping bellflower (*Campanula rapunculoides*), orange hawkweed (*Hieracium aurantiacum*), and white sweet-clover (*Melilotus alba*; Hemmera, 2019). Cherry-laurel (*Prunus laurocerasus*) and oxeye daisy (*Leucanthemum vulgare*) were not observed in the 2019 survey (Hemmera, 2019).

The survey completed by Stantec in 2021 detected 21 invasive species within the CPA (Table 3). A survey of areas of the Certified Project Area that are not disturbed by construction will occur in 2024.





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Figure 3 shows the conditions in the CPA based on the 2019 invasive species surveys, including specific information regarding the location of noxious weeds (Japanese knotweed and thistle species). Table 3 provides an aggregated list of the invasive species identified in all four surveys and identifies the SSISC management category for each species documented during surveys (SSISC, 2020a). A photo log of the observed species is provided in Appendix A.

| Table 3         Invasive Plant Species Documented in the CPA from 2013 to 20 | 021 |
|--|-----|
|--|-----|

|   |  |                        | DOS                               |                                    |  | Years Document |      |      | nente | d    |
|---|--|------------------------|-----------------------------------|------------------------------------|--|----------------|------|------|-------|------|
| Common<br>Name(s)   | Latin Name                                     | Weed<br>Control<br>Act | Bylaw<br>No.<br>2786 <sup>1</sup> | SLRD<br>Bylaw<br>1542 <sup>2</sup> | SSISC<br>Management<br>Category <sup>3</sup> | 2013           | 2017 | 2018 | 2019  | 2021 |
| big-leaf periwinkle   | Vinca major                                    | -                      | -                                 | Yes                                | Prevention<br>Watchlist                      | х              |      |      | x     |      |
| bladder campion;<br>maidenstears                                    | Silene vulgaris<br>(cucubalus)                 | -                      | -                                 | -                                  | Prevention<br>Watchlist                      | х              |      |      |       |      |
| traveler's joy;<br>wild Clematis                                    | Clematis<br>vitalba                            | -                      | -                                 | Yes                                | Prevention<br>Watchlist                      | х              | x    | x    | x     | x    |
| butterfly-bush  | Buddleja<br>davidii                            | -                      | -                                 | Yes                                | Contain                                      | х              | x    | x    | x     | x    |
| English holly   | llex aquifolium                                | -                      | -                                 | Yes                                | Contain                                      | х              | x    | х    | х     | х    |
| English ivy   | Hedera helix                                   | -                      | Yes                               | Yes                                | Contain                                      | х              | x    | х    | х     | х    |
| Japanese<br>knotweed  | Fallopia<br>japonica<br>Reynoutria<br>japonica | Noxious                | Yes                               | Yes                                | Contain                                      | х              | x    | x    | x     | x    |
| common burdock;<br>lesser burdock                                   | Arctium minus                                  | -                      | -                                 | -                                  | Strategic<br>Control                         | х              |      | х    | х     | х    |
| common periwinkle   | Vinca minor                                    | -                      | -                                 | Yes                                | Strategic<br>Control                         |                | x    |      | x     | х    |
| common St.<br>John's-wort   | Hypericum<br>perforatum                        | -                      | Yes                               | Yes                                | Strategic<br>Control                         | х              |      |      | x     | x    |
| common tansy  | Tanacetum<br>vulgare                           | -                      | -                                 | -                                  | Strategic<br>Control                         | х              | x    | x    | x     | х    |
| common foxglove;<br>purple foxglove                                 | Digitalis<br>purpurea                          | -                      | -                                 | -                                  | Strategic<br>Control                         | х              |      |      | x     | х    |
| Himalayan<br>blackberry   | Rubus<br>armeniacus                            | -                      | Yes                               | Yes                                | Strategic<br>Control                         | х              | x    | x    | x     | x    |
| orange hawkweed   | Hieracium<br>aurantiacum                       | -                      | -                                 | Yes                                | Strategic<br>Control                         | х              |      |      | x     | x    |
| oxeye daisy   | Leucanthemu<br>m vulgare                       | -                      | -                                 | -                                  | Strategic<br>Control                         |                | x    | x    |       | x    |
| policeman's<br>helmet; ornamental<br>jewelweed;<br>Himalayan balsam | Impatiens<br>glandulifera                      | -                      | Yes                               | Yes                                | Strategic<br>Control                         |                | x    | x    | x     | x    |



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|  |  |                        | DOS                               |                                    |   | Years Documented |      |      |      |      |
|--|--|------------------------|-----------------------------------|------------------------------------|---|------------------|------|------|------|------|
| Common<br>Name(s)  | Latin Name                               | Weed<br>Control<br>Act | Bylaw<br>No.<br>2786 <sup>1</sup> | SLRD<br>Bylaw<br>1542 <sup>2</sup> | SSISC<br>Management<br>Category <sup>3</sup>      | 2013             | 2017 | 2018 | 2019 | 2021 |
| Scotch broom   | Cytisus<br>scoparius                     | -                      | Yes                               | Yes                                | Contain   | х                | x    | x    | x    | x    |
| sow-thistle species <sup>4</sup>                                     | Sonchus spp.                             | Noxious                | Yes                               | -                                  | Strategic<br>Control                              |                  | x    | x    | x    |      |
| prickly sow-thistle  | Sonchus asper                            | -                      | Yes                               | -                                  | Insufficient<br>Information                       |                  |      |      | x    | х    |
| perennial<br>sow-thistle   | Sonchus<br>arvensis                      | Noxious                | Yes                               | -                                  | Strategic<br>Control                              | х                |      |      |      |      |
| thistle species⁵   | <i>Cirsium</i> or<br><i>Silybum</i> spp. | Noxious                | Yes                               | Yes                                | Prevention<br>Watchlist /<br>Strategic<br>Control |                  | x    | x    | х    |      |
| Canada thistle   | Cirsium<br>arvense                       | Noxious                | Yes                               | -                                  | Strategic<br>Control                              | х                |      |      |      |      |
| common dandelion   | Taraxacum<br>officinale                  | -                      | -                                 | -                                  | No Action   | х                |      |      |      |      |
| common plantain  | Plantago major                           | -                      | -                                 | -                                  | No Action   | х                |      |      |      |      |
| creeping buttercup   | Ranunculus<br>repens                     | -                      | -                                 | Yes                                | No Action   | х                |      |      |      | x    |
| curled dock; curly<br>dock   | Rumex crispus                            | -                      | -                                 | -                                  | No Action   | х                |      |      |      |      |
| field bindweed;<br>morning glory                                     | Convolvulus<br>arvensis                  | -                      | -                                 | -                                  | No Action   | х                | x    | x    | x    | x    |
| great mullein;<br>common mullein                                     | Verbascum<br>thapsus                     | -                      | -                                 | -                                  | No Action   | х                | x    | x    | x    |      |
| narrow-leaved<br>plantain; ribwort<br>plantain                       | Plantago<br>lanceolata                   | -                      | -                                 | -                                  | No Action   | х                |      |      |      |      |
| yellow salsify;<br>western goat's<br>beard                           | Tragopogon<br>dubius                     | -                      | Yes                               | -                                  | No Action   | х                |      |      |      |      |
| white sweet-clover   | Melilotus alba                           | -                      | -                                 | -                                  | No Action   |                  |      |      | х    | х    |
| yellow sweet-clover  | Melilotus<br>officinalis                 | -                      | -                                 | -                                  | No Action   | х                |      |      |      | x    |
| European<br>bittersweet;<br>climbing<br>nightshade;<br>blue bindweed | Solanum<br>dulcamara                     | -                      | -                                 | -                                  | -   |                  |      |      |      | x    |
| cherry-laurel  | Prunus<br>Iaurocerasus                   | -                      | -                                 | -                                  | Insufficient<br>Information                       |                  | х    | х    |      |      |

### Table 3Invasive Plant Species Documented in the CPA from 2013 to 2021



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|  |                            | DOS                    |                                   |                                    |  | Years Documented |      |      |      |      |  |
|--|----------------------------|------------------------|-----------------------------------|------------------------------------|--|------------------|------|------|------|------|--|
| Common<br>Name(s)                          | Latin Name                 | Weed<br>Control<br>Act | Bylaw<br>No.<br>2786 <sup>1</sup> | SLRD<br>Bylaw<br>1542 <sup>2</sup> | SSISC<br>Management<br>Category <sup>3</sup> | 2013             | 2017 | 2018 | 2019 | 2021 |  |
| creeping bellflower;<br>rampion bellflower | Campanula<br>rapunculoides | -                      | -                                 | -                                  | Insufficient information                     |                  |      |      | x    |      |  |
| reed canarygrass                           | Phalaris<br>arundinacea    | -                      | Yes                               | -                                  | Insufficient<br>Information                  | х                |      |      |      |      |  |

#### Table 3 Invasive Plant Species Documented in the CPA from 2013 to 2021

Notes:

<sup>1</sup> District of Squamish Invasive Plants identified in Bylaw No. 2786 (from the *Spheres of Concurrent Jurisdiction – Environment and Wildlife Regulation*)

- <sup>2</sup> SLRD noxious weeds identified in Bylaw 1542 (2018)
- <sup>3</sup> Management categories for Priority Species in ISMA 1 defined as follows (SSISC, 2020a):
  - Prevention Watchlist = not yet known in the ISMA; prevent species from entering the region and eradicate immediately if detected following Early Detection Rapid Response protocol
  - Contain = abundant in portions of ISMA; apply control measures to keep the species from spreading
  - Strategic Control = widespread species beyond landscape-level control and/or with relatively low impact; apply control measures in high priority areas only (e.g., wildlife habitat, agricultural land)
  - Insufficient Information = not enough information to assign a management category. Monitor known locations and/or access more information from other regions.
- <sup>4</sup> In 2013, perennial sow-thistle (*Sonchus arvensis*) was recorded; in 2019, prickly sow-thistle (*Sonchus asper*) was recorded. Surveys in 2017 and 2018 were unable to identify the sow-thistle plants to species.
- <sup>5</sup> In 2013, Canada thistle was recorded on site. Subsequent surveys were not able to identify the thistles to species.

# 4.1 AREAL EXTENTS OF INVASIVE SPECIES OCCURRENCES

A total of 46.64 hectares of invasive plant species occurrences have been recorded to date. In addition to the polygon occurrences reported in Table 4 there are 125 point-occurrences of invasive plant species that occur in the CPA; the majority occur within the mapped invasive plant occurrences.

#### Table 4 Areal Extents of Contiguous Invasive Plant Species Occurrences in the CPA

| Invasive Plant Species (common names)                     | Hectares |
|---|----------|
| Knotweed  | 3.67     |
| Knotweed and other invasive species                       | 16.50    |
| Knotweed and Himalayan Blackberry                         | 14.42    |
| Other invasive species                                    | 7.72     |
| Prickly sow thistle (invasive) and other invasive species | 3.22     |
| Thistle and other invasive species                        | 0.29     |
| Thistle species   | 0.82     |
| Total   | 46.64    |



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# 5.0 INVASIVE PLANT MITIGATION

The measures to prevent and control the establishment and spread of invasive plant species in the terrestrial and riparian portions of the CPA during construction and operations are described in the following subsections. The (nexwantas (monitoring) and reporting program, including the approach to adaptive management, is described in Section 6.3.

# 5.1 BEST MANAGEMENT PRACTICES AND STANDARDS

Governments and industry bodies have published several best practices, guidelines, and codes of practice applicable to the management of invasive plants. These documents contain management techniques that are acceptable to regulators and contribute to the corporate due diligence in environmental protection. The following documents were considered in the development of this Plan:

- The Field Guide to Noxious Weeds and Other Selected Invasive Plants of British Columbia (Province of British Columbia, 2021)
- Invasive Alien Plant Program Reference Guide (Ministry of Forests and Range, 2010)
- A Guide to Weeds in British Columbia (MAFF, 2002)
- Invasive Alien Plants in Canada Technical Report (Canadian Food Inspection Agency, 2008)
- Sea to Sky Corridor Invasive Plants: A Guide to Identification & Management (SSISC, 2012)
- Best Practices for Managing Invasive Plants on Roadsides (ISCBC, 2019)
- Best Practices for Managing Invasive Species on Utility Operations (ISCBC, 2014)
- Pest Management Plan for Invasive Alien Plant and Noxious Weed Control on Provincial Crown Lands within South Coastal Mainland of British Columbia (Province of British Columbia, 2011)
- Best Management Practices for Knotweed Species in the Metro Vancouver Region
   (Metro Vancouver, 2021a)
- Best Management Practices for English and Irish Ivies in the Metro Vancouver Region (Metro Vancouver, 2021b)
- Best Management Practices for English Holly in the Metro Vancouver Region (Metro Vancouver, 2021c)
- Best Management Practices for Himalayan Balsam in the Metro Vancouver Region (Metro Vancouver, 2021d)
- Best Management Practices for Himalayan Blackberry in the Metro Vancouver Region (Metro Vancouver, 2021e)
- Best Management Practices for Scotch Broom in the Metro Vancouver Region
   (Metro Vancouver, 2021f)
- Best Management Practices for Reed Canarygrass in the Metro Vancouver Region (Metro Vancouver, 2021g)



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- Targeted Invasive Plant Solutions 16 Invasive Knotweeds (IPCBC, 2008)
- Invasive Japanese Knotweed (*Fallopia japonica* (Houtt.)) Best Management Practices in Ontario (OIPC and Anderson, 2012)

# 5.2 CONSTRUCTION PHASE

# 5.2.1 Prevention Program

Table 5 lists the Project activities that may result in the introduction or spread of invasive plant species and the associated potential effect, and describes mitigations to prevent such introduction or spread during the Project construction phase.

| Project<br>Activity                | Potential Activity<br>Effect  | Mitigation   |
|------------------------------------|---|--|
| Vehicle and<br>Machinery<br>Access | Vehicles and machinery<br>are the most common<br>ways invasive plants<br>infest new areas | • The Contractor will establish wash and inspection stations where vehicles and construction equipment arriving and departing the site will be cleaned and inspected to prevent the spread of invasive plants. Wash stations involve the use of water to remove accumulations of dirt, debris, and weed matter from vehicles and construction equipment (USDA, 2005). If the inspection determines a vehicle or piece of construction equipment is not clean upon arrival to the CPA, the Contractor will wash it prior to use. The Contractor will also wash vehicles and construction equipment prior to barging offsite. When washing, special attention will be paid to wheel wells, tire treads, tracks, and undercarriages where mud, roots, and seeds may be lodged. The use of these wash stations will be documented by the Contractor's EM. Wash stations will require containment of run-off and sediment to prevent further distribution of invasive plants. Treatment of any invasives that establish in stockpiled accumulated sediment will follow the Soil Management and Grading Project Activity in this table (Table 5). Erosion and sediment control and treatment of potentially contaminated soil in accumulated sediment stockpiles will follow the methods in Table 6 and Section 5.2.4. |
|                                    |   | <ul> <li>Vehicle and equipment movement within the CPA will be<br/>concentrated within designated roads, travel corridors, and<br/>development areas (including clearing and grubbing outside of<br/>designated roads). Designated roads, travel corridors, and<br/>development areas will be identified by the Contractor; they will be<br/>responsible for conveying this information to equipment operators<br/>either through signage within the CPA or maps presented as part<br/>of the environmental orientation program detailed in the<br/>Construction Environmental Management Plan (CEMP).</li> </ul>  |
|                                    |   | <ul> <li>Disturbed areas which have exposed, unvegetated ground/soil<br/>surfaces will be revegetated with a vegetation seed mix in order to<br/>establish a vegetation cover that will control invasive plant<br/>establishment and surface erosion (seed mix details provided<br/>under Vegetation Clearing activity).</li> </ul>  |

#### Table 5 Mitigation to Prevent the Spread of Invasive Plant Species during Construction



| Project<br>Activity               | Potential Activity<br>Effect  | Mitigation   |
|-----------------------------------|---|--|
| Vegetation<br>Clearing            | If areas that are currently<br>vegetated are cleared for<br>temporary use, those<br>areas will be revegetated<br>by the Contractor once<br>the area is no longer<br>required. Cleared<br>vegetation could contain<br>invasive plant<br>propagules or seeds and<br>exposed soil could<br>promote invasive plant<br>establishment if not<br>revegetated with native<br>species in a timely<br>manner. | <ul> <li>Areas to be cleared will be flagged to limit the risk of over clearing of vegetation.</li> <li>Clearing within 20 m of known locations of noxious weeds will be monitored by the EM to confirm that mitigation measures are being followed.</li> <li>The QP will provide an erosion control or reclamation seed mix specification (e.g., custom native seed mix, Coastal Revegetation Mix, or Ministry of Highways Vancouver Island/Coast mix) and application rate that the Contractor will use to reseed disturbed areas<sup>1</sup>.</li> <li>Seed grade will be Common No. 1 Forage or better, as determined by QP<sup>1</sup>.</li> <li>Practices for clearing and grubbing will be proposed by the Contractor and approved by the EM.</li> </ul>  |
| Soil<br>Management<br>and Grading | There is potential that<br>soil being moved<br>between areas within the<br>CPA or imported as fill<br>will introduce or spread<br>invasive plant species.   | <ul> <li>Any soil or fill brought to the CPA for use during construction will be obtained from reputable suppliers that meet the requirements of the District of Squamish Soils Management Bylaw No. 2641 (DOS, 2018), as applicable.</li> <li>Within the CPA, soil from areas with invasive plant species present will only be reused or stockpiled within that specific site or areas where the invasive plant species are already present and subject to control measures (Figure 3).</li> <li>Invasive plant infestations will be treated prior to clearing to reduce the potential for invasive plants to spread once clearing has started.</li> <li>After moving soil from areas that contain invasive propagules, vehicles, tools, and other equipment will be cleaned to avoid spreading invasive plant parts around the CPA.</li> <li>Soil containing any invasive plant parts that will be buried will be buried to a minimum depth of 5 m</li> <li>Disturbed areas which have exposed, unvegetated ground/soil surfaces will be revegetated with a vegetation seed mix in order to establish a vegetation cover that will control invasive plant establishment and surface erosion (seed mix details provided under Vegetation Clearing activity).</li> </ul> |
| Shared Land<br>Use                | Introduction or spread of<br>invasive species via use<br>of Forest Service Roads<br>located within the CPA  | <ul> <li>Woodfibre LNG is working with the forest tenure holders and other land tenure holders to identify opportunities for ongoing access through construction and operations.</li> <li>Woodfibre LNG will communicate with other tenure holders where invasive plant species occur to mitigate the spread of invasive plant species.</li> </ul>   |

#### Table 5 Mitigation to Prevent the Spread of Invasive Plant Species during Construction

Note:

<sup>1</sup> Seed mix will not contain clover (*Trifolium* spp.)



# 5.2.2 Control Program

The control program is based on the control and disposal methods listed in Table 6 and Table 7. The program will address control of existing invasive plant species listed under the *Weed Control Act* and SLRD Noxious Weeds Control Bylaw (Bylaw No. 1542), as well as species on the SSISC Priority Species List (2020a) with management category of Prevention Watchlist, Contain, or Control, in areas where vegetation is cleared to support Project activities. As summarized in Table 3, these management categories are associated with the following approaches to control:

- **Prevention Watchlist:** invasive species not yet known in the ISMA. Prevent the invasive species from entering the region and eradicate immediately if detected following Early Detection Rapid Response protocol. Three invasive plant species with management category Prevention Watchlist were identified in the CPA, though two of them have not been observed since 2013.
- **Contain:** invasive species abundant in portions of ISMA. Apply control measures to limit the spread of the invasive species. Four invasive plant species with this management category have been identified in the CPA, including the noxious weed Japanese knotweed.
- Strategic Control: widespread invasive species beyond landscape-level control and/or with relatively low impact; apply control measures in high priority areas only. Twelve invasive plant species with this management category were identified in the CPA, including two noxious species: thistle species (*Cirsium* spp.) and sow-thistle species (*Sonchus* spp.). The Green Zone and riparian areas are the high priority areas within the CPA (see Figure 1). The Green Zone is an area adjacent to Mill Creek where riparian habitat will be protected and enhanced following Project construction. In compliance with the Certified Project Description, the Green Zone will be planted with suitable native vegetation and will not contain any permanent Project buildings.
- **Insufficient Information**: Complete an inventory for these species if needed; monitor known locations. There are three invasive plant species identified within the CPA in the management category of Insufficient Information.

Site preparation for the Project footprint will generally consist of clearing of debris and vegetation, removal of topsoil and soil containing organic materials (i.e., soil salvage), and disposal and/or stockpiling of materials. Cleared and salvaged soil materials will be categorized according to the presence of invasive species (e.g., clean, general organic, containing noxious weeds), with prevention and control measures applied accordingly. Materials containing invasive plants (or propagules) will be stockpiled and/or disposed of properly (Table 6 and Table 7). Stockpiling will only occur in areas approved by Woodfibre LNG and will follow the measures outlined in Table 5 (Soil Management and Grading) and Section 5.2.4. Stockpiled soils will be a minimum of 30 m from a watercourse, and at least 50 m away from a watercourse where feasible.

In addition to the broad management of vegetation and soil materials containing invasive species that will occur during site preparation activities in the Project footprint, targeted control measures may be required for individual occurrences of invasive species. Table 6 provides a suite of targeted control and disposal methods for noxious weeds listed on the *Weed Control Act* that have been identified in the CPA. These methods were developed through discussions with invasive plant specialists from the Skwxwú7mesh Úxwumixw (Squamish Nation) working group and MoF. Recommended measures for targeted control of other invasive plant species known to occur within the CPA are presented in Table 7.



| Table 6 | Control and Disposal Methods for Weed Control Act Noxious Weeds within |
|---------|--|
|         | the CPA  |

| Common<br>Name        | Control and Disposal Methods   |
|-----------------------|--|
| knotweed <sup>1</sup> | • Areas infested with knotweed (as per Figure 3) will be georeferenced, flagged, signed, treated, bermed where feasible, and monitored prior to any earthworks to prevent further infestation.   |
|                       | • Where clearing is planned outside of the growing season (i.e., late fall and winter), knotweed areas will be flagged during the previous growing season (i.e., spring, summer, or early fall).   |
|                       | • Infested or potentially infested soil, plant, or knotweed material (Figure 3) will remain onsite for disposal. Contaminated soils that also contain invasive plant parts will be handled in a manner consistent with Contaminated Sites Regulation requirements for contaminated soils, as applicable (see Section 5.2.4).   |
|                       | • Salvaged/disturbed soil, vegetation, or material containing, or potentially containing, knotweed plant parts will be stockpiled in a predetermined area where there is a known knotweed infestation prior to its disposal. The stockpile will be subject to appropriate erosion and sediment control (e.g., tarping during winter months and extreme weather events) to prevent erosion and following disposal this area will be reviewed by a QP bi-weekly, treated, and managed, as necessary during the growing season.   |
|                       | • Potential spread of knotweed from the knotweed infested soil stockpile will be controlled by covering the stockpile. Knotweed in this area will be treated with herbicide in-situ in this area, if required. This area will be bermed where feasible, clearly marked, signed and monitored bi-<br>weekly during the growing season to make sure plant parts are not observed outside of the contained area and to monitor effectiveness of herbicide treatment.  |
|                       | • Knotweed areas disturbed by construction will be treated and managed to control the spread of knotweed or introduction of other invasive species.  |
|                       | <ul> <li>As per the specifications of the weed control contract developed by Woodfibre LNG, chemical<br/>treatment will be applied, as needed, to infected areas. The use of herbicides will be<br/>discussed with District of Squamish or SLRD staff and provided to Squamish Nation prior to<br/>treatment. Herbicide application permits, as required by regulatory agencies such as the BC<br/>Ministry of Environment, will be obtained prior to application. The licensed weed management<br/>professional must be certified, have a valid pesticide license, and have at least three years of<br/>experience treating and successfully managing knotweed infestations.</li> </ul> |
|                       | • Knotweed located within the waterbody or within 30 m of a waterbody may be treated using stem injections or foliar herbicides approved for use within riparian areas. Only herbicides that are approved by the Government of Canada for use near water will be used within 30 m of a water course. Prior to the use of any herbicide WLNG will consult with IG and relevant government agencies.   |
|                       | • No herbicides will be used within the herbicide-free zone (1 m away from the high-water mark) unless approved by the appropriate entities described in Section 1.0 and Section 2.0.  |
|                       | Chemical treatment will be conducted annually in the spring, early summer, and late summer<br>or fall for follow-up treatments   |
|                       | <ul> <li>Follow up treatments will be based on the monitoring observations recorded during<br/>quality inspection</li> </ul>   |
|                       | • Mechanical removal will be used where herbicide use is not considered acceptable by a QP.<br>In this case, applicable agencies (e.g., Fisheries and Oceans Canada, BCER) will be<br>consulted in advance and works will be monitored.  |



| Table 6 | Control and Disposal Methods for Weed Control Act Noxious Weeds within |
|---------|--|
|         | the CPA  |

| Common<br>Name                      | Control and Disposal Methods   |
|-------------------------------------|--|
| knotweed <sup>1</sup><br>(conťd)    | • Live stems can be hand-cut, tarped, bagged, and disposed of by deep burial at a minimum depth of 5 m (ISCBC, 2017; Metro Vancouver, 2021a). Cutting of plants should be done before plants go to seed (late spring or early summer). The burial area will be monitored during the growing season to verify that knotweed does not become established. Any regrowth of knotweed will be chemically treated where appropriate (e.g., not within 30 m of waterbody, unless treated using stem injections).  |
|                                     | <ul> <li>If contaminated soils infested with knotweed need to be disposed of offsite, all material should<br/>be bagged, sealed, and securely strapped to a vehicle. Facilities that accept knotweed<br/>infested soils can be found in Best Management Practices for Knotweed Species in the Metro<br/>Vancouver Region (Metro Vancouver, 2021a). Knotweed canes will not be transported off<br/>site. Areas where knotweed has been removed that are outside of the Project footprint<br/>(i.e., not subject to development) will be revegetated using a seed mix approved by the QP to<br/>prevent further invasive plant establishment.</li> </ul> |
|                                     | • As knotweed should not be transported, if possible (Metro Vancouver, 2021a), where feasible knotweed may be disposed of by completely incinerating the plants onsite (ISCBC, 2008; OIPC and Anderson, 2012) using an appropriate burning device (e.g., an air curtain burner), that will attain high enough temperatures to render the rhizomes and other plant parts incapable of reproduction, re-rooting, or spread. A QP will observe the success of incineration and provide feedback to the incineration Contractor.   |
| thistle or sow-thistle <sup>2</sup> | Treatment will be undertaken during the growing season prior to start of construction in the vicinity of the occurrence.   |
|                                     | Mechanical treatment will include the following, depending on the timing of the treatment:   |
|                                     | <ul> <li>Mowing plants when buds are present (mid- to late-spring); or</li> </ul>  |
|                                     | <ul> <li>Digging up rosettes and leaving to decompose on site.</li> </ul>  |
|                                     | <ul> <li>Prior to flowering, plant parts will be left to decompose on site.</li> </ul>   |
|                                     | <ul> <li>However, if plants are cut after flowering, they will be disposed of in an on- or off-site<br/>landfill for deep burial.</li> </ul>   |
|                                     | <ul> <li>Herbicide will be used if a QP determines that mechanical control is unlikely to be effective for<br/>the species. The use of herbicides will be discussed with District of Squamish or SLRD staff<br/>prior to treatment. Herbicide application permits, as required by regulatory agencies such as<br/>the BC Ministry of Environment, will be obtained prior to application. If feasible, treatment will<br/>occur at the growth stage stated on the herbicide label. More than one application may be<br/>required.</li> </ul>  |

Notes:

<sup>1</sup> There are four species of knotweed that occur in southwestern BC: Japanese knotweed (*Fallopia japonica/Reynoutria japonica*), giant knotweed (*Fallopia sachalinensis*), bohemian knotweed (*Fallopia x bohemica*), and Himalayan knotweed (*Polygonum polystachyum*) (ISCBC, 2017). Japanese knotweed is the only species of these four that has been documented in the CPA (Section 5.0). All knotweeds are designated as noxious under the *Weed Control Act* and they are similar in appearance. Control and disposal methods in this table are applicable to all four species.

<sup>2</sup> Several different thistle species (*Cirsium sp.* or *Sonchus sp.*) were identified during the surveys; however, specimens were not identified to the species level due to their poor condition. Until confirmatory surveys are undertaken to determine the species and the applicability of the *Weed Control Act*, all thistle species documented within the CPA will be treated as though noxious and regulated by the *Weed Control Act*.



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To be most effective, targeted control methods will be tailored to the characteristics of the invasive plant species occurrence being controlled, based on information such as the target plant species, size of infestation and treatment type, and flowering period and seed production. This selection of control methods will be determined with input from the QP, EM, and/or licensed weed management professional and approved by Woodfibre LNG's Environmental Representative.

For invasive plant infestations, the following is the preferential order for treatment:

- 1. Infestations in high traffic areas and travel routes
- 2. Infestations in riparian and seasonally flooded or standing water areas
- 3. Infestations in areas of known soil containing invasive plants

The majority of the invasive occurrences on site will be controlled by removal of above ground plant parts during clearing and construction and then disposed of by incineration in an air curtain burner (Table 7). Soil containing invasive plant parts will be treated as per Table 6 for knotweed and sow-thistle and Table 5 for all other species. Table 7 provides methods for the targeted control and disposal of other invasive plant species (i.e., species listed under SLRD Bylaw 1542 and/or with SSISC Management Category of Prevention Watchlist, Contain, or Strategic Control that are not noxious weeds) that have been identified within the CPA. Appropriate control and disposal methods for known occurrences impacted by construction activities will be developed by a QP for implementation by the Contractor. In cases where removal and incineration are not feasible and the QP determines that targeted control is required, the location and extents of occurrences will be isolated and access controls (i.e., flagging and signage) will be implemented until the appropriate disposal method has been determined and implemented for that particular occurrence (Table 7; SSISC, 2012). The use of herbicides as a treatment method for invasive plants that are not noxious weeds will comply with any applicable legislation, including local bylaws. Herbicide application permits, as required by regulatory agencies such as the BC Ministry of Environment, will be obtained prior to application.



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| Common Name                      | Latin Name                     | SLRD<br>Bylaw<br>1542 | Control and Disposal Methods  |
|----------------------------------|--------------------------------|-----------------------|---|
| All Categories                   | 1                              |                       | ·   |
| All                              | N/A                            | N/A                   | Throughout the majority of the site, above ground invasive<br>plant occurrences will be mechanically removed using an<br>excavator during clearing and construction activities.<br>Excavated invasive plant parts will be incinerated<br>(e.g., air curtain burner) by a Contractor concurrent with<br>the clearing and construction activities.  |
| Prevention Watchlis              | t                              |                       |   |
| traveler's joy; wild<br>clematis | Clematis vitalba               | Yes                   | Cut climbing vines at knee height and apply herbicide to<br>cut vines. Treat vines when actively growing in late spring.<br>Plant material will be bagged, labelled as invasive plant<br>material, and disposed of at an appropriate facility and/or<br>landfill.   |
| big-leaf periwinkle              | Vinca major                    | Yes                   | Small infestations and seedlings can be pulled or covered<br>with a weed barrier (e.g., landscaping fabric) for<br>4-6 months. Plant material will be bagged, labelled as<br>invasive plant material, and disposed of at an appropriate<br>facility and/or landfill.  |
| bladder campion;<br>maidenstears | Silene vulgaris<br>(cucubalus) | Yes                   | Manual treatment by removing the seed heads and plant.<br>Herbicides effective but best applied early in season<br>before seed production. Fall applications may also offer<br>long-term control. Plant material will be bagged, labelled<br>as invasive plant material, and disposed of at an<br>appropriate facility and/or landfill.   |
| Contain                          | 1                              |                       |   |
| butterfly-bush                   | Buddleja davidii               | Yes                   | Remove when flowering. Pull smaller plants and cut larger<br>plants at the base of the stem. Dig up the root ball and<br>cover with a fabric barrier, then mulch to prevent<br>re-sprouting. Do not leave stems on the ground. Plant<br>material will be bagged, labelled as invasive plant material,<br>and disposed of at an appropriate facility and/or landfill.  |
| English ivy                      | Hedra helix                    | Yes                   | Manually remove ivy at rooting nodes before seeds are<br>produced. Bag plants and dispose of at a landfill. Will need<br>to be repeated if herbicides are not used. Pulling vines out<br>of trees can cause damage, so it is better to cut vines at<br>chest height and remove everything below that. Plant<br>material will be bagged, labelled as invasive plant material,<br>and disposed of at an appropriate facility and/or landfill<br>(Metro Vancouver, 2021b). |
| English holly                    | llex aquifolium                | Yes                   | Cut down mature plants before berries are produced and<br>brush stumps with herbicide. Young plants will be pulled.<br>Roots should be removed as much as possible<br>(Metro Vancouver, 2021c). Plant material will be bagged,<br>labelled as invasive plant material, and disposed of at an<br>appropriate facility and/or landfill.   |

### Table 7 Control and Disposal Methods for Invasive Plant Species



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| Common Name   | Latin Name                | SLRD<br>Bylaw<br>1542 | Control and Disposal Methods  |
|---|---------------------------|-----------------------|---|
| Strategic Control   | 1                         |                       | ·   |
| scotch broom  | Cytisus scoparius         | Yes                   | Larger plants must be cut below ground level and the<br>stems injected or sprayed with herbicide, while smaller<br>plants will be hand pulled (Metro Vancouver, 2021f).<br>Plants must be cut or pulled prior to seed production and<br>must be bagged and disposed of in a landfill.   |
| orange hawkweed   | Hieracium<br>aurantiacum  | Yes                   | Plants can be removed by digging up the rosette. Care<br>must be taken not to break the roots and entire plant must<br>be removed to prevent plant re-growth. If flowers are<br>already present, plants should be carefully disposed of by<br>placing them in a plastic bag or similar container so seeds<br>cannot spread. Regular mowing before the flowers go to<br>seed can reduce seed production. Plant material will be<br>bagged, labelled as invasive plant material, and disposed<br>of at an appropriate facility and/or landfill.   |
| common St. John's<br>wort   | Hypericum<br>perforatum   | Yes                   | This species is considered under biological control, but<br>some populations of the plant are out of phase with the<br>chemical control measures. Combinations of 2,4-D and<br>picloram, or 2,4-D and glyphosate have been used to<br>control this plant in the US. Several biocontrol agents are<br>available to control large infestations. Monitor sites to<br>confirm chemical control measures are present and the<br>plant is not dispersing. If any plant material is cut, it will be<br>bagged, labelled as invasive plant material, and disposed<br>of at an appropriate facility and/or landfill. |
| policeman's helmet;<br>ornamental<br>jewelweed;<br>Himalayan balsam | Impatiens<br>glandulifera | Yes                   | Plants can be easily removed by hand-pulling but must be<br>removed before seeds are produced, usually before<br>flowering. For larger infestations, mowing can also be<br>effective in non-riparian areas (Metro Vancouver, 2021d).<br>Plant material will be bagged, labelled as invasive plant<br>material, and disposed of at an appropriate facility and/or<br>landfill.   |
| Himalayan<br>blackberry   | Rubus<br>armeniacus       | Yes                   | Cut back branches when flowering and before berries are<br>produced. Dig up the root ball using machinery or by hand.<br>Plant material will be bagged, labelled as invasive plant<br>material, and disposed of at an appropriate facility and/or<br>landfill (Metro Vancouver, 2021e).   |
| common periwinkle   | Vinca minor               | Yes                   | Dig up plants by removing the plants and 60 cm of soil<br>under and around the plants. Hand pull regrowth and<br>repeat over two to three years for complete removal if<br>herbicides are not used. Plant material will be bagged,<br>labelled as invasive plant material, and disposed of at an<br>appropriate facility and/or landfill.   |

### Table 7 Control and Disposal Methods for Invasive Plant Species



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| Common Name                         | l atin Name                | SLRD<br>Bylaw<br>1542 | Control and Disposal Methods  |  |  |
|-------------------------------------|----------------------------|-----------------------|---|--|--|
| Strategic Control (co               | Strategic Control (cont'd) |                       |   |  |  |
| common burdock                      | Arctium minus              | -                     | Preventing the production of the burred seed is a key<br>manner to prevent spread. Mowing or cutting is best done<br>before flowering to eliminate seed production. To remove<br>this problematic plant fully, the large taproot system that<br>grows deep underground must be tilled. Re-seed bare soil<br>where possible, and encourage desirable, competing<br>vegetation. Most broadleaf herbicides are also useful for<br>control. Plant material will be bagged, labelled as invasive<br>plant material, and disposed of at an appropriate facility<br>and/or landfill. |  |  |
| common foxglove;<br>purple foxglove | Digitalis purpurea         | -                     | Cut before seed set. Plant material will be bagged, labelled<br>as invasive plant material, and disposed of at an<br>appropriate facility and/or landfill.  |  |  |
| common tansy                        | Tanacetum<br>vulgare       | -                     | Use a combination of mowing and herbicide to control<br>large infestations. Hand pulling is effective for smaller<br>patches. Gloves must be worn to prevent skin irritation<br>from the sap. Plant material will be bagged, labelled as<br>invasive plant material, and disposed of at an appropriate<br>facility and/or landfill.   |  |  |
| oxeye daisy                         | Leucanthemum<br>vulgare    | -                     | Herbicide may be applied to prevent regrowth. Plant<br>material will be bagged, labelled as invasive plant material,<br>and disposed of at an appropriate facility and/or landfill  |  |  |
| No Action                           |                            |                       |   |  |  |
| creeping buttercup                  | Ranunculus<br>repens       | Yes                   | Manual removal by digging out, removing runners, roots<br>and growing points, is most effective from fall to spring<br>when soil is moist. Plants resist mowing and re-sprout<br>quickly when cut. Broadleaf herbicides can be effective<br>and likely require two or three applications to eradicate<br>because mature plants can recover and the seed bank<br>persists. Plant material will be bagged, labelled as invasive<br>plant material, and incinerated on site.   |  |  |
| Insufficient Information            |                            |                       |   |  |  |
| cherry-laurel                       | Prunus<br>Iaurocerasus     | No                    | Small plants can be dug up while larger plants can be cut<br>to the ground and the root ball dug out or an herbicide<br>used on the stump (SSISC, 2020b).   |  |  |
| creeping bellflower                 | Campanula<br>rapunculoides | No                    | Hand-pulling or digging plants out before blooming will<br>prevent seed production. Roots are likely to resprout, so as<br>much root and rhizome material as possible must be<br>removed (Alberta Invasive Species Council, 2014).  |  |  |
| reed canarygrass                    | Phalaris<br>arundinacea    | No                    | Small patches can be removed by digging out the plant<br>and all of the roots. Larger infestations can be smothered<br>using clear or black plastic. Herbicides are also effective<br>(Tu, 2004).   |  |  |

### Table 7 Control and Disposal Methods for Invasive Plant Species



# 5.2.3 Treatment Constraints

Treatments may be completed at any time of the growing season for all species except knotweed, which needs to be treated at least twice with herbicide at specific times: once in late spring and then again two months later. Three invasive plant control field program scopes of work will be carried out in the spring, summer, and fall for this site. It is assumed that the majority of species will require treatment during more than one of the three programs.

Within 30 m of waterbodies, conventional foliar herbicides will not be used, but stem injections or manual removal are permitted. Within 1 m of waterbodies, no conventional herbicides will be applied; however, an herbicide designed for riparian applications is being explored for use subject to approval by the relevant entities (see below for more information). Broadcast spray application of herbicides is not recommended in natural undisturbed vegetated areas such as forests or shrubland areas to avoid herbicide injury to non-target species due to spray drift. Alternate herbicide application methods for areas such as forest or shrubland are recommended, including stem injection, stem painting, wipe on application, basal spray, or cut stump application. Mechanical or manual control treatments are also recommended for these areas (see NSW, 2022 and USDA, 2011).

Woodfibre LNG has applied for a permit to use Habitat® Aqua for riparian area herbicide applications, and is currently consulting with relevant groups and agencies. The effectiveness of Habitat® Aqua will be assessed during Quality Inspection of invasive treatments (see Section 6.0 for details on Quality Inspection). If approved for use in 2023, Habitat® Aqua will be used in the third treatment application (targeting September). The manufacturer, BASF, reports that Habitat® Aqua is a "low-volume herbicide that provides effective, long-lasting, post-emergent control of undesirable, invasive and emergent aquatic vegetation", and is a "nonvolatile, water-soluble herbicide that will not bioaccumulate in aquatic organisms" (BASF 2021).

# 5.2.4 Management of Contaminated Soils and Contaminated Soils with Invasive Plants

Due to the historical industrial use of Swĺyat, there is the potential for contaminated soils to also have invasive plant species present. In all cases, the requirements of the Contaminated Sites Regulation under the *Environmental Management Act* will take precedence over any guidance provided in this IPMP. To mitigate the spread of invasive plant species during contaminated soils management activities, the following mitigation measures will be applied:

- Soils that are, or suspected to be, contaminated and contain invasive plants (propagules) will be stockpiled in a contained area that is flagged and posted with appropriate signage. Mitigations for extreme weather events/erosion and sediment control will be provided (e.g., tarps and silt fencing).
- Woodfibre LNG is in the process of applying for an Approval in Principle from the Ministry of Environment to reuse contaminated soils on site as per conditions of the Approval in Principle (e.g., buried to a minimum of 1.5 m and capped with a road surface).



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- Equipment transporting the contaminated soils on site will be cleaned prior to use for other purposes.
- Within the CPA, soils with contamination levels that allow for re-use on-site and from areas with
  invasive plant species present will only be reused within that specific site or areas where the same
  invasive plant species is already present. Soils will only be re-used after invasive plant management
  has occurred (i.e., mechanical or chemical treatment, if appropriate). Contaminated soils that contain
  invasive plant parts will only be re-used if they can be buried to the specifications of the BMPs found
  in Section 5.1 and as per the Agreement in Principle described above.

# 5.3 OPERATIONS PHASE

After commissioning the LNG facility, Woodfibre LNG will prepare an operational IPMP that will outline the approach to surveying and managing remaining invasive plants within the CPA. This is anticipated to build upon the learnings from the construction phase of the Project. As part of this process, Woodfibre LNG will review new information from the ISCBC, SSISC, and BC Inter-Ministry Invasive Species Working Group Priority Species list to identify any new or emerging noxious weed or invasive plant species of concern that have the potential to occur within the terrestrial portion of the CPA. It is anticipated that the extent of invasive plants within the terrestrial portion of the CPA will be substantially reduced by the end of construction and the intent of the operations phase IPMP will be to prevent, control, and monitor the establishment and spread of invasive plant species in the terrestrial portions of the CPA.



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# 6.0 INVASIVE PLANT SPECIES ÍNEXWANTAS (MONITORING) AND REPORTING

The objectives of the inexwantas (monitoring) program are to confirm implementation of the IPMP during construction, determine the effectiveness of the invasive plants control measures outlined in Section 5.2, and identify triggers and actions for treatment. The effectiveness component of the inexwantas (monitoring) program will be used to inform subsequent control activities in the terrestrial portions of the CPA.

# 6.1 CONSTRUCTION PHASE COMPLIANCE ÍNEXWANTAS (MONITORING) AND REPORTING

During construction, the EM will be responsible for documenting compliance with the prevention measures described in Section 5.2. This will be documented in the monthly inexwantas (monitoring) reports prepared by the EM and will be available for audit purposes.

As required by the OGAA, an invasive species compliance record is required. This record will be prepared and maintained by the QP and will include:

- A description of the monitoring activities used to determine whether invasive species have become established, are established, or have spread to new areas
- The location, presence/absence, and density/distribution of invasive plants observed
- Activities carried out to prevent transport and establishment of invasive plants
- Activities carried out to remove invasive plants
- Revegetation activities, including which species are planted

The invasive species compliance record will contain the dates, methods and equipment used for invasive plant activities (i.e., monitoring, activities carried out to prevent transport and establishment of invasive species, invasive species removal activities and revegetation activities). The qualifications of personnel completing and/or supervising the activities will be included in the compliance report.

# 6.2 CONSTRUCTION PHASE EFFECTIVENESS ÍNEXWANTAS (MONITORING) AND REPORTING

Woodfibre LNG will undertake an effectiveness (nexwantas (monitoring) program in years 2 and 3 of construction and at the end of construction, prior to the start of operations. The schedule for these surveys has been selected as the initial invasive plants control activities will be implemented by Woodfibre LNG's Contractor(s) in years 1 and 2, with earth works (i.e., stripping and grading) underway in year 1 as well.



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As part of this inexwantas (monitoring) program, invasive plant surveys will be completed in the terrestrial portion of the CPA and 100 m buffer around terrestrial portions of the CPA, where safe and feasible to access, with particular focus on areas of recent Project activities. Surveys will follow the guidelines provided by the Invasive Alien Plant Program at the time of each survey. These surveys will be overseen by a QP and will be used to:

- Monitor the effectiveness of the prevention program by identifying and delineating any new infestations
  - Quality inspections will be completed within approximately two weeks of each treatment, and the results of these surveys will be used to inform future treatments.
- Monitor the effectiveness of the control program by documenting:
  - the presence/absence and density/distribution and vigour of invasive plants in areas that have been treated
  - o delineating areas containing invasive plants that have not yet been subject to the control program
  - o delineating areas where regrowth has occurred
- Inform recommendations for additional treatments (Section 5.2.2)

Triggers for additional treatment will be based on the results of surveys. The following triggers will be taken into consideration by the QP in providing recommendations for additional treatment:

- Identification of a new invasive species in the CPA
- Spread of invasive species beyond bounds previously mapped
- Changes to applicable legislation or guidance requiring control of species found in the CPA (e.g., addition of a new species to the Weed Control Regulation under the *Weed Control Act*, or a change in management category by the SSISC)

The results of each survey will be documented in a short technical report that summarizes the control program implemented in the previous year, the results of the current survey, and recommendations for further implementation of the control program (i.e., treatment prescriptions). This report will describe any adaptive measures that were taken and followed up on. This report will be signed by a QP. Copies of these reports will be available to the relevant parties, currently identified as the BC EAO, MoF, BCER, Skwxwú7mesh Úxwumixw (Squamish Nation), and Tsleil-Waututh Nation, upon request.

Two weeks after each invasive plant control treatment, a quality inspection survey will be completed that will document the effectiveness of the treatment and provide input for the next round of treatments. In addition to this report, the treatment Contractor will provide documentation of every treatment indicating specifications, methodology, location, effectiveness, and updated spatial extents, and the results will also be considered in adaptive management.



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# 6.3 ADAPTIVE MANAGEMENT

If the prevention or control methods specified in Sections 5.2.1 and 5.2.2 are not effective during construction, Woodfibre LNG will consult with the SSISC, ISCBC (or the regulating body if that association dissolves), and MoF Invasive Plant Specialists to discuss alternative prevention and treatment strategies, as new methods and technologies may be developed over time. The CPA will be surveyed for invasive plant species annually during Construction. New treatment strategies will be developed with the QP. Any information related to new treatment strategies will be updated in the IPMP and further clarification on treatment will be provided by a QP. If new invasive plant species occurrences, or new occurrences of previously documented species are encountered during treatment or monitoring activities, their location, distribution, and density will be described and incorporated into treatment plans. This IPMP will be updated by the Woodfibre LNG Environmental Representative to reflect any prevention or control measures added or removed as part of the adaptive management strategy, or new invasive species and occurrences encountered. If this occurs, Woodfibre LNG will prepare a red-line version of the Plan identifying the changes that were made. The red-line version will be issued to Skwxwú7mesh Úxwumixw (Squamish Nation), Tsleil-Waututh Nation, and regulatory agencies for a 30-day review and comment period. After comments are received, the updated IPMP will be finalized and issued to the BC EAO. During Project operations, Woodfibre LNG onsite environmental staff will determine an appropriate (nexwantas (monitoring) program and adaptive management approaches.

# 6.4 OPERATIONS PHASE ÍNEXWANTAS (MONITORING) AND REPORTING

Woodfibre LNG will conduct follow-up (nexwantas (monitoring) of native plant landscaping on the Project site that is implemented as part of post-construction reclamation efforts. Inexwantas (Monitoring) will occur in the first two years of operations to determine the success of native plant revegetation efforts and overall condition of the site. The survival, growth, health, and vigour of planted native plants will be assessed, along with the presence and extent of invasive plant species.

Ínexwantas (Monitoring) of planted native plants and invasive plant species will occur once in the growing season each year for two years. Survival will be assessed either by conducting a complete census of nursery stock or assessed along a linear transect. Native and invasive plant species cover will be determined using at least three transects and the line-intercept method. Health and vigour will be qualitatively assessed on a scale from 1 to 4, where 1 = dead, 2 = low health and vigour, 3 = moderate health and vigour, and 4 = high health and vigour. Invasive plant species presence and extent will be assessed using the Invasive Alien Plant Program (nexwantas (monitoring) forms for the areas of native plant landscaping as a whole (MOFR, 2010). A summary report of survey findings will be produced following each (nexwantas (monitoring) year.

Native plant landscaping area(s) will be considered successful if  $\geq 80\%$  of the planted stock survive or planted stock plus natural recruitment yields at least one plant (tree or shrub) per square metre in the restoration area, at the end of the second growing season, and there is no increasing trend of invasive plant cover during the two-year (nexwantas (monitoring) period.



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# 6.5 PRE-CONSTRUCTION INVASIVE PLANT CONTROL

Two invasive plant species control treatment programs were completed in 2022 (July 11 to 15 and July 18 to 21, and August 22 to 26 and August 29 to September 2), and a follow-up quality inspection was completed in November 2022 after the second treatment Approximately 40-59% mortality of invasive plants was observed on the treated areas (approximately 23.5 ha) The objectives of the quality inspection survey were to document the effectiveness of invasive plant species control measures using IAPP field forms (MOFR, 2010); and photo document invasive plant species occurrences using the IAPP photo log form. Details of the quality inspection survey can be found in the memo referenced as "November 2022 Invasive Plant Control Quality Inspection" (Stantec, 2022).



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# **APPENDIX A**

**Invasive Plant Species Photo-Log** 



July 28, 2023

# Appendix A Invasive Plant Species Photo-Log





### Client: Woodfibre LNG

#### Project: WLNG-W0001-EV-EMP-0004: Invasive Plant Management Plan

Photograph ID: 1 Name: Common burdock (*Arctium minus*).

SLRD Bylaw 1542: N/A

SSISC Management Category: Strategic Control





Reference: Invasive Species Council of BC (Available at: <u>https://bcinvasives.ca/</u> Accessed November 2021).

#### Photograph ID: 2 Name: Butterfly-bush

(Buddleja davidii).

SLRD Bylaw 1542: Yes

SSISC Management Category: Contain





Reference: Invasive Species Council of BC (Available at: <u>https://bcinvasives.ca/</u> Accessed November 2021).



#### Client: Woodfibre LNG

#### Project: WLNG-W0001-EV-EMP-0004: Invasive Plant Management Plan

#### Photograph ID: 3

Name: Thistle species<sup>1</sup> (*Cirsium* spp.). Noxious.

SLRD Bylaw 1542: Yes

SSISC Management Category: Strategic Control





Reference: Invasive Species Council of BC (Available at: https://bcinvasives.ca/ Accessed November 2021).

#### Photograph ID: 4 Name: Traveler's joy

(Clematis vitalba).

SLRD Bylaw 1542: Yes

**SSISC Management** Category: Prevention Watchlist.

Photograph ID: 5

SLRD Bylaw 1542:

(Convolvulus arvensis).

Management Category: No

N/A SSISC

Action





Reference: E-Flora BC (Available at: https://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Clematis%20vitalba Accessed November 2021).





Reference: E-Flora BC (Available at: https://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Convolvulus%20arvensis Accessed November 2021).

Canada thistle (Cirsium arvense) or milk thistle (Silybum marianum) were not identified to species as both are listed as noxious.



# Client: Woodfibre LNG

| Project: WLNG-W0001                                | -EV-EMP-0004: Invasive Plant Management Plan   |
|--|--|
| Photograph ID: 6                                   |  |
| Name: Scotch broom ( <i>Cytisus scoparius</i> ).   |  |
| <b>SLRD Bylaw 1542:</b><br>Yes                     |  |
| SSISC Management<br>Category: Strategic<br>Control | Reference: Invasive Species Council of BC (Available at: <u>https://bcinvasives.ca/</u><br>Accessed November 2021).                          |
| Photograph ID: 7                                   |  |
| Name: Foxglove<br>( <i>Digitalis purpurea</i> ).   |  |
| SLRD Bylaw 1542:                                   |  |
| SSISC Management                                   |  |
| Category:<br>Strategic Control                     | Reference: E-Flora BC (Available at:<br>https://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Digitalis%20purpurea<br>Accessed November 2021). |
| Photograph ID: 8                                   |  |
| helmet ( <i>Impatiens</i> glandulifera).           |  |
| SLRD Bylaw 1542:<br>Yes                            |  |
| SSISC Management<br>Category: Strategic<br>Control |  |
|  | Reference: Invasive Species Council of BC (Available at: <u>https://bcinvasives.ca/</u><br>Accessed November 2021).                          |



### Client: Woodfibre LNG

#### Project: WLNG-W0001-EV-EMP-0004: Invasive Plant Management Plan

| -  |   |
|--|---|
| Photograph ID: 9   |   |
| Name: Knotweed<br>species <sup>2</sup><br>( <i>Fallopia spp.</i> ).<br>Noxious.<br>SLRD Bylaw 1542:<br>Yes |   |
| SSISC<br>Management<br>Category:<br>Contain  | Reference: Invasive Species Council of BC (Available at: https://bcinvasives.ca/                                    |
|  | Accessed November 2021).  |
| Photograph ID: 10  |   |
| <b>Name:</b> English ivy ( <i>Hedra helix</i> ).   |   |
| SLRD Bylaw 1542:<br>Yes  |   |
| SSISC Management<br>Category: Contain  | Reference: Invasive Species Council of BC (Available at: <u>https://bcinvasives.ca/</u><br>Accessed November 2021). |
| Photograph ID: 11  |   |
| Name: Orange<br>hawkweed ( <i>Hieracium</i><br><i>aurantiacum</i> ).                                       |   |
| SLRD Bylaw 1542:<br>Yes  |   |
| SSISC Management<br>Category:<br>Strategic Control   | Reference: Invasive Species Council of BC (Available at: <u>https://bcinvasives.ca/</u><br>Accessed November 2021). |

<sup>&</sup>lt;sup>2</sup> Japanese knotweed includes scientific synonyms *Reynoutria japonica* var. *japonica* or *Polygonum cuspidatum*.



## Client: Woodfibre LNG

| =  |   |
|--|---|
| Photograph ID: 12                                      |   |
| Name: Common<br>St. John's wort                        |   |
| (Hypericum<br>perforatum).                             |   |
| SLRD Bylaw 1542:<br>Yes                                |   |
| SSISC Management<br>Category: Strategic<br>Control     | Reference: Invasive Species Council of BC (Available at: https://bcinvasives.ca/                                    |
|  | Accessed November 2021).  |
| Photograph ID: 13                                      |   |
| <b>Name:</b> English holly ( <i>llex aquifolium</i> ). |   |
| <b>SLRD Bylaw 1542:</b><br>Yes                         |   |
| SSISC Management<br>Category: Contain.                 |   |
|  | Reference: Invasive Species Council of BC (Available at: <u>https://bcinvasives.ca/</u><br>Accessed November 2021). |



# Client: Woodfibre LNG

# Photographic Log

#### Project: WLNG-W0001-EV-EMP-0004: Invasive Plant Management Plan

| Photograph ID: 14<br>Name: Yellow sweet-                        |   |
|---|---|
| clover<br>( <i>Melilotus officinalis</i> ).                     |   |
| SLRD Bylaw 1542:<br>N/A   |   |
| SSISC Management<br>Category: No Action                         | Reference: E-Flora BC (Available at:<br>https://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Melilotus%20officinalis<br>Accessed November 2021). |
| Photograph ID: 15   |   |
| <b>Name:</b> Reed canary grass ( <i>Phalaris arundinacea</i> ). | A REPART OF THE AREA  |
| SLRD Bylaw 1542:<br>N/A   |   |
| SSISC Management<br>Category:<br>Insufficient Information       |   |
|   | Reference: E-Flora BC (Available at:<br>https://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Phalaris%20arundinacea<br>Accessed November 2021).  |



# Client: Woodfibre LNG

| Project: WLNG-W0001  | -EV-EMP-0004: Invasive Plant Management Plan  |
|--|---|
| Photograph ID: 16<br>Name: Narrow-leaved<br>plantain<br>( <i>Plantago lanceolata</i> ).<br>SLRD Bylaw 1542:<br>N/A<br>SSISC Management<br>Category: No Action  | Reference: E-Flora BC (Available at:         https://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Plantago%20lanceolata         Accessed November 2021). |
| Photograph ID: 17<br>Name: Common<br>plantain ( <i>Plantago</i><br><i>major</i> ).<br>SLRD Bylaw 1542:<br>N/A<br>SSISC<br>Management<br>Category: No<br>Action | Reference: E-Flora BC (Available at:         https://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Plantago%20major         Accessed November 2021).      |



### Client: Woodfibre LNG

#### Project: WLNG-W0001-EV-EMP-0004: Invasive Plant Management Plan

| riejeen mene meeer   |   |
|--|---|
| Photograph ID: 18  |   |
| <b>Name:</b> Creeping<br>buttercup ( <i>Ranunculus</i><br><i>repens</i> ). |   |
| SLRD Bylaw 1542:<br>Yes  |   |
| SSISC Management<br>Category: No Action                                    | Reference: E-Flora BC (Available at:<br>https://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Ranunculus%20repens                         |
|  | Accessed November 2021).  |
| Photograph ID: 19  |   |
| <b>Name:</b> Himalayan<br>blackberry<br>( <i>Rubus armeniacus).</i>        |   |
| SLRD Bylaw 1542:<br>Yes  |   |
| SSISC<br>Management<br>Category:<br>Strategic Control                      | Reference: Northwest Invasive Plant Council (Available at:         http://nwipc.org/plants/himalayan-blackberry Accessed November 2021) |
| Photograph ID: 20  |   |
| Name: Curled dock ( <i>Rumex crispus</i> ).                                |   |
| SLRD Bylaw 1542:<br>N/A  |   |
| SSISC Management<br>Category: No Action                                    | Reference: E-Flora BC (Available at:<br>https://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Rumex%20crispus<br>Accessed November 2021). |



## Client: Woodfibre LNG

| Project: WLNG-W0001-   | EV-EMP-0004: Invasive Plant Management Plan   |
|--|---|
| Photograph ID: 21  |   |
| Name: Bladder<br>campion ( <i>Silene</i><br><i>cucubalus).</i> |   |
| <b>SLRD Bylaw 1542:</b><br>N/A                                 |   |
| SSISC<br>Management<br>Category:<br>Prevention<br>Watchlist    | Reference: Northwest Invasive Plant Council (Available at: _         http://nwipc.org/plants/bladder-campion Accessed November 2021)                |
| Photograph ID: 22  |   |
| Name: White<br>sweetclover<br>( <i>Melilotus alba</i> )        |   |
| SLRD Bylaw 1542:<br>N/A  |   |
| SSISC Management<br>Category: No Action                        | Reference: E-Flora BC (Available at:         https://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Melilotus%20albus         Accessed November 2021). |



## Client: Woodfibre LNG

| Photograph ID: 23  |   |
|--|---|
| Name: European<br>bittersweet; climbing<br>nightshade; blue<br>bindweed (Solanum<br>dulcamara) |   |
| SLRD Bylaw 1542:<br>N/A  |   |
| SSISC Management<br>Category:<br>Insufficient Information                                      | Reference: E-Flora BC (Available at: <u>https://linnet.geog.ubc.ca/ShowDBImage/gallery.aspx?page=0&amp;specrep=0&amp;latinName=Solanum%20dulcamara</u> ) Accessed May 2022.   |
| Photograph ID: 24  |   |
| Name: Sow-thistle<br>species <sup>3</sup> ( <i>Sonchus</i><br>spp.). Noxious.                  |   |
| <b>SLRD Bylaw 1542:</b><br>Yes   |   |
| SSISC Management<br>Category:<br>Strategic Control   | Reference: Alberta Invasive Species Council (Available at: <a href="https://abinvasives.ca/fact-sheet/sow-thistle-perennial/">https://abinvasives.ca/fact-sheet/sow-thistle-perennial/</a> Accessed November 2021). |
| Photograph ID: 25  |   |
| Name: Common tansy (Tanacetum vulgare).  |   |
| SLRD Bylaw 1542:<br>N/A  |   |

<sup>&</sup>lt;sup>3</sup> Annual sow thistle (*Sonchus oleraceus*) or perennial sow thistle (*Sonchus arvensis*) were not identified to species as both are listed as noxious.



#### Client: Woodfibre LNG

SSISC Management Category: Strategic

Control

#### Project: WLNG-W0001-EV-EMP-0004: Invasive Plant Management Plan

| SX-10 |
|-------|
|       |
|       |
|       |
|       |



Reference: Invasive Species Council of BC (Available at: <u>https://bcinvasives.ca/</u> Accessed November 2021).

#### Photograph ID: 26 Name: Common

dandelion (*Taraxacum officinale*).

SLRD Bylaw 1542: N/A

SSISC Management Category: No Action

Photograph ID: 27 Name: Western goat's beard (*Tragopogon* 

SLRD Bylaw 1542:

SSISC Management Category: No Action

dubius).

N/A





Reference: E-Flora BC (Available at: <u>https://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Taraxacum%20officinale&redblue=B</u><u>oth&lifeform=7</u> Accessed November 2021).





Reference: Northwest Invasive Plant Council (Available at: <u>http://nwipc.org/plants/mead-goats-beard November 2021</u>)



Client: Woodfibre LNG

# Photographic Log

| Project: WLNG-W0001   | -EV-EMP-0004: Invasive Plant Management Plan  |
|---|---|
| Photograph ID: 28   |   |
| Name: Mullein (Verbascum thapsus).  |   |
| SLRD Bylaw 1542:<br>N/A   |   |
| SSISC<br>Management<br>Category: No<br>Action                             | Reference: Alberta Invasive Species Council (Available at: https://abinvasives.ca/fact-   |
|   | sheet/mullein-common/ Accessed November 2021).  |
| Photograph ID: 29   |   |
| Name: Big-leaf<br>periwinkle<br>( <i>Vinca major</i> ).                   |   |
| <b>SLRD Bylaw 1542:</b><br>Yes  |   |
| SSISC Management<br>Category:<br>Prevention Watchlist                     |   |
|   | Reference: E-Flora BC (Available at: <u>https://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Vinca%20major&amp;redblue=Both&amp;lifefo</u><br><u>rm=7</u> Accessed November 2021). |
| Photograph ID: 30   |   |
| Name: Common<br>periwinkle<br>( <i>Vinca minor</i> ).<br>SLRD Bylaw 1542: |   |
| N/A<br>SSISC<br>Management<br>Category:<br>Strategic Control              |   |
|   | Reference: Invasive Species Council of BC (Available at: <u>https://bcinvasives.ca/</u><br>Accessed November 2021).   |



#### Client: Woodfibre LNG

#### Project: WLNG-W0001-EV-EMP-0004: Invasive Plant Management Plan

| Photograph ID: 31               |  |
|---------------------------------|--|
| Name: Oxeye daisy (Leucanthemum |  |
| vulgare).                       |  |

SLRD Bylaw 1542: Yes

**SSISC Management** Category: Strategic Control





Reference: Alberta Invasive Species Council (Available at: https://abinvasives.ca/factsheet/oxeye-daisy/ Accessed November 2021).

Photograph ID: 32

Name: Cherry-laurel (Prunus laurocerasus).

SLRD Bylaw 1542: N/A SSISC Management

Category: Insufficient Information

Photograph ID: 33 Name: Creeping

**SSISC Management** 

rapunculoides). SLRD Bylaw 1542:

N/A

Category:

Reference: E-Flora BC (Available at: https://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Prunus%20laurocerasus Accessed November 2021).

bellflower (Campanula Insufficient Information.



Reference: Alberta Invasive Species Council (Available at: https://abinvasives.ca/factsheet/creeping-bellflower/ Accessed November 2021).