
WesPac Tilbury Marine Jetty Project Tilbury Island, Delta, BC



Project Description

Presented under the

Canadian Environment Assessment Act

and the

British Columbia Environmental Assessment Act

PREFACE

The purpose of this Project Description is to present a summary of all Project components and activities, in addition to describing the environmental and social setting at the Project site. This document is expected to support the engagement and consultation process for the provincial and federal Environmental Assessment (EA) reviews of the Project. This Project Description has been prepared in accordance with the BC Environmental Assessment Office (EAO) *Guidelines for Preparing a Project Description for an Environmental Assessment in British Columbia* (2013) and the Canadian Environmental Assessment Agency (CEA Agency) *Guide to Preparing a Description of a Designated Project Under the Canadian Environmental Assessment Act, 2012* (2014).

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Project Description Requirements		Section in this Project Description
1.0	General Information and Contact(s)	
1.1	<i>Describe the nature of the designated project, and proposed location (2–3 paragraphs; note additional location details are to be provided in section 3).</i>	1.1 Project Overview
1.2	<i>Proponent information</i>	
1.2.1	<i>Name of the designated project.</i>	1.1 Project Overview
1.2.2	<i>Name of the proponent.</i>	2.1 Project Contacts 2.2 Overview of WesPac Midstream Vancouver-LLC
1.2.3	<i>Address of the proponent.</i>	
1.2.4	<i>Chief Executive Officer or equivalent (include name, official title, email address and telephone number).</i>	
1.2.5	<i>Principal contact person for purposes of the project description (include name, official title, email address and telephone number).</i>	
1.3	<i>Provide a list of any jurisdictions and other parties including Aboriginal groups and the public that were consulted during the preparation of the project description. (A description of the result of any consultations undertaken is to be provided in sections 6 and 7.)</i>	1.1 Project Overview
1.4	<i>Provide information on whether the designated project is subject to the environmental assessment and/or regulatory requirements of another jurisdiction(s).</i>	1.2 Regulatory Context
1.5	<i>Provide information on whether the designated project will be taking place in a region that has been the subject of an environmental study. Proponents are advised to contact the Agency during the preparation of the project description for information regarding any regional environmental studies that may be relevant.</i>	1.2.3 Past and Current Environmental Studies in the Region

Project Description Requirements		Section in this Project Description
2.0	Project Information	
2.1	<i>Provide a general description of the project, including the context and objectives of the project. Indicate whether the designated project is a component of a larger project that is not listed in the Regulations Designating Physical Activities.</i>	3.1 General Project Description and Objectives
2.2	<i>Indicate the provisions in the schedule to the Regulations Designating Physical Activities that describe the designated physical activities that are proposed to be carried out as part of the designated project.</i>	1.2.2 Canadian Environmental Assessment Act
2.3	Components and activities <i>Provide a description of the components associated with the designated project, including:</i>	
2.3.1	<i>The physical works associated with the designated project (e.g., large buildings, other structures, such as bridges, culverts, dams, marine transport facilities, mines, pipelines, power plants, railways, roads, and transmission lines) including their purpose, approximate dimensions, and capacity. Include existing structures or related activities that will form part of or are required to accommodate or support the designated project.</i>	3.6 Project Components
2.3.2	<i>Anticipated size or production capacity of the designated project, with reference to thresholds set out in the Regulations Designating Physical Activities, including a description of the production processes to be used, the associated infrastructure, and any permanent or temporary structures. The production capacity does not refer to the planned production capacity of a project but the maximum production capacity based on the project's design and operating conditions.</i>	3.6 Project Components
2.3.3	<i>If the designated project or one component of the designated project is an expansion, describe the size and nature of the expansion with reference to the thresholds set out in the Regulations Designating Physical Activities</i>	3.6 Project Components N/A Project is not an Expansion

Project Description Requirements		Section in this Project Description
2.3.4	<p><i>A description of the physical activities that are incidental to the designated project. In determining such activities, the following criteria shall be taken into account:</i></p> <ul style="list-style-type: none"> • <i>nature of the proposed activities and whether they are subordinate or complementary to the designated project;</i> • <i>whether the activity is within the care and control of the proponent;</i> • <i>if the activity is to be undertaken by a third party, the nature of the relationship between the proponent and the third party and whether the proponent has the ability to “direct or influence” the carrying out of the activity;</i> • <i>whether the activity is solely for the benefit of the proponent or is available for other proponents as well; and,</i> • <i>the federal and/or provincial regulatory requirements for the activity.</i> <p><i>Should an EA be required for the designated project, the Agency will take these criteria into consideration in determining the activities that are incidental to the designated project.</i></p> 	<p>3.7 Project Activities 3.7.5.1 Berthing</p>
2.4	<p><i>Emissions, discharges and waste</i></p> <p><i>Provide a description of any waste that is likely to be generated during any phase of the designated project and plans to manage that waste, including the following:</i></p>	
2.4.1	<p><i>Sources of atmospheric contaminant emissions during the designated project phases (focusing on criteria air contaminants and greenhouse gases, or other non-criteria contaminants that are of potential concern) and location of emissions.</i></p>	<p>3.8 Anticipated Emissions, Discharges and Waste</p>
2.4.2	<p><i>Sources and location of liquid discharges.</i></p>	<p>3.8 Anticipated Emissions, Discharges and Waste</p>
2.4.3	<p><i>Types of wastes and plans for their disposal (e.g., landfill, licenced waste management facility, marine waters, or tailings containment facility).</i></p>	<p>3.8 Anticipated Emissions, Discharges and Waste</p>

Project Description Requirements		Section in this Project Description
2.5	<p><i>Construction, operation, decommissioning and abandonment phases and scheduling.</i></p> <p><i>Provide a description of the timeframe in which the development is to occur and the key project phases, including the following:</i></p>	1.3 Project and Tentative EA Deliverable Schedule
2.5.1	<p><i>Anticipated scheduling, duration and staging of key project phases, including preparation of the site, construction, operation, decommissioning and abandonment.</i></p>	1.3 Project and Tentative EA Deliverable Schedule
2.5.2	<p><i>Main activities in each phase of the designated project that are expected to be required to carry out the proposed development (e.g., activities during site preparation or construction might include, but are not limited to, land clearing, excavating, grading, de-watering, directional drilling, dredging and disposal of dredged sediments, infilling, and installing structures).</i></p>	3.7 Project Activities
3.0	Project Location	
3.1	<p><i>Provide a description of the designated project's location including:</i></p>	
3.1.1	<p><i>Coordinates (i.e., longitude/latitude using international standard representation in degrees, minutes, seconds) for the centre of the facility or, for a linear project, provide the beginning and end points.</i></p>	3.2 Project Location
3.1.2	<p><i>Site map/plan(s) depicting location of the designated project components and activities. The map/plan(s) should be at an appropriate scale to help determine the relative size of the proposed components and activities.</i></p>	Figures 1 & 2
3.1.3	<p><i>Map(s) at an appropriate scale showing the location of the designated project components and activities relative to existing features, including but not limited to:</i></p> <ul style="list-style-type: none"> • <i>watercourses and waterbodies with names where they are known;</i> 	Figures 1 & 2
	<ul style="list-style-type: none"> • <i>linear and other transportation components (e.g., airports, ports, railways, roads, electrical power transmission lines and pipelines);</i> 	Figures 1 & 2

Project Description Requirements		Section in this Project Description
	<ul style="list-style-type: none"> other features of existing or past land use (e.g., archaeological sites, commercial development, houses, industrial facilities, residential areas and any waterborne structures); 	Figures 1 & 2
	<ul style="list-style-type: none"> location of Aboriginal groups, settlement land (under a land claim agreement) and, if available, traditional territory; 	Figure 1
	<ul style="list-style-type: none"> federal lands¹ including, but not limited to National parks, National historic sites, and reserve lands; 	Figure 1 & Figure 6a
	<ul style="list-style-type: none"> nearby communities; 	Figure 1 & Figure 2
	<ul style="list-style-type: none"> permanent, seasonal or temporary residences; 	Figure 1 & Figure 2
	<ul style="list-style-type: none"> fisheries and fishing areas (i.e., Aboriginal, commercial and recreational); 	Figure 9
	<ul style="list-style-type: none"> environmentally sensitive areas (e.g., wetlands, and protected areas, including migratory bird sanctuary reserves, marine protected areas, National Wildlife areas, and priority ecosystems as defined by Environment Canada); 	Figure 1 , Figure 2 & Figure 8
	<ul style="list-style-type: none"> Provincial and international boundaries. 	Figure 1
3.1.4	Photographs of work locations to the extent possible.	Appendix A
3.1.5	Proximity of the designated project to: <ul style="list-style-type: none"> any permanent, seasonal or temporary residences; 	3.1 Project Location

¹ As defined in CEAA 2012, “federal lands” means

(a) lands that belong to Her Majesty in right of Canada, or that Her Majesty in right of Canada has the power to dispose of, and all waters on and airspace above those lands, other than lands under the administration and control of the Commissioner of Yukon, the Northwest Territories, or Nunavut;

(b) the internal waters of Canada (in any area of the sea not within a province), the territorial sea of Canada (in any area of the sea not within a province), the exclusive economic zone of Canada, and the continental shelf of Canada; and

(c) Reserves, surrendered lands and any other lands that are set apart for the use and benefit of a band and that are subject to the Indian Act, and all waters on and airspace above those reserves or lands.

Project Description Requirements		Section in this Project Description
	<ul style="list-style-type: none"> <i>traditional territories, settlement land (under a land claim agreement) as well as lands and resources currently used for traditional purposes by Aboriginal peoples; and,</i> 	5.3 Aboriginal Interests, Including Current Use of Land and Resources for Traditional Purposes
	<ul style="list-style-type: none"> <i>any federal lands.</i> 	3.4 Federal Land, Federal Funding and Trans-boundary Effects
3.2	<p><i>Land and Water Use</i></p> <p><i>To the extent that is known at this time, describe the ownership and zoning of land and water that may be affected by the project, including the following.</i></p>	3.3 Legal Description of Lands and Water Lot
3.2.1	<i>Zoning designations.</i>	3.3 Legal Description of Lands and Water Lot
3.2.2	<i>Legal description of land to be used (including information on sub-surface rights) for the designated project, including the title, deed or document and any authorisation relating to a water lot.</i>	3.3 Legal Description of Lands and Water Lot
3.2.3	<i>Any applicable land use, water use (including ground water), resource management or conservation plans applicable to or near the project site. Include information on whether such plans were subject to public consultation.</i>	3.3 Legal Description of Lands and Water Lot
3.2.4	<i>Describe whether the designated project is going to require access to, use or occupation of, or the exploration, development and production of lands and resources currently used for traditional purposes by Aboriginal peoples.</i>	3.5 Aboriginal Communities, Treaty Lands and Asserted Traditional Territories
4.0	<i>Federal Involvement – Financial Support, Lands and Legislative Requirements</i>	
4.1	<i>Describe if there is any proposed or anticipated federal financial support that federal authorities are, or may be, providing to support the carrying out of the designated project.</i>	1.2.3 Past and Current Environmental Studies in the Region

Project Description Requirements		Section in this Project Description
4.2	<i>Describe any federal lands that may be used for the purpose of carrying out the designated project. This is to include any information on any granting of interest in federal land (i.e., easement, right of way, or transfer of ownership).</i>	3.4 Federal Land, Federal Funding and Trans-boundary Effects
4.3	<i>Provide a list of any federal permits, licences or other authorisations that may be required to carry out of the project.</i>	6.0 Project Permitting Requirements
5.0	<i>Environmental Effects</i>	
5.1	<i>A description of the physical and biological setting, including the physical and biological components in the area that may be adversely affected by the project (e.g., air, fish, terrain, vegetation, water, wildlife, including migratory birds, and known habitat use).</i>	3.10 Project Environment and Social Setting
5.2	<i>A description of any changes that may be caused as a result of carrying out the designated project to:</i> <i>(a) fish and fish habitat, as defined in the Fisheries Act;</i>	3.7 Project Activities 3.10.2 Fish and Aquatic Resources 4.1 Potential Project Effects
	<i>(b) marine plants, as defined in the Fisheries Act ; and,</i>	3.10.2 Fish and Aquatic Resources 4.1 Potential Project Effects
	<i>(c) migratory birds, as defined in the Migratory Birds Convention Act, 1994.</i>	3.10.3.2 Wildlife Appendix B: Migratory Bird Species
5.3	<i>A description of any changes to the environment that may occur, as a result of carrying out the designated project, on federal lands, in a province other than the province in which the project is proposed to be carried out, or outside of Canada.</i>	3.4 Federal Land. Federal Funding and Trans-boundary Effects

Project Description Requirements		Section in this Project Description
5.4	<i>A description of the effects on Aboriginal peoples of any changes to the environment that may be caused as a result of carrying out the designated project, including effects on health and socio-economic conditions, physical and cultural heritage, the current use of lands and resources for traditional purposes, or any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.</i>	4.2 Potential Effects of Changes to the Environment on Aboriginal Peoples
6.0	<i>Proponent Engagement and Consultation with Aboriginal Groups</i>	
6.1	<i>A list of Aboriginal groups that may be interested in, or potentially affected by, the designated project.</i>	5.2 Potentially Affected Aboriginal Groups
6.2	<i>A description of the engagement or consultation activities carried out to date with Aboriginal groups, including:</i> <ul style="list-style-type: none"> • <i>names of Aboriginal groups engaged or consulted to date with regard to the designated project</i> 	5.4 Overview of Aboriginal Consultation and Engagement Activities to Date
	<ul style="list-style-type: none"> • <i>date(s) each Aboriginal group was engaged or consulted; and</i> 	5.4 Overview of Aboriginal Consultation and Engagement Activities to Date
	<ul style="list-style-type: none"> • <i>means of engagement or consultation (e.g., community meetings, mail or telephone).</i> 	5.4 Overview of Aboriginal Consultation and Engagement Activities to Date
6.3	<i>An overview of key comments and concerns expressed by Aboriginal groups identified or engaged to date, including any responses provided to these groups.</i>	5.5 Key Issues Identified By Aboriginal Groups To Date
6.4	<i>A consultation and information-gathering plan that outlines the ongoing and proposed Aboriginal engagement or consultation activities, the general schedule for these activities and the type of information to be exchanged and collected (or, alternatively, an indication of why such engagement or consultation is not required).</i>	Will be provided as a separate document

Project Description Requirements		Section in this Project Description
7.0	<i>Consultation with the Public and Other Parties (other than Aboriginal consultation included above)</i>	
7.1	<i>An overview of key comments and concerns expressed to date by stakeholders and any responses that have been provided.</i>	5.7.1 Identification of Stakeholders and Consultations to Date
7.2	<i>An overview of any ongoing or proposed stakeholder consultation activities.</i>	5.7.3 Proposed Consultation Activities
7.3	<i>A description of any consultations that have occurred with other jurisdictions that have environmental assessment or regulatory decisions to make with respect to the project.</i>	5.7.1 Identification of Stakeholders & Consultations to Date
8.0	<i>Summary of the Project Description</i>	
—	<i>Proponents are to include as part of the project description a standalone section that summarises the information identified in Sections 1 to 7 of this Guide. Under CEAA 2012, the Agency is required to consult the public on a summary of the project description that has to be posted on the Agency’s Internet site in both of Canada’s official languages as required under the Official Languages Act. As a result, in order to be in a position to initiate the screening phase in a timely manner, the summary is to be prepared and submitted to the Agency in both English and French.</i>	Provided in a separate standalone summary of the Project Description

Table of Concordance with EAO’s Guidelines for Preparing a Project Description for an Environmental Assessment in British Columbia

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Proponent Information		
1	The proponent’s name and the representative managing the Project.	2.1 Project Contacts
2	Contact information, including a mailing address, phone and fax numbers, and email addresses.	2.1 Project Contacts
3	Corporate information, including a website address, particulars of company incorporation, and partners’ names (if applicable).	2.2 Overview of WesPac Midstream – Vancouver LLC
General Background Information		
4	The type and size of the project, with specific reference to the thresholds set out in the Reviewable Projects Regulation.	1.2.1 Environmental Assessment Act
5	Project purpose and rationale.	3.1 General Project Description and Objectives
6	Estimated capital cost.	3.9 Project Capital Costs and Employment Estimates
7	Number of construction jobs (in person years) and operating jobs (actual number).	3.9 Project Capital Costs and Employment Estimates
8	Location (latitude and longitude).	3.2 Project Location
Project Overview		
9	A brief description of the major on-site and off-site project components, including options if the final site selections are not yet available.	3.6 Project Components
10	A conceptual site plan and map(s) at sufficient scale to allow for clear location of all major components of the project (proponents may wish to include photographs if these would be helpful to understanding the nature and location of the proposed project).	Figures 1 to 9 Appendix A

Project Description Requirements		Section in this Project Description
11	The project's duration, including decommissioning if appropriate.	1.3 Project and Tentative EA Deliverable Schedule
12	The project's potential environmental, economic, social, heritage, and health effects (in general terms).	4.1 Potential Project Effects
Land Use Setting		
13	A general description of existing land use in the vicinity of the project site.	3.3 Legal Description of Lands and Water Lot
14	Whether the project and its components are situated on private or Crown land.	3.3 Legal Description of Lands and Water Lot
15	Information about First Nations interests where asserted claims to rights or title are known.	5.3 Aboriginal Interests, Including Current Use of Land and Resources for Traditional Purposes
Consultation Activities		
16	A summary of consultation activities that have been carried out with:	
16(a)	First Nations	5.4 Overview of Aboriginal Consultation and Engagement Activities to Date
16(b)	the public	5.7.1 Identification of Stakeholders & Consultations to Date
16(c)	local governments	5.7.1 Identification of Stakeholders & Consultations to Date

Project Description Requirements		Section in this Project Description
Proposed Development Schedule		
17	A tentative schedule for submitting an application for an environmental assessment certificate and developing the project (should a certificate be issued).	1.3 Project and EA Review Schedule
Required Permits		
18	A list of required permits, if known.	6.0 Project Permitting Requirements

Acronyms and Abbreviations

Terminology used in this document is defined where it is first used. The following list will assist readers who may choose to review only portions of the document.

Term	Description
AIR	Application Information Requirements
AOA	Archaeological Overview Assessment
AIA	Archaeological Impact Assessment
BC	British Columbia
BMP	Best Management Practice
BOG	Boil Off Gas
CACs	Criteria Air Contaminates
CCG	Canadian Coast Guard
CD	Chart Datum
CDF	Coastal Douglas Fir
CEA Agency	Canadian Environmental Assessment Agency
CEAA	<i>Canadian Environmental Assessment Act 2012</i>
CEMP	Construction Environmental Management Plan
CEPA	<i>Canadian Environmental Protection Act</i>
DFO	Department of Fisheries and Oceans Canada
DWT	Dead Weight Tonnes
EA	Environmental Assessment
EAA	<i>Environmental Assessment Act</i>
EAC	Environmental Assessment Certificate
EAO	British Columbia Environmental Assessment Office

Term	Description
EC	Environment Canada
EMP	Environmental Management Plan
EIS	Environmental Impact Statement
ESS	Emergency Shutdown System
FEED	Front End Engineering Design (FEED)
FSC	Fish for Food, Social, and Ceremonial
FLNR	Ministry of Forests, Lands and Natural Resources Operations (British Columbia)
FREMP	Fraser River Estuary Management Program
GCD	Grab Clamshell Dredge
GHG	Green House Gas
LLC	Limited Liability Company
LNG	Liquefied Natural Gas
MARR	Ministry of Aboriginal Relations & Reconciliation
MARPOL Convention	International Convention for the Prevention of Pollution From Ships
MNGD	Ministry of Natural Gas Development
MOE	Ministry of the Environment
NEB	<i>National Energy Board Act</i>
NEB Agency	National Energy Board Agency
NG	Natural Gas
NPA	<i>Navigable Protection Act (Formerly the Navigable Waters Protection Act)</i>
NPP	Navigation Protection Program (Under the NPA)
NRA	Navigational Risk Assessment

Term	Description
OCP	Official Community Plan
OEMP	Operational Environmental Management Plan
OGC	British Columbia Oil and Gas Commission
PIANC	World Association for Waterborne Transport Infrastructure (English Translation)
PPA	Pacific Pilotage Authority
PMV	Port Metro Vancouver
Project	Tilbury Marine Jetty Project
SAP	Sampling and Analysis Plan
SARA	<i>Species at Risk Act</i>
SIGTTO	Society of International Gas tanker and terminal operators
TC	Transport Canada
TERMPOL	Technical Review Process of Marine Terminal Systems and Transshipment Sites
TFNFA	Tsawwassen First Nation Final Agreement
TSHD	Trailer Suction Hopper Dredge
VAFD	Vancouver Airport Fuel Delivery Project
VAFFC	Vancouver Airport Fuel Facilitates Corporation
VC	Valued Component
VOCs	Volatile Organic Compounds
WesPac	WesPac Midstream-Vancouver LLC
WesPac Midstream	WesPac Midstream LLC

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1.0 Introduction

1.1 Project Overview

WesPac Midstream–Vancouver LLC (“WesPac”) proposes to construct and operate a marine jetty for loading Liquefied Natural Gas (LNG) onto LNG carriers and LNG barges (the “Project”) on Tilbury Island along the South Arm of the Fraser River, in Delta, British Columbia (BC) (Figure 1). The Project site is situated adjacent to the existing FortisBC Tilbury LNG Liquefaction Plant (Tilbury LNG Plant) and Varsteel / Dominion Pipe (Varsteel), approximately 21 km from the mouth of the Fraser River (Sand Heads), and 300 m downriver from Seaspan Ferries’ Tilbury terminal (the “Project site”) (Figure 2). The onshore portion of the Project site is situated on private land, while the offshore portion of the Project site is situated on crown lands (water lots) on the South Arm of the Fraser River, which have recently come under the jurisdiction of the BC Ministry of Forests, Lands and Natural Resource Operations (FLNR).

The purpose of the Project is to transfer LNG to carriers and barges for delivery to both offshore export markets and local fuel markets. All LNG carriers or barges expected to call at the Project site will be operated by qualified shipping companies engaged in the business of LNG transportation. Storage and processing of LNG are not part of this Project. The Project will receive processed LNG for transfer to LNG carriers and barges from the Tilbury LNG Plant (Figure 3). FortisBC is currently constructing an expansion of the Tilbury LNG Plant which is separate and distinct from the Project. In addition to FortisBC’s current and planned use of LNG produced at the Tilbury LNG Plant as a reserve for peak natural gas demand on its utility distribution system, the Tilbury LNG Plant also has truck racks which presently load, and will continue to load, LNG onto trucks to support FortisBC’s growing onshore LNG supply business. Therefore, WesPac will not have care or control over the Tilbury LNG Plant, nor any ability to direct or influence the carrying out of that activity; nor will the Tilbury LNG Plant be expanded for WesPac’s exclusive benefit.

The Project comprises the removal of existing abandoned marine infrastructure currently occupying a portion of the water lots and the construction of a new marine jetty, including a vessel loading platform, four berthing dolphins, four mooring dolphins, and an access trestle (Figure 4). The marine jetty will accommodate one vessel at a time, either self-propelled LNG carriers up to 90,000 m³ of LNG capacity that would serve offshore export markets² or individual LNG barges up to 4,000 m³ of LNG capacity that would serve regional markets. The marine jetty will support LNG product transfer from shore, above riparian areas via installation of an above ground pipe rack system. The system to be installed will support service lines that connect to the Tilbury LNG Plant, enabling the transfer of LNG and other utilities. Project transfer facilities and control systems will be powered by electricity provided by BC Hydro. Photographs of the Project site showing the locations proposed for components and activities of the Project are presented in Appendix A.

² The marine jetty and marine safety items described and evaluated in this Project Description are for LNG Carriers with capacities of up to 90,000 m³. This size vessel exceeds the current beam width dimension limits for vessels on the Fraser River. Although the vessel dimension policies are under review by Port Metro Vancouver (PMV) in response to the widening of the Panama Canal, dimensions exceeding a beam width of 32.25 m are currently only allowed via an exception from PMV. The beam width currently approved by PMV is 32.25 m. WesPac has requested PMV to evaluate allowing a beam of up to 38.0 m for ships that call at the jetty. PMV has granted exemptions for non-LNG vessels wider than 32.25 m in the past.

The Project may require an estimated maximum dredge area of 18.7 ha in the future, however, the initial dredge area will be approximately 12.0 ha (Figure 3). Prior to dredging, sediment samples will be collected and tested for specified contaminants as described in Section 3.7.2.3. Before commencing dredging activities, effort will be made to find a beneficial end use for dredge material, and ocean disposal or disposal at a permitted onshore facility will only be considered if a beneficial use is not found.

The onshore portion of the Project (the “Onshore Facilities”) will include all land-based components located on easements and rights-of-way inside the FortisBC property, parts of which are within the Project site boundary (Figure 3). The offshore portion of the Project (the “Offshore Facilities”) will include all foreshore and water based components located outside the FortisBC property, but within the Project site boundary.

Jurisdictions and other parties, including Aboriginal groups and stakeholders, that WesPac has met with during the preparation of this Project Description include the following:

- Musqueam Indian Band;
- Tsawwassen First Nation;
- Cowichan Tribes;
- Halalt First Nation;
- Penelakut Tribe;
- Stz’uminus First Nation;
- Kwantlen First Nation;
- EAO;
- CEA Agency;
- British Columbia Oil and Gas Commission (OGC);
- FLNR;
- PMV;
- Corporation of Delta;
- Fraser River Pilots Association; and
- Adjacent landowners and operating companies, including FortisBC, Varsteel and Seaspac Ferries.

A draft version of this Project Description was provided to Musqueam Indian Band, Tsawwassen First Nation, Cowichan Tribes, Halalt First Nation, Penelakut Tribe, and Stz’uminus First Nation for comment prior to the formal submission of this document to the EAO and CEA Agency.

1.2 Regulatory Context

1.2.1 Environmental Assessment Act, SBC 2002, c. 43 (EAA)

The requirement for the Project to obtain an Environmental Assessment Certificate (EAC) under the EAA is based on thresholds prescribed in the *Reviewable Projects Regulation B.C.* Under Part 8 (4) of these regulations the Project would be classified as a Marine Port Facility and would be a Reviewable Project according to:

“The proposals exceed the threshold for dredging, filling or other direct physical disturbance of 1,000m or more of linear shoreline, and/or 2 hectares (ha) or more of foreshore or submerged lands, below the natural boundary of a marine coastline or marine estuary”.

The Project exceeds the *Reviewable Projects Regulations* under EAA as the maximum dredge area is expected to be 18.7 ha, and an initial dredge area of approximately 12.0 ha is proposed. To date, WesPac has provided an overview of the Project and initiated consultation with the EAO regarding the Project’s design and proposed measures to mitigate potential effects that may occur as a result of the Project.

1.2.2 Canadian Environmental Assessment Act, 2012 S.C. 2012, c.19, s.52, (CEAA)

The requirement for the Project to obtain an environmental assessment decision to proceed under CEAA is based on thresholds prescribed in the *Regulations Designating Physical Activities (Section 24 (c))*. The following threshold specifies that a federal environmental assessment is triggered for a:

“Marine terminal designed to handle ships larger than 25,000 DWT unless the terminal is located on lands that are routinely and have been historically used as a marine terminal or that are designated for such use in a land-use plan that has been the subject of public consultation”

The Project is designed to receive LNG carriers of approximately 47,000 DWT (90,000 m³ of LNG capacity), therefore it exceeds this threshold.

1.2.3 Past and Current Environmental Studies in the Region

The Project is not located in a region of the province that has been subjected to a regional environmental study as defined in CEAA. In addition, the Project does not require federal funding support from federal authorities. The EA prepared for the Vancouver Airport Fuel Facilities Corporation’s Vancouver Airport Fuel Delivery Project, situated approximately 1.2 km northwest of the Project, has been identified as the closest EA to the Project site (Figure 2). That project received an EAC on December 11, 2013. Publicly available information from that EA and other relevant EA’s in the surrounding area will be reviewed, and any relevant information will be incorporated into an EA for the Project as appropriate. Where necessary Project-specific studies on human and biophysical environments will be conducted to support a Project EA.

1.2.4 Other Environmental Review Requirements

PMV, as mandated by the *Canada Marine Act*, elected as of year-end 2014 to not renew its head lease for the offshore portion of the Project site, therefore the Project is not situated within waters or lands administered by the Canada Port Authority and not subject to a PMV environmental review.

Other specific federal, provincial and municipal regulatory permitting and approvals the may be required for the Project to proceed have been outlined in Section 6.0.

1.3 Project and Tentative EA Deliverable Schedule

A tentative schedule for deliverables associated with the EA process is presented in Table 1-1. A preliminary sequencing schedule for each phase of the Project is also presented in Table 1-2. As shown the targeted construction duration of the Project is 15 months and the Project is expected to operate for a minimum of 30 years.

Table 1-1: Tentative EA Deliverable Schedule

Deliverable		2015			
BCEAA EA Process	CEAA EA Process	Q1	Q2	Q3	Q4
Project Description					
Valued Component (VC) Selection Document					
Draft Application Information Requirements (AIR)	Draft Environmental Impact Statement (EIS) Guidelines				
Final AIR	Final EIS Guidelines				
EAC Application	EIS				

Table 1-2: Preliminary Project Sequencing Schedule

Project Phase	Duration	Targeted Year
Project Procurement	18 months (A portion of this phase will overlap with Project preparation and construction)	2016 - 2017
Project Preparation	3 months	2016
Project Construction	15 months	2016 - 2017
Project Operation	30 years (minimum)	2018 - 2047
Project Decommissioning	2 months	2048 or later

2.0 Project Team

2.1 Project Contacts

This Project Description has been prepared on behalf of WesPac Golder Associates Limited (Golder). Contact information for WesPac and Golder is provided in Table 2-1.

Table 2-1: Project Team Contact Information

Proponent: WesPac Midstream–Vancouver LLC (WesPac)	
Address	WesPac Midstream–Vancouver LLC (WesPac) 2355 Main Street, Suite 210 Irvine, CA 92614 USA
Key Contact	Mr. Art Diefenbach, P.E. Vice President – Engineering Email: ADiefenbach@WesPacTilbury.ca Cell: +949 478-3158 Fax: +949 222-0992
Alternate Contacts	Mr. Ben Thompson Vice President – Commercial Development Email: BThompson@WesPacTilbury.ca Cell: +949 222-1014 Fax: +949 222-0992 Mr. Scott Gardner Senior Vice President Email: SGardner@WesPacTilbury.ca Cell: +415 819 2625 Fax: +949 222-0992
Project Website	www.wespacilbury.ca
Company Website	www.wespac.com
Environmental Assessment Consultant: Golder Associates Limited (Golder)	
Address	Golder Associates Limited 200 - 2920 Virtual Way Vancouver, BC V5M 0C4 Canada
Key Contact	Mr. Dave Carter Project Manager – Senior Environmental Scientist Email: David_Carter@golder.com Tel: +604 296-4200

2.2 Overview of WesPac Midstream–Vancouver LLC

WesPac Midstream–Vancouver LLC is a wholly-owned subsidiary of WesPac Midstream LLC. Both companies are privately owned Delaware Limited Liability Companies and not publicly traded. Both companies have headquarters located in Irvine, California (CA), United States of America (USA). Information about WesPac Midstream LLC is provided at www.wespac.com. There is no website for WesPac Midstream–Vancouver LLC; however, the Project’s website is www.wespactilbury.ca. WesPac Midstream LLC and its subsidiaries and affiliates currently do not own or operate any facilities in BC.

WesPac Midstream LLC develops, constructs, owns, and operates energy infrastructure throughout North America. WesPac Midstream LLC projects provide customers with clean, safe, and efficient modes of fuel supply, processing, storage, and distribution. WesPac Midstream LLC has provided fuel logistics and master planning services at a number of large commercial facilities. WesPac Midstream LLC also has considerable experience in the construction, operations, and maintenance of fuel distribution systems. Additionally, WesPac Midstream LLC has extensive knowledge of North American fuel supply infrastructure and logistics, including trading and pricing mechanisms. The company’s technical expertise and modern facilities have earned it a solid reputation in the industry.

Since 2011, WesPac Midstream LLC has maintained a principal focus on LNG liquefaction facilities, storage and transportation. WesPac Midstream LLC projects are focused on high horsepower engine applications including oil-to-gas fuel switching in power plants, commercial ships, railroad locomotives, trucking and other industries.

WesPac Midstream LLC’s predecessor companies, WesPac Energy and WesPac Pipelines were established in 1998 with a focus on jet fuel pipelines, terminals and logistics. Subsequently, WesPac Midstream LLC developed various petroleum products and crude oil projects involving pipelines, marine terminals, and railroad facilities in North America and Central America (Costa Rica).

WesPac Midstream LLC’s majority owner, Highstar Capital is a wholly owned subsidiary of Oaktree Capital with deep expertise in energy investing and development. Other direct Highstar investments include Ports America, Southern Star, Advanced Disposal, Star West Generation and Caiman Energy.

Oaktree Capital is a global investment management firm with approximately \$90 billion in diversified assets under management. Oaktree was founded in Los Angeles in 1995, and today its reach includes offices in major cities around the world. Oaktree’s clients include 100 of the 300 largest global pension plans, 75 of the 100 largest U.S. pension plans, 300 endowments and foundations, 11 sovereign wealth funds and 38 of the 50 primary state retirement plans in the USA.

More information about WesPac Midstream LLC and Oaktree Capital is available at www.wespac.com and www.oaktreecapital.com.

3.0 Project Information

3.1 General Project Description and Objectives

The purpose of the Project is to provide berthing and loading facilities to LNG carriers up to 90,000 m³ of LNG capacity to serve offshore export markets and LNG barges to serve regional markets. The Project is advantageously located adjacent to the existing Tilbury LNG Plant, which processes and stores LNG. The Project will allow WesPac to obtain LNG from FortisBC and transfer it to a single LNG carrier or barge berthed at the jetty (Figure 2). FortisBC is currently building an LNG liquefaction expansion along with an additional LNG storage tank capable of storing approximately 46,000 m³ of LNG at the Tilbury LNG Plant. The expansion of the Tilbury LNG Plant is occurring irrespective of this Project. The Project will take custody of the LNG from FortisBC at the point where the flange of the Project's LNG transfer pump connects to the FortisBC storage tank. A vapour return pipe will carry boil off gas (BOG) back to the Tilbury LNG Plant BOG compressor, where custody of the natural gas will be returned to FortisBC. The Project will not require the construction of a new natural gas supply pipeline or additional major transmission infrastructure common in other large-scale LNG projects currently under consideration in BC.

LNG is a clean burning fossil fuel being used throughout the world to reduce emissions by replacing less efficient, less clean fuels such as coal or diesel. Compared to conventional diesel fuel, LNG adoption cuts carbon dioxide (CO₂) emissions by about 25 percent (%), sulphur oxides (SO_x) by almost 100% and nitrogen oxides (NO_x) by 85%, which translates into cleaner exhaust emissions. Natural gas is currently unavailable in many communities and countries, and in these locations people typically rely on higher-impact fuels such as diesel or coal for energy production. Marine transportation of LNG would provide customers access to a cleaner energy alternative, providing cost savings and environmental benefits to these communities. At present, the price of natural gas in North American markets is significantly lower than international markets. LNG exports offer Canadian producers an opportunity to access international markets.

The Project will also provide a point from which LNG supply can be transported to local and regional markets for use as fuel in marine vessels or for electric power generation. LNG is seen as a commercially robust and environmentally viable alternative to heavy fuel oil currently used in the marine industry, as LNG has much lower emissions than heavy fuel oil. LNG fuelled passenger ferries have been in operation for over a decade with more than a million operational hours without the occurrence of a safety incident. BC Ferries recently awarded a contract to build three new intermediate class vessels with LNG fuel capabilities, which will accommodate 145 vehicles and 600 passengers. These new intermediate class vessels will be the first vessels in BC Ferries' fleet capable of operating on LNG as a fuel and are expected to lead the way into further expansion of LNG fuelled vessels.

All LNG carriers or barges calling at the Project site will be operated by qualified shipping companies engaged in the business of LNG transportation. LNG carriers will transit to the Project site from the Pacific Ocean along established shipping routes through the Strait of Juan de Fuca, the Strait of Georgia and the South Arm of the Fraser River (Figure 5).

Marine transportation on these shipping routes is governed by a comprehensive set of statutes and regulations. Vessels intending to call at the Project site are separate from the Project and will be subject to requirements including, but not limited to, the *Canada Shipping Act, 2001*, the *Pilotage Act*, the *Canada Marine Act*, the *Marine Transportation Security Act*, and numerous regulations issued pursuant to those acts.

3.2 Project Location

The Project site is located on Tilbury Island adjacent to the Fraser River in Delta, BC (Figure 1), coordinates of the approximate center of the Project are 49° 8'30"N 123° 02'14"W. The Project site is approximately 21 km from the mouth of the South Arm of the Fraser River (Sand Heads), 300 m down river from the Seaspac Ferries' Tilbury Terminal and 650 m from Lehigh Hanson Cement Plant (Figure 2). The Project site lies adjacent to the Tilbury LNG Plant situated to the northeast and Varsteel located to the southwest.

The closest identified permanent residents to the Project are three farm dwellings located approximately 750 m south on 68th Street, south of River Road. No other seasonal or temporary residents were identified within 1km of the site (Figure 2). The Onshore Facilities portion of the Project is on private property owned by FortisBC, and there is no land based recreational access to the Project site.

3.3 Legal Description of Lands and Water Lot

The Project site is located within the municipal boundary of Delta, BC on Tilbury Island on the southern shoreline of the South Arm of the Fraser River (Figure 1). The Offshore Facilities portion of the Project is located in the water area in front of land owned by FortisBC, Varsteel, and the Federal Government (DFO). The Onshore Facilities portion of the Project is located on easements and rights of way within the FortisBC property, located at 7651 Hopcott Road, in the Tilbury Industrial Area of Delta, BC legal lot LT 1 DL 135 GP 2 NWD PL EPP28232 EX PL EPP36476 (PID:016-198-506). (Figure 3 & Figure 6a). Varsteel is located adjacent to the Project access road at 6845 Tilbury Road (Figure 2). The strip of land bordering the Fraser River to the south-west of the Varsteel property is owned by the Crown in Right of Canada, represented by the Minister of Fisheries and Oceans. WesPac has received consent from Varsteel and anticipates receiving consent from FortisBC and (if necessary, as described in Section 3.4) DFO representing the Federal Crown, to use the water lot area in front of their respective properties.

The offshore portion of the Project site comprises approximately 69,000 m² of Crown land water area under the administration of FLNR (Figure 6a). A new waterlot lease extending approximately 150 m along the Fraser River foreshore will be required for the Project, and the new lease will be issued by FLNR. The majority of the Project site was previously leased by Weyerhaeuser Company Limited (Weyerhaeuser), where they operated their Northwest Hardwood Mill which included a marine jetty. This waterlot lease was recently transferred to Varsteel, and Varsteel is in the process of executing a new, temporary lease with FLNR until the Project is approved for its new water lot lease, at which time Varsteel will cease to use any portion of the Project site.

The land surrounding the Project site is predominately designated for industrial and marine uses. Marine terminals situated in the surrounding area include Seaspan Ferries, Lehigh Hanson Cement, Annacis Auto Terminals, and Fraser Surrey Docks. The Seaspan Ferries Tilbury freight terminal is located approximately 300 m upstream of the Project site, and the Lehigh Hanson Cement plant is approximately 650 m upstream of the Project site (Figure 2).

The Project site has been designated in previous Corporation of Delta Official Community Plans (OCP) and in PMV land-use planning processes. Both the Delta OCP and PMV land-use planning processes included public, stakeholder and agency consultations during the plan development. The current Corporation of Delta OCP designates the onshore portion of the Project site as I2 (Heavy Industrial) (Figure 6b). The OCP goals related to future industrial land use have designated the Project site as industrial; i.e., intended for light, heavy, and water-related industrial uses (OCP, Map 2 - Future Land Use). As described in the 2010 PMV Consolidated Land Use Plan, the Project occupies an area intended for port services and industrial uses. The FortisBC property situated to the east and south of the Project site is designated as I7 (Special Industrial) which allows for the manufacturing, processing, finishing, and storage of natural gas.

The offshore portion of the Project site is currently zoned as I5 (River Zone). The Corporation of Delta has indicated intent to rezone the waterlot portion of the Project site to reflect the possibility of LNG activity. WesPac expects to pursue the rezoning of the waterlot concurrently with the EA process. The majority of properties surrounding the Project are industrial and privately owned except for the narrow strip of federal Crown land and two properties located to the east along Ross Rd which occupy provincial Crown land (Figure 6a).

3.4 Federal Land, Federal Funding and Trans-boundary Effects

There is no proposed or anticipated federal financial support being provided to carry out the Project. There are also no federal lands that will be used for the purpose of carrying out the Project. The nearest federal land is located adjacent and downstream, approximately 0.2 km from the Project site (Figure 6a). This federal property (LT 16 DL 135 GP 2 NWD PL LMP44262) is owned by the Crown in Right of Canada, represented by the DFO and was transferred to the Crown as a condition of a review undertaken by the Fraser River Environmental Management Program (FREMP). If the waterlot lease to be issued by FLNR includes that area of the Fraser River immediately adjacent to this shoreline property, the consent of DFO, representing the Federal Crown, to the use of the water lot area may be required.

There are no expected changes to the environment that may occur, as a result of carrying out the Project, on the adjacent federal property or any other federal lands. Additionally, there are no trans-boundary effects from the Project expected outside of British Columbia or Canada (e.g., air quality effects, effects on marine mammals, etc.). The Project location is more than 15 km from the United States border. The Project has a small air emissions profile, and therefore, is unlikely to result in distinguishable changes to air quality beyond the local study area. The geographic extent and ambient concentrations of project-

related emissions will be assessed as part of the scope of the environmental assessment to validate this conclusion.

3.5 Aboriginal Communities, Treaty Lands and Asserted Traditional Territories

Aboriginal groups that have communities in close proximity to the Project include Musqueam Indian Band and Tsawwassen First Nation (Figure 1). The established or asserted traditional territories of other Aboriginal groups overlap the Project site, include:

- Cowichan Tribes;
- Halalt First Nation;
- Lake Cowichan First Nation;
- Lyackson First Nation;
- Penelakut Tribe (including Hwiltsum);
- Stz'uminus First Nation;
- Tseil-Waututh Nation;
- Semiahmoo First Nation;
- Katzie First Nation;
- Squamish Nation;
- First Nations of the Stó:lō Nation; and
- First Nations of the Stó:lō Tribal Council.

While no Métis communities have been identified in proximity to the Project site to date, WesPac understands that there may be a requirement by the federal government to consult with the Métis Nation British Columbia. WesPac intends to update this list as the Project moves forward, with input from Aboriginal groups and as advised by regulatory agencies.

3.6 Project Components

The Project is comprised of the following components, described in more detail in the sections below:

- Marine Jetty (access trestle, loading platform, mooring dolphins and berthing dolphins);
- LNG Transfer System;
- Process Control and Power Supply Systems;
- Fire Protection and Emergency Systems; and
- Project Access (access road and parking).

The coordination of the Project's operations, including operations of Onshore Facilities and Offshore Facilities, with those of the Tilbury LNG Plant, will be managed through an operational agreement between WesPac and FortisBC. The operational agreement will outline communication, control and

responsibility for the management of Project components and systems. The general coordination of control and safety systems is also described in the sections below.

3.6.1 Marine Jetty

The marine jetty is part of the Offshore Facilities and will be comprised of a loading platform (16.5 m x 25 m) and an access trestle (360 m x 10.6 m). The access trestle will connect the structure to the shoreline and support all LNG pipeline transfer systems including, a vapour return line, fire-fighting water supply pipe and other utilities (Figure 4). The design of the access trestle will accommodate both a walkway and a separate roadway for light vehicles and is designed to be above ground to pass over sensitive shoreline habitats. The loading platform will be installed at the end of the trestle and will support all LNG transfer systems. Two mooring dolphins (6.5m x 10m) will also be installed on either side of the loading platform in addition to two stern-line and two bowline-mooring dolphins (8m x 8m) that will support the berthing of Project vessels (Figure 4). The berthing dolphins will be designed to withstand the impact from the largest (90,000 m³ of LNG capacity) LNG carriers expected to call at the Project. These dolphins will also be designed to withstand loads from wind, wake, and current forces when vessels are moored along the jetty and will be set apart to ensure full contact with the parallel sides of the vessels. The fender units are designed to accommodate a full range of vessel sizes at all tidal states. Mooring dolphins will be set back off the berth face to optimize the mooring line lengths and angles and provide access to tugs when vessels require assistance. Piles will support the loading platform (12 piles), access trestle (36 piles) and mooring dolphins (8 piles). Catwalks will be constructed to connect mooring dolphins to the loading platform. The loading platform and the berthing dolphins will be separate structures to prevent the transfer of horizontal loads from LNG barges and carriers. Quick release hooks will be installed on each mooring dolphin for the release of mooring lines in the event of a ship or a barge needing to leave the berth in an emergency.

3.6.2 LNG Transfer System

The LNG transfer system has components in both the Offshore Facilities and the Onshore Facilities. The system will include a 2000 m³/hr transfer pump installed within the FortisBC LNG storage tank. In addition, the transfer system will comprise two stainless steel insulated pipes (one 76 cm and one 15 cm diameter) and one 50 cm diameter vapour return pipe of approximately 470 m in length that will terminate at the Tilbury LNG Plant BOG compressor. The LNG transfer system will extend on both sides of the FortisBC property line (Figure 3). All pipes and supporting infrastructure will be installed on a pipe rack system approximately 1 m above ground level and aligned along the western boundary of the Tilbury LNG Plant (Figure 3).

To facilitate vessel loading three 40 cm diameter stainless steel loading arm pipes will be installed on the loading platform facing the river channel. Two of the arms will be used for LNG loading and the other arm

will be used for natural gas vapour return. All of the arms will be remotely controlled from a portable control box. The ends of the arms will have quick connect/disconnect leak-tight connectors.

3.6.3 Process Control and Power Supply Systems

The Offshore Facilities will include a control room that will be manned during vessel berthing and loading operations (Figure 4). The jetty operator will clear the ship for loading and operate the loading arms to connect to the vessel. The jetty operator will then give permission to the FortisBC operator in the Tilbury LNG Plant control room to load the vessel. The jetty operator will monitor all operating conditions and maintain communication with the FortisBC operator during all loading operations. The FortisBC operator will control and monitor the LNG transfer pump (on/off and flow rate) and the boil off gas compressors (on/off and flow rate). The volume of LNG loaded will be measured using the ship's tank level gauges. A flow meter will be used to measure the volume of gas returned from the vessel. When the filling operation is complete, the FortisBC operator will shut down the LNG transfer pump and BOG compressor. The LNG filling process works as a closed loop system that avoids the release of gas to the atmosphere.

The Project will use a 4160 V electrical power supply from BC Hydro's existing electric power distribution system. The connection point will be at an existing transformer located within the Tilbury LNG Plant. The load will be approximately 25 kW. No additions to BC Hydro's electrical distribution system will be required for the Project. A backup generator will be installed near the jetty to provide sufficient power to operate critical equipment during an electrical failure. Critical equipment will include the loading arms and transfer valves. The control and communication systems will be protected by use of an uninterruptible power supply.

3.6.4 Fire Protection and Emergency Systems

The Project fire protection system will include a 25 cm fire water pipe of approximately 795 m, extending on both sides of the FortisBC property line. This will be installed from the loading platform; along the entire pipe rack system, and fed from the water system at the adjacent Tilbury LNG Plant. Dry chemical fire extinguishers will be installed on the marine jetty, and an alarm system and Emergency Shutdown System (ESS) will also be installed to stop the flow of LNG and close all LNG transfer valves in the event of a fire.

The Project control room described in Section 3.6.3 will coordinate with the Tilbury LNG Plant control room and have systems installed to evaluate, monitor and manage any emergency or unusual event. Local shutdown facilities will be provided to control and manage shutdown equipment at the point of failure. Safety measures (e.g., emergency response plans and operating procedures), and safety systems/equipment (e.g., fire water pumps, hydrants, fire extinguishers, high expansion foam systems, gas detection and cryogenic leak detection systems) will be used to actively protect Project personnel, construction and operations equipment, and the surrounding areas and resources. Protection, safety systems, and planning will be used to avoid, limit, and mitigate injury or damage from incidents associated with the release of LNG product or associated vapor.

The marine jetty will also accommodate a floating dock where a small safety vessel could be moored (Figure 4). This safety vessel may be used to patrol the waters surrounding the Project site during vessel loading operations.

3.6.5 Project Access

Access to the Project site will be via Tilbury Road through a shared entrance with the FortisBC (Figure 3). An 800 m access road will be constructed adjacent to the Varsteel property boundary up to the river dike (to be upgraded by FortisBC in 2015-16), where the road will turn eastward and run adjacent to the dike, before crossing the dike. A small parking area will be constructed on the existing concrete deck at the Project site, with enough space for up to eight vehicles (Figure 3).

3.7 Project Activities

The Project design as outlined in this Project Description is currently at the feasibility stage, therefore further technical work is required, primarily related to dredge material analysis and Project design requirements based on the geotechnical investigation. In addition, individual contracts between WesPac and future LNG loading customers are also under development.

The Project will require the following construction and commissioning activities, including expected onshore and offshore construction machinery requirements, in the Sections below:

- Site Preparation;
- Site Set-up and Removal of Existing Marine Infrastructure;
- Ground Stabilization Works;
- Support Pile Driving;
- Marine Jetty and LNG Transfer Pipe Construction;
- Capital Dredging;
- Shoreline Restoration; and
- Project Commissioning Activities.

3.7.1 Site Preparation

3.7.1.1 Site Set-up and Removal of Existing Marine Infrastructure

During this phase a construction laydown area, temporary site office with power connection and worker amenities and sanitary facilities will be established on the FortisBC property immediately adjacent to the Project site (Figure 7). As described in Section 3.6.5 access to the Project site during construction will be through the adjacent property that is owned by FortisBC and an entrance will be provided on Tilbury Road (Figure 3). Construction supplies and services will mainly be delivered to the site via barges using established shipping routes in the Fraser River. Barges will be stored in the equipment storage area until required (Figure 7). However, some construction materials may also be delivered by trucks using the local road network.

It is expected that the existing abandoned marine infrastructure currently present in the water lot will be removed during this phase using a marine crane and support barge (Appendix A). The existing infrastructure to be removed includes timber piles, mooring dolphins, steel piles and concrete deck. To enable access, the onshore portion of the Project site will be cleared of logs and debris using excavators and other machinery as required. Any waste materials from site clearance activities including timber and steel piles, abutment deck slabs and foundations will be stockpiled in the construction laydown area pending removal to a suitably permitted offsite facility.

3.7.1.2 Ground Stabilization Works

Ground stabilization works are required for portions of both the Onshore Facilities and Offshore Facilities to meet post-seismic performance requirements necessary to support the installation of Project infrastructure. It is expected that in-situ ground densification to depths in the order of 20 m to 25 m will be required. An area of 48,600 m³ along the foreshore will require ground stabilization in addition to an area of 120,600 m³ along the onshore pipe rack corridor and an area of 540 m³ at the cut off wall.

Ground stabilization techniques will include vibro-replacement and stone column installation. During offshore ground stabilization activities flat deck barges may be used to transfer equipment or, alternatively, temporary rock berms may be constructed from the foreshore into the riverine environment. The exact extent of stabilization works within the confines of the Fraser River will depend on the results of a geotechnical investigation being undertaken by Golder Associates on behalf of WesPac. This investigation will determine the specific characteristics of riverbed sediments within the Project site, and the results of this investigation and subsequent stabilization requirements will be summarized in the EAC Application/EIS.

3.7.2 Project Construction Activities

3.7.2.1 Support Pile Driving

A total of 64 steel friction piles will support the loading platform, adjoining access trestle, berthing dolphins and mooring dolphins. As the site is underlain by soft and compressible deltaic soils, pile depths are expected to range between 30 to 40 m below the final dredged elevation. Firm bearing strata, for end bearing support of pile foundations, are not within practical reach, and may be found at depths likely in excess of 100 m. Pile driving would be undertaken by a crane barge supported by an equipment storage barge (Figure 7).

3.7.2.2 Marine Jetty and LNG Transfer Pipe Construction

Jetty construction activities will include the installation of trestle bridge sections, catwalks, platforms and decks using a crane barge (Figure 4). Where necessary, reinforcement steel (rebar) will be used to reinforce concrete structures. Following the construction of the access trestle, loading platform, berthing dolphins, and mooring dolphins: catwalks, fenders and quick release mooring hooks will be installed.

Construction activities on the topside of the jetty will include installation of the LNG transfer piping, vapour return line, loading arms, lighting, control systems, and supporting utilities. The specific stipulations for navigational safety and lighting requirements, along with the addition of navigational aids will be developed with Transport Canada (TC) through the *Navigation Protection Program* (NPP) review process under the *Navigation Protection Act* (NPA).

Construction of the jetty structure (access trestle, loading platform berthing dolphins and mooring dolphins) will be principally from the water using a crane barge (Figure 7). Support flat top barges may be used to bring concrete trucks out to the jetty to support construction activities. Project construction activities will predominantly occur outside of the established navigational channel in the Fraser River, therefore no effects on navigation are anticipated. In addition, the potential for effects will be confirmed through the NPP review process under the NPA.

The onshore portion of the jetty topsides (LNG transfer pipe, vapor return pipe, loading arms and other utilities), the LNG transfer pipeline, and the pipe rack system will be constructed on land using cranes and other machinery as required.

3.7.2.3 Capital Dredging

The existing Fraser River depth surrounding the Project site is sufficient for the safe approach and departure of the majority of vessels expected to call at the jetty. However; approach limitations exist (in the vicinity of the jetty) for LNG carriers with drafts in excess of 9 m during low tidal conditions. Therefore, an approach channel and berth pocket will require dredging. For the purposes of the Project Description the maximum dredge area is estimated to be 18.7 ha (Figure 3). This dredge area would better accommodate LNG carriers up to 90,000 m³ of LNG capacity to access to the jetty. WesPac contemplates implementing a smaller dredge area of approximately 12.0 ha (Figure 3) during initial jetty operations when smaller LNG carriers are more likely.

The dredging will enable a design elevation of -9.5 m Chart Datum (CD) in the approach channel and -11.0 m CD in the berth pocket. The final depth of the dredge cut will be based on a ratio of 1.1 times the maximum design draft of the largest LNG carriers expected to call at the Project site, with an additional provision for vessel clearance.

Capital dredging of the Project mooring basin will be undertaken by a Trailing Suction Hopper Dredge (TSHD) (Figure 7). In addition a Grab Clamshell Dredge (GCD) may also be used to dredge the final section slopes at the shore side of the basin. A TSHD is an independent vessel that uses suction pipes, located near the side of the vessel, that descend to the river bed and suck material into a hopper that can be offloaded. Conversely, a typical GCD operation is comprised of a motorized crane mounted on a barge, equipped with a clamshell grabber utilized for grabbing material from the river bed and transferring it on to flat top barges.

All dredging activities will be undertaken outside of the freshet period, which runs from April to June. Also dredging will be conducted following Best Management Practices (BMPs) including windows of least risk and may be undertaken in conjunction with the annual navigational dredging program conducted in the Fraser River.

Every effort will be made by WesPac to find a beneficial end use for dredge material. If determined to be suitable following testing, dredge material can have many beneficial end uses for productive purposes such as construction, foreshore restoration and creation of upland habitats. However, at this time the specific end uses for material, and locations of the end use, have not been identified. If ocean disposal is the only available option, dredge material would be subject to the *Canadian Environmental Protection Act, 1999 (CEPA)* and a permit application would be submitted by WesPac under Section 127 of *CEPA*, pursuant to the limitations detailed in *CEPA* Schedules 5 and 6. The *Disposal at Sea Regulations* provide chemical concentration screening limits for dredge material, and Environment Canada (EC) provides additional guidance regarding the minimum sampling requirements to support an application under this regulation.

Prior to dredging, a Sampling and Analysis Plan (SAP) will be developed to address the sampling requirements outlined by EC's guidance, as well as guidance received from EC through the consultation process. EC may request that a member of the Disposal at Sea Office attend the Project site to observe material sampling when it is conducted. Subsequently, the results from sampling will be screened for sediment chemistry results against the limits outlined in the *Disposal at Sea Regulations* (Section 4 Table Lower Level), and an analysis report will be prepared. If the concentrations are found to be lower than specified, EC may issue a permit for the disposal of the material at a designated disposal site. Sand Heads is the closest disposal site in proximity to the Project. Conversely, If one or more limits are exceeded, EC may accept an evaluation of potential bioavailability of the contaminant of concern, or may require toxicity testing as outline in the *Disposal at Sea Regulations* to support the application. If testing determines that the material is not suitable for beneficial use or ocean disposal, the material will be disposed of at a permitted onshore disposal facility.

3.7.2.4 Shoreline Restoration

The existing shoreline at the Project site has been disturbed by previous industrial activities conducted on the shoreline. The Project is designed to have a limited footprint in the existing riparian and foreshore area (Figure 4). There is an opportunity for shoreline enhancement at the site, and early discussions to date have identified the potential for creation of a substantial amount of marsh and mudflat habitat in the area. There is approximately 100 m of disturbed shoreline that may be suitable for enhancement. WesPac intends to work with regulatory agencies and Aboriginal groups to develop a plan for enhancing the shoreline. If habitat offsets as a condition of an authorization under the *Fisheries Act* are a requirement, it is expected that those offset requirements could be incorporated into the shoreline enhancement plan.

3.7.3 Project Commissioning Activities

Prior to operation, all installed mechanical and electrical equipment will be tested under non-load conditions. In addition, installed pipework will be hydrotested (filled with water and pressurized to prove system integrity) and pneumatically pressure tested. A final survey of the dredged area will also be

conducted to ensure the necessary vessel clearance for Project design vessels has been achieved. Final inspections during this phase will also include, but would not be limited to, checks of:

- All fasteners or fenders and mooring provisions;
- Quick release mechanisms on mooring hooks;
- Firefighting equipment, water supply systems and monitors;
- Communication and lighting provisions on the jetty and trestle; and
- A visual inspection of emergency ladders and catwalks.

3.7.4 Project Machinery Requirements

The exact onshore and offshore based machinery requirements for the construction phase of the Project will be determined during the Front End Engineering Design (FEED) process. However, for this Project Description, a preliminary estimate of machinery requirements is provided in Table 3-1.

Table 3-1: Machinery for the Project Construction Phase

Machinery/Equipment	Expected Activity
Offshore	
Crane barge	<ul style="list-style-type: none"> • Installation of loading platform, access trestle bridge sections and catwalks for decks • Installation of rebar and placing concrete • Installation of fenders, mooring hooks and placing of the loading arms
Pile-driver and vibratory hammers	<ul style="list-style-type: none"> • Offshore pile-driving and placing of pile caps
Flat-deck materials barges (18 m x 7 m x 1 m to 55 m x 16 m x 3 m)	<ul style="list-style-type: none"> • Used to transport construction materials to the Project site (e.g., concrete supply, pile driving equipment)
Trailing Suction Hopper Dredge (TSHD)	<ul style="list-style-type: none"> • Dredging of the mooring basin
Grab Clamshell Dredge (GCD) and dump barges	<ul style="list-style-type: none"> • Final dredging of end sections of the mooring basin and slopes at the shore side of the basin
Towed dump barges	<ul style="list-style-type: none"> • Transport of the dredge materials
Survey boat	<ul style="list-style-type: none"> • Pre-dredge survey, progress surveys and post dredge survey
Mobile batch-plant on flat-deck barge	<ul style="list-style-type: none"> • Cast in place concrete

Machinery/Equipment	Expected Activity
Tugboat(s)	<ul style="list-style-type: none"> • Support for the berthing of construction vessels, if required
Onshore	
Hydraulic excavator	<ul style="list-style-type: none"> • Site clearance and preparation activities
Dozer	<ul style="list-style-type: none"> • Site clearance and preparation activities
Pile-driver and vibratory hammers	<ul style="list-style-type: none"> • Onshore pile-driving
Crane	<ul style="list-style-type: none"> • Pipe placement • Equipment placement, such as loading arms and drain tank.
Ready-mix trucks	<ul style="list-style-type: none"> • Supply of concrete
Trucks	<ul style="list-style-type: none"> • Welding pipe • Moving material through the site
Forklifts, compressors, lighting plants, welders	<ul style="list-style-type: none"> • Ancillary and support equipment for site preparation and construction

3.7.5 Project Operation Activities

Project operation activities will include berthing, jetty operations and maintenance dredging. These activities are described further in the sections below.

3.7.5.1 Berthing

The Project will provide berthing space suitable for LNG carriers and barges at the jetty. The specifications for the largest LNG carriers and barges expected to call at the Project are presented in Table 3-2. As shown, the largest vessels have a smaller DWT than many of the Panamax sized deep-sea container vessels that currently transit through the established shipping channels on the Fraser River.

Each LNG carrier will berth directly at the jetty using a tug escort upon approach. All tugs will be provided by a suitably qualified tug operator that will be contracted by the operator of the LNG carrier. LNG carriers will usually approach the jetty keeping the berth on their starboard side. This will allow the approaching vessel to keep its bow upriver without turning, will enable maximum control, and will also aid in reducing speed when the vessel is in close proximity to the jetty. Specifically, vessels on the approach will be slowed to a suitable speed so that assisting tugs can move safely alongside. Subsequently, tow lines will be passed up to the selected, closed tow chocks or fairleads. Once secured, tugs will follow the approaching vessel during its river transit until such time that the pilot on board the approaching LNG carrier requires further tug assistance. The initial approach to the berth will be accomplished at an oblique angle to the center-line of the navigable channel in the river.

Vessels will be stopped in position using assisting tugs, approximately one beam width off the jetty, parallel to the berth face, at which point they will be maneuvered alongside the berth fenders using tugs acting on the pilot's instructions, at the approved contact velocity. Once vessels are alongside the jetty fenders one or two of the tugs will be used to 'push-to-hold' the vessel firmly against the fender panels. Following this the docked vessel will cast lines and move into the final position with its manifolds aligned with the shore loading arms. During this process one or two line boats may be employed to assure the efficient transfer of the individual mooring lines to the appropriate fore and aft mooring dolphins. On departure, vessels will be pulled off the berth using a tug assist by a distance of approximately one beam width and, while the stern is held in position by tugs, the bow will be swung down river from a virtually stopped position off the berth.

Table 3-2: Typical Specifications of LNG Carriers, Barges and Current Deep-Sea Traffic

Specifications (Approximate)	Project LNG Barge	Project LNG Carrier	Typical Panamax sized Container Ship
Length (m)	106	242	180-220
Beam width (m)	16.5	38	32
Draft (m)	5.1	10	12
Capacity to ship LNG (m ³)	4,000	90,000*	n/a
Dead weight tonnes (DWT)	NA	Up to 47,000	50,000 to 90,000

*Note: The marine jetty and marine safety items described and evaluated in this Project Description are for LNG Carriers with capacities of up to 90,000 m³. This size vessel exceeds the current beam width dimension limits for vessels on the Fraser River. Although the vessel dimension policies are under review by PMV in response to the widening of the Panama Canal, dimensions exceeding a beam width of 32.25 m are currently only allowed via an exception from PMV. The beam width currently approved by PMV is 32.25 m. WesPac has requested PMV to evaluate allowing a beam of up to 38.0 m for LNG ships that call at the jetty. PMV has granted exemptions for non- LNG vessels wider than 32.25 m in the past.

In general, WesPac intends to deliver LNG to LNG carriers and barges berthed at the jetty. The receivers of LNG will be required to arrange for marine transportation. The exact number of vessel calls at the jetty will depend on market conditions during operation, but it is estimated that up to up to 122 LNG carrier (of various sizes) calls and 90 LNG barge calls could occur at the jetty per year.

WesPac will require vessel operators to comply with all applicable national and international safety requirements when at the Project. However, responsibility for the care, safety and control of the LNG carriers, LNG barges and, upon loading, the LNG product will generally lie with the receivers and with the vessel operators. All LNG carriers calling at the jetty will be operated by qualified shipping companies engaged in the business of LNG transportation, and must comply with requirements including, but not limited to, the *Canada Shipping Act, 2001*, the *Pilotage Act*, the *Canada Marine Act*, the *Marine Transportation Security Act*, and numerous regulations issued pursuant to those acts. Shipping activities will also comply with applicable national and international safety regulations, such as requirements established by the International Maritime Organization. WesPac also expects that where applicable, consideration will also be given by vessel operators to BMPs for the safe operation of LNG vessels

presented by the Society of International Gas Tanker and Terminal Operators (SIGTTO), and the World Association for Waterborne Transport Infrastructure.

3.7.5.2 Jetty Operations

Once a vessel is securely fastened at the jetty, the LNG loading arms on the jetty loading platform will be connected to the vessel. LNG will then be transferred to the vessel via the Project's LNG loading system. LNG carriers and barges may remain tied up at the jetty for up to approximately eight days. However, under normal operating conditions LNG carriers will be tied up at the jetty for approximately 24 to 48 hours, and LNG barges are expected to complete loading operations in a much shorter timeframe. When the LNG loading process is complete vessels moored at the jetty will depart the berth following a reverse of the docking procedure described above.

During construction and throughout the operational phase of the Project a marine security zone will be established around jetty operations and the Offshore Facilities. Once the security zone is established, only Project-related and authorized vessel traffic will be permitted to enter this restricted area during berthing and LNG loading operations. A small craft will be stationed at the floating dock to patrol the security zone if necessary. The exact extent of the security zone will be determined through the final design of the Project. During this process, consideration will also be given to local river conditions, applicable marine regulatory BMPs requirements, input from Aboriginal groups, and input from PMV.

3.7.5.3 Maintenance Dredging

Maintenance dredging of the Project berth is expected to be undertaken on a regular basis after the annual freshet period. All dredging activities are expected to be undertaken by either a TSHD or GCD as described in Section 3.7.2.3 (Figure 7). Maintenance dredge material would be subject to the same regulatory and sampling requirements, and every effort would be made to find a suitable end use for the material rather than ocean disposal of the material as also outlined in Section 3.7.2.3.

3.7.6 Project Decommissioning and Closure

Decommissioning and closure activities for the Project are expected to include the dismantling of both Offshore Facilities and Onshore Facilities and include removal of steel and concrete structures, to prepare the Project site for future uses. Prior to decommissioning, a review will be conducted to identify if subsequent industrial activity planned for the Project site could utilize the Project infrastructure. Decommissioning and closure activities will comprise, but not be limited to the following:

- Removal of all LNG transfer systems, pipes, loading arms and control facilities;
- Removal of all associated jetty infrastructure (including the access trestle, railings, catwalks and other structures);

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- Demolition of concrete decks and the dredging of the spilled concrete from the riverbed;
 - Pulling and removal of pile foundations, or cutting of piles below the mud-line; and
 - Foreshore slope protection where applicable and re-planting vegetation.

3.8 Anticipated Emissions, Discharges and Waste

3.8.1 Preparation and Construction

The emissions anticipated during preparation and construction phase activities are described in the Sections below. Specifically, these include the following:

- **Air and Dust Emissions**
 - Combustion engine exhaust emissions from onshore and offshore based construction equipment/machinery/vessels (e.g., hydraulic excavator, crane, tugs, grab dredge and dump barges); and
 - Dust emissions from construction activities.
- **Noise and Vibration Emissions**
 - Noise and vibration emissions related to construction machinery operation (e.g., dredging activities, pile driving machinery and excavator movements etc.).
- **Storm-Water Runoff**
 - Storm-water runoff during the construction period, following rainfall events and silt and soil control (e.g., access roads, laydown areas, storm-water drainage facilities and general dust control).
- **Solid and Sanitary Wastes**
 - Overburden and debris from removal of any site surfacing (e.g., abutment deck slabs and foundations);
 - Existing abandoned marine infrastructure removal;
 - Construction waste (e.g., construction trash, food trash, and other wastes);
 - Hazardous waste (e.g., unserviceable batteries, used motor and hydraulic oils, contaminated filters, used chemical cleaning fluids, paints and other waste items considered as hazardous by jurisdictional authorities); and
 - Sanitary waste from worker amenities.
- **Dredge Material**
 - Material from capital dredging activities.
- **Light Emissions**
 - Site safety lighting, construction machinery, and equipment during construction activities.
- **Accidents and Malfunctions**
 - Events involving spills of toxic or hazardous materials (e.g., hydrocarbon fuels, lubricants, into environmentally sensitive habitat); and
 - Structural failure of a sediment containment measure resulting in erosion and sedimentation on the aquatic environment.

3.8.1.1 Air and Dust Emissions

Air emissions will be generated from construction activities and the operation of construction equipment. Dust or particulate matter (PM) will be the primary air emission present from construction activities (e.g., clearing, grading and compaction of the Project site, and during construction of the jetty and other structures). Combustion of diesel and gasoline fuels by construction equipment will release atmospheric emissions such as, NO_x, PM, SO₂, hydrocarbons and CO₂. In addition, greenhouse gas emissions (GHGs) may also be released from construction activities such as, site clearing and preparation, and the operation of construction equipment. Given that the nearest residential receptors are approximately 750 m from the Project site, the industrial nature of the surrounding area, and the temporary and intermittent nature of the construction activities, adverse effects are expected to be localized and intermittent, and will only occur for a short period of time during the construction phase.

3.8.1.2 Noise and Vibration Emissions

Noise and vibration emissions will be generated through construction activities such as site preparation, ground stabilization, pile driving, and other construction activities associated with the construction of the Project. Given that the nearest residential receptors are approximately 750 m from the Project site, the industrial nature of the surrounding area, and the temporary and intermittent nature of construction activities, adverse effects are expected to be localized and intermittent, and will only occur for a short period of time during the construction phase. As part of mitigation, a noise monitoring and management section would be included in the Construction Environmental Management Plan (CEMP).

3.8.1.3 Storm-Water Runoff

During construction, storm-water discharges will be directed to a temporary storm-water drainage system which will be established during the site preparation phase. To control adverse effects of erosion and sedimentation on surface waters, construction activities will be conducted in accordance with a CEMP. Precautions will be taken during construction to avoid hydrocarbon spills, both onshore, offshore and in near shore areas and the CEMP will include a spill prevention and control section.

3.8.1.4 Solid and Sanitary Wastes

Solid wastes may be generated from site preparation and construction activities. A CEMP will be developed that presents procedures to minimize, segregate, safely store, and dispose of all wastes generated from the Project. Solid and liquid hazardous waste (e.g., unserviceable batteries, used motor and hydraulic oils, contaminated filters, used chemical cleaning fluids, paints and other waste items considered as hazardous by jurisdictional authorities) will be collected on-site segregated, secured, contained in the lay down area and disposed of at a suitably licensed facility. In addition, there will be a small quantity of sanitary and solid waste from worker on site amenities that will be disposed at a suitably licensed facility.

3.8.1.5 Dredge Material

The Project will produce waste material from capital dredging activities. As described in Section 3.7.2, prior to dredging activities being conducted, material samples will be collected and tested for the specified contaminants in line with the SAP, which will be approved by EC. Before commencing dredging activities every effort will be made to find a suitable end use for this material and ocean disposal or disposal at a permitted onshore disposal facility will only be considered as an option as a last resort. Dredge material will be transported in barges or trucks to a final use or disposal site, and will not be stored on the Project site or elsewhere prior to an end use being identified.

3.8.1.6 Light Emissions

Construction activities will primarily be undertaken during daylight hours. Light emissions during nighttime construction activities will be based on mobile and fixed on-site lighting established for health and safety and, or navigational purposes. Light emissions will be mitigated appropriately using various methods that may include directional lighting, height of lighting and low lumen fixtures.

3.8.1.7 Accidents and Malfunctions

The CEMP will provide mitigation measures in the event of a structural failure of sediment containment issues. An emergency spill response procedure will be prepared to address events related to accidents and malfunctions.

3.8.2 Operation

There will be no processing of natural gas or storage of LNG on the site as part of this Project, as all LNG will be supplied from the adjacent Tilbury LNG Plant. Therefore, there will be no air emissions or liquid discharges or effluents discharged from the Project related to LNG liquefaction or storage. Anticipated emissions/discharges during operation are described in the sections below and include the following:

- **Air Emissions**
 - Emissions from LNG carriers, barges and other support vessels (e.g., tugboats) during berthing, departure from the jetty, and operations while at berth;
 - Potential fugitive emissions from LNG loading operations (e.g., connecting and disconnecting loading arms);
 - Emissions from periodic maintenance dredging activities; and
 - Emissions from backup power generation during the event of a power outage.
- **Noise and Vibration Emissions**
 - Emissions from intermittent docking and loading of LNG carriers and barges;
 - Emissions related to periodic maintenance dredging; and
 - Emissions related to servicing of Project components and worker arrival and departure from the site.

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- **Storm-Water Runoff**
 - Storm-water runoff onsite during operation, following rainfall events and silt and soil control (e.g., access ways and storm-water drainage facilities).
 - **Solid and Sanitary Wastes**
 - Operational worker waste including food trash and other wastes;
 - Hazardous waste (e.g., unserviceable batteries, used motor and hydraulic oils, contaminated filters, used chemical cleaning fluids, paints and other waste items considered as hazardous by jurisdictional authorities); and
 - Sanitary waste from worker amenities.
 - **Maintenance Dredging**
 - Dredge material from maintenance dredging.
 - **Light Emissions**
 - Fixed on-site lighting for health and safety; and
 - Ship light emissions for health and safety.
 - **Accidents and malfunctions**
 - Events involving spills of toxic or hazardous materials (e.g., hydrocarbon fuels, lubricants, into environmentally sensitive habitat); and
 - Loss of containment of LNG during loading operations.

3.8.2.1 Air Emissions

During operation, there will be air emissions (including GHGs) from LNG carriers and barges berthing at the facility in addition to supporting tug vessels and emissions from dredging activities. Canada is a signatory to the International Convention for the Prevention of Pollution from Ships (MARPOL). Therefore, ship owners will be required to ensure that emissions from the LNG carriers will comply with the regulations on emissions of NO_x and SO₂ in MARPOL convention Annex VI and applicable Canadian regulations.

There will be no significant point source air emissions from the Project as all natural gas processing and LNG pumping facilities will be provided offsite at the existing Tilbury LNG Plant. During the Project operation phase, onshore air emissions (including GHGs) will include fugitive vapour losses from loading operations, backup generator emissions (when in use) and emissions from vehicle access to the Project site. Any fugitive emissions from loading operations are expected to be low as loading arms will be drained and nitrogen purged before connection is broken with the vessel. The LNG transfer system is a closed system with no vents to the atmosphere. Pressure safety valves and thermal relief valves will direct their outputs into the BOG return pipe, which recycles the gas into the LNG liquefaction process (Figure 3).

3.8.2.2 Noise and Vibration Emissions

During operation, potential noise emissions will be related to intermittent LNG loading operations, marine vessel traffic (berthing of LNG carriers or barges), maintenance and vehicle access and backup generator

noise if in use. Acoustical enclosures, blankets, and other measures will be installed on infrastructure connected to the Project, as necessary to ensure noise-generating machinery and equipment operates within acceptable limits and mitigation measures related to noise will be outlined in a section in the Operational Environmental Management Plan (OEMP).

3.8.2.3 Storm-Water Runoff

During operation of the Project, storm-water will be directed to a drainage system established during the site preparation. To control the specific adverse effects of erosion and sedimentation on surface waters, operational activities will be conducted in accordance with the sediment control and storm-water management sections outlined in a section in the OEMP.

3.8.2.4 Solid and Sanitary Waste

During operation, a small quantity of hazardous wastes will be produced from maintenance activity (e.g., unserviceable batteries, used motor and hydraulic oils, contaminated filters, used chemical cleaning fluids, paints and other waste items considered as hazardous from maintenance activities during operation) and disposed of. In addition, there will be a small quantity of solid and sanitary waste from worker on-site amenities which will be appropriately disposed of. An operational waste management section in the OEMP will be developed for the Project that presents procedures to minimize, segregate, safely store, and dispose of both regular waste and hazardous waste.

3.8.2.5 Dredge Material

Maintenance dredging of the Project berth is expected to be undertaken on an annual basis, as required. Prior to dredging activities being conducted as described in Section 3.7.2, material samples will be collected and tested for the specified contaminants in line with the SAP, which will be approved by EC. Before commencing dredging activities, every effort will be made to find a suitable end use for this material and ocean disposal or disposal at a permitted onshore disposal facility will only be considered as an option as a last resort. Dredge material will be transported in barges or trucks to a final use site or disposal site, and will not be stored on the Project site or elsewhere prior to an end use being identified.

3.8.2.6 Light Emissions

Operational light emissions during nighttime activities will be limited to fixed on-site lighting and light emissions from vessels. Light emissions will be based on mobile and fixed on-site lighting established for health and safety or navigational purposes. Intermittent light emissions during nighttime maintenance activities will be based on mobile and fixed on-site lighting established for health and safety purposes. Light emissions will be mitigated appropriately using various methods that may include directional lighting, height of lighting, and low lumen fixtures.

3.8.2.7 Accidents and Malfunctions

During operation, measures will be implemented to mitigate the consequences of an accident or malfunction through adherence to legislated requirements and BMPs. An emergency spill response procedure will be prepared to address events related to accidents and malfunctions. Precautions will be taken during Project operations to avoid hydrocarbon spills, both onshore and in the aquatic environment. To prevent accidental discharges during operations all personnel will be trained in fuel-handling procedures and a spill prevention management plan section will be prepared in the OEMP. Provisions have been included in the design of Project to contain LNG if a spill was to occur on the loading platform.

3.8.3 Decommissioning and Closure

It is expected that emissions associated with site decommissioning/closure will relate to air emissions from combustion engines, noise emissions from machinery activities, storm-water and accidental runoff, and general waste generated from the closure of a facility. Therefore, the control measures identified are expected to be the same as those outlined in Section 3.8.1. Decommissioning emissions will be short-term in nature occurring only during the decommissioning period and all emissions are expected to cease upon closure of the Project.

3.9 Project Capital Costs and Employment Estimates

The operational lifespan of the Project is anticipated to be 30+ years. Depending on the final Project configuration, the estimated direct capital cost of the Project including topsides is expected to be approximately \$175 million. The capital cost of the Project will be revised during the preliminary and detailed design phases.

During preparation and construction, the Project will create approximately 131.5 person-years of temporary employment. The numbers of personnel employed by the Project during operation will be closely linked to the anticipated number of vessels calling at the Project per year. The Project will not require any workforce accommodations.

During the operational phase, the Project is expected to lead to the following employment opportunities:

- **Project Employees** – The Project is anticipated to employ in shifts approximately 19 full time equivalent operational employees for 30 years (570 person-years). Facility positions may include skilled technicians and operators, managers and supervisors, and unskilled workers;
- **Contracted Employment** – Contractors are expected to undertake many of the operational activities for the Project, and may provide employment within a number of positions, including tug operators, local transportation services, health and safety, audit and monitoring services;
- **Indirect Employment** – Relates to personnel in the maritime industry and infrastructure services. Employment opportunities are likely to be created in businesses that manufacture, process, or market these goods; and
- **Induced Employment** – Construction and operation of the Project will provide an increase in employment and household income, and may promote extra spending in the local economy.

Extra spending could lead to higher employment in a range of sectors such as housing and real estate services, recreation, entertainment, and food services.

3.10 Project Environmental and Social Setting

3.10.1 River Processes

The Project is located on the South Arm of the Fraser River, which conveys 80% to 85% of the total river discharge. Currents in the South Arm of the river average 1.5 knots. The level of river discharge and tides create alternating flood and ebb currents. Ebb currents during periods of high river discharge may reach 5 to 6 knots in narrower sections of the lower sections of the South Arm (FREMP 2006). The faster flowing deep water portion of the South Arm channel, such as the outside curve of Tilbury Bend, consists predominantly of sand substrate (Swain et al. 1998). The slower near shore areas, like the Project site on the inside curve of Tilbury Bend, accumulate finer substrates that form intertidal flats in sheltered near shore areas (FREMP 2006).

The spring freshet of the Fraser River transports millions of tonnes of material into the lower reaches of the river. The conveyed material is sorted, with larger gravels deposited between Agassiz and Mission. Coarser sands and fines tend to be deposited between below Mission and Sand Heads. Approximately 30% of the sediment carried by the river is conveyed all the way to Sand Heads and the remaining 70% is deposited in the lower channels of the river. Material deposition within the channel creates in stream features such as bars and beaches that provide habitat for fish and wildlife (FREMP 2006). These same features can be hazards for navigation that requires sufficient depth within the channel. An annual dredging program is conducted to maintain the navigational channel through the South Arm of the Fraser River.

3.10.2 Fish and Aquatic Resources

The Project site is located in the South Arm Meso-Tidal segment of the Fraser River, which extends upstream from Deas Island to the eastern tip of Annacis Island (FREMP 2006). The Fraser River Estuary Management Program (FREMP) classified the Fraser River estuary foreshore as red, yellow or green based on productivity. While the FREMP has been discontinued, the classification system is still regularly used by DFO. The FREMP classification system is based on habitat classification of intertidal, near-shore and riparian habitat along the Fraser River (FREMP 2002). Red coded shorelines are considered areas of high productivity. These areas include diverse habitat types, which provide important fish and wildlife features or are sites of previous habitat compensation. Shoreline fish habitat in the South Arm of the Fraser River is limited to a narrow band of riparian forest with intertidal marsh and mudflat along the shore (FREMP 2006). Much of the shoreline along this segment of the river is used in industrialized activity, as reflected in the relatively higher percentage of low productivity shoreline (green coded shoreline) under FREMP. Although the majority of this Fraser River segment is classified as low-productivity shoreline, the habitat area in the immediate vicinity of the Project is a mixture of high, moderate and low productivity shoreline (Figure 8). The shoreline intertidal zone within the Project site mainly consists of mudflat and estuarine marsh habitat with some shrub and deciduous tree riparian vegetation. A review of the FREMP

Habitat Atlas on the Community Mapping Network website (<http://cmnmaps.ca/FREMP>) indicates that these are the main shoreline habitats present at the Project site. There is no documented evidence of any marine plants, as defined in the *Fisheries Act*, being present at the Project site. Marine vegetation including macroalgal species such as rockweed (*Fucus spp.*), sea lettuce (*Ulva spp.*) and bull kelp (*Nereocystis luetkeana*), as well as marine vascular plant species such as eelgrass (*Zostera marina*) are present beyond the mouth of the Fraser River and more than 20 km from the Project site.

The South Arm of the Fraser River is considered an estuarine ecosystem, given the presence of a tidally-driven salt-water wedge underneath a freshwater surface layer (FREMP 2002). The salt-water wedge from the Strait of Georgia moves upstream along the river bottom, while the freshwater flows over the surface. Salinity levels vary based on levels of freshwater discharge and the daily tides.

The lower section of the Fraser River, between Mission and Sand Heads supports as many as 37 native fish species (Richardson et al. 2000). Salmonid use of the South Arm of the river is mainly confined to upstream adult migration in the fall and downstream juvenile migration and rearing in the spring to mid-summer months. All five Pacific salmon species (Chinook [*Oncorhynchus tshawytscha*], chum [*Oncorhynchus keta*], coho [*Oncorhynchus kisutch*], pink [*Oncorhynchus gorbuscha*] and sockeye [*Oncorhynchus nerka*]) spend at least part of their life in the area. Adult salmonids use the South Arm to migrate upriver to spawning grounds, while juvenile salmonids use the channel of the South Arm to move downriver to the ocean. Juvenile salmon use the shallower brackish near shore areas, including the shoreline portion of the Project site, within the South Arm to feed and rear prior to moving out into the ocean. The South Arm of the river also supports white sturgeon year round and an annual eulachon spawning migration in the spring (FREMP 2006). The benthic community at the Project site will consist mainly of epibenthic and burrowing invertebrates associated with soft sediment mudflat and marsh habitats. Benthic invertebrates at the Project site are expected to include Harpacticoid copepods, Chironomid larvae and Oligochaetes (Stronach, 1995).

Harbour seals (*Phoca vitulina*) are the only marine mammal species likely to venture up the Fraser River to the Project site. A total of 16 marine mammal species have been documented in Georgia Strait. Marine mammals such as sea lion, dolphin, porpoise, and Killer whales do occur within Georgia Strait. The following provincially and/or federally designated at-risk marine mammal species may occur within the Strait of Georgia:

- Grey whale (*Eschrichtius robustus*): Provincially blue-listed, Federally listed as Special Concern;
- Humpback whale (*Megaptera novaeangliae*): Provincially blue-listed, Federally listed as Special Concern;
- Killer whale (*Orcinus orca*) southern resident: Provincially blue-listed, Federally listed as Endangered;
- Sea otter (*Enhydra lutris*): Provincially blue-listed, Federally listed as Special Concern; and
- Steller sea lion (*Eumetopias jubatus*): Provincially blue-listed, federally listed as Special Concern.

The identified critical habitat for southern resident killer whales includes the Strait of Georgia that is more than 20 km from the Project site. It is not anticipated that the Project will affect critical habitat for killer whales within the Strait of Georgia.

Four provincially and/or federally designated at-risk fish species could potentially occur adjacent to the Project site. Table 3-3 includes fish species that are listed on the BC Conservation Data Centre website (<http://a100.gov.bc.ca/pub/eswp/>) and are identified as migratory, semi-resident or resident species in the Meso-Tidal segment of the Fraser River (FREMP 2006). No identified areas of critical habitat, as defined in the *Species at Risk Act*, 2002 (SARA), for aquatic species have been documented on or near the Project site.

Table 3-3: Summary of Federally and Provincially-Listed Fish Species Potentially Occurring in the Project Site

Fish Species	Listed (Provincial)	Listed (Federal)
Green sturgeon (<i>Acipenser medirostris</i>)	Red-listed	Special concern on SARA Schedule 1
White sturgeon (<i>Acipenser transmontanus</i>)	Red-listed (Upper Fraser River population)	Endangered
Cutthroat trout (<i>Oncorhynchus clarkii lewisi</i>)	Blue-listed	Special concern on SARA Schedule 1
Coho salmon (<i>Oncorhynchus kisutch</i>) Interior Fraser population		Endangered
Eulachon (<i>Thaleichthys pacificus</i>)	Blue-listed	-

Dredging and pile driving activities connected to the Project will be conducted in an area that has previously been disturbed by regular dredging activities associated with the former terminal facility. The shoreline has also been historically modified by previous barge loading and log handling. Due to the level of previous disturbance at the Project site and available best management practices for the expected construction methods, it is anticipated that potential effects on fish and fish habitat can be avoided through appropriate Project design and mitigation. The project is not anticipated to impact existing sensitive ecosystems or critical aquatic habitats.

3.10.3 Terrestrial Ecological Setting

The Project site is located within the moist maritime (mm) subzone of the Coastal Douglas Fir (CDF) Biogeoclimatic Zone (iMap BC 2014). The CDFmm biogeoclimatic zone experiences warm, dry summers and mild, wet winters, which lends to a long growing season (Meidinger and Pojar 1991). Common tree species in zonal sites of the CDFmm include coast Douglas fir (*Pseudotsuga menziesii* var. *menziesii*), grand fir (*Abies grandis*) and western red cedar (*Thuja plicata*); (Green and Klinka 1994). Dominant

understory species include salal (*Gaultheria shallon*), dull Oregon grape (*Mahonia nervosa*), ocean-spray (*Holodiscus discolor*), and lesser amounts of baldhip rose (*Rosa gymnocarpa*), snowberry (*Symphoricarpos albus*), honeysuckle (*Lonicera* sp.), and vanilla leaf (*Achlys triphylla*; Green and Klinka 1994). Terrain in the Project site is generally flat. Riparian and cleared (paved) portions of the Project site are several meters above the high-water mark of the Fraser River estuary.

3.10.3.1 Vegetation and Sensitive Habitats

The onshore portion of the Project site is mostly paved. Patches of vegetation exist at the northern extent of the alignment where the access trestle will connect to the land and at the southeast extent of the Project site where the LNG pipeline will be connected to Tilbury LNG Plant.

The eastern extent of the proposed access trestle will bisect estuarine marsh and riparian vegetation. Estuarine marsh habitat located directly adjacent to the Fraser River is dominated by grasses and sedges (*Carex* sp.), interspersed with herbs such as silverweed (*Potentilla* sp) and angelica (*Angelica* sp.), and lesser amounts of common cattail (*Typha latifolia*). Scattered red-osier dogwood (*Cornus stolonifera*) and willow (*Salix* sp.) shrubs occur closer to the treeline. Driftwood is scattered throughout the shrubs suggesting that the marsh habitat is inundated at high tide. Riparian habitat upslope of the estuarine marsh habitat varies in width from 20 to 40 m and is dominated by red alder (*Alnus rubra*) and black cottonwood (*Populus trichocarpa*). Dense Himalayan blackberry (*Rubus armeniacus*), a non-native plant species, growth occurs southeast of the riparian trees.

A strip of trees, approximately 2 m wide, dominated by red alder and black cottonwood exists at the northern end of the access road and onshore pipe route approximately 30 m east of the jetty. Southeast from this patch of trees, the proposed above ground pipeline parallels a ditch with common cattail and black cottonwood saplings. The pipeline and access route alignment turns 90 degrees to the northeast and crosses an open field of maintained grass approximately 340 m southeast of the Fraser River.

The design of the access trestle will limit the effect of the Project on riparian habitat. The access trestle will cross the foreshore in an area of lower shoreline productivity (Figure 7). The design seeks to avoid interaction of the Project with higher productivity mudflat and marsh habitats.

3.10.3.2 Wildlife

Reptiles and Amphibians

Amphibian species occurring in the Lower Mainland Region breed in aquatic and terrestrial habitats. Aquatic breeding amphibians use a variety of slow moving aquatic habitats, including slow moving streams, ditches, wetlands, and shallow edges of pond and lakes (except for coastal tailed frog [*Ascaphus truei*] and Pacific giant salamander [*Dicamptodon tenebrosus*]) (Matsuda et al. 2006). Terrestrial breeding amphibians lay eggs in crevices in moist locations such as rock crevices and rotting wood (Matsuda et al. 2006). Adults of most aquatic and terrestrial breeding amphibians inhabit uplands outside of the breeding season. Upland habitats are typically moist and provide shelter and

thermoregulatory microhabitat features such as decaying logs, shrub cover, moist hollows and debris or rock piles (Matsuda et al. 2006). In addition, adult amphibians require access to hibernation sites such as talus slopes, debris piles, burrows and holes, and wetland or pond habitats. The ditch running parallel to the pipeline and access road alignment could provide breeding habitat for amphibian species adapted to urban environments, such as Pacific treefrog (*Pseudacris regillia*). In addition, the Project site may support terrestrial breeding amphibians.

Reptile species occur in terrestrial and aquatic habitats. Terrestrial portions of the Project site may support several species of garter snake (*Thamnophis* sp) which occur in a variety of habitat types including marshes, lakes, riparian habitat, and other habitat where its prey (i.e., amphibians and earthworms) are found (Matsuda et al. 2006). Species, such as terrestrial garter snake (*T. elegans*), are strongly associated with aquatic habitat and are typically found around fresh or marine waterbodies (Matsuda et al. 2006). In the winter, garter snakes congregate in communal hibernacula, where suitably deep hibernating sites are available (Matsuda et al. 2006).

Birds

Bird species occur in a wide variety of habitat types including young and old forests, wetlands, and riparian areas. Tolerance to human activity, human presence, and habitat alteration is variable, with some species dependent on mature to old forests (e.g., northern goshawk [*Accipiter gentilis*]), while others are associated with anthropogenic features (e.g., barn swallow [*Hirundo rustica*]), or are abundant in urban areas (e.g., northwestern crow [*Corvus caurinus*]). Variation in landscape and vegetation communities provide the diversity of habitat and microhabitat features that may be required for activities such as singing and breeding displays, nesting, chick rearing, foraging, and overwintering for multiple species (Squires *et al* 1997). Mudflat and other intertidal habitat along the banks of the Fraser River provide suitable foraging habitat for a variety of migratory shorebirds and waterfowl. Waterfowl are frequently concentrated in the intertidal marshes and mudflats along the shoreline, although some diving ducks utilize deeper water for foraging for fish. Some waterfowl species may nest on the ground and in cavities in riparian, upland grass and forested habitat. Deciduous vegetation along the shoreline provides suitable nesting and foraging habitat for a variety of passerine species.

The CDF biogeoclimatic zone supports 322 bird species (Stevens 1995). Additionally, approximately 140 migratory bird species occur within the Greater Vancouver region (Toochin 2013), some of which may occur in the Project site. A list of migratory species that occur regularly within the Greater Vancouver region, including species that potentially use the Project site, are presented in Appendix B.

The Project site is situated along the Pacific Flyway migration route. The Pacific Flyway is used by a variety of bird species during migration to move between central America and Alaska. The Project site is also located in the vicinity of Ramsar site 243 which encompasses Burns bog, Sturgeon bank, South arm marshes, Boundary bay, the Serpentine River, and the former “Alaksen” Ramsar Site (Ramsar 2015). In addition, the Province has designated Wildlife Management Areas at Boundary Bay, Roberts Bank, and the South arm marshes which is situated 4 km southwest (downstream) of the Project site (MoE 2015).

The Project site is adjacent to Important Bird Area (IBA) BC017 within the terrestrial environment and extends into the IBA at the Fraser shoreline. The aquatic portion of the Project site is within IBA BC017. This IBA supports 50 species of shorebird, as well as a variety of raptors and waterfowl (IBA Canada 2014). This IBA supports globally or continentally significant populations of fifteen species of shorebirds and waterfowl, and supports species at-risk (IBA Canada 2014). Birds overwintering in and migrating through the IBA use the complex of marine, estuary, freshwater and agricultural habitat that occurs along Boundary Bay, Roberts Bank and Sturgeon Bank. Agricultural fields, estuarine marshes, wetlands and eelgrass beds provide foraging habitat for overwintering and migratory birds. The terrestrial portion of the Project site has been historically modified by industrial use and is mostly paved, no longer providing suitable foraging habitat. The riparian habitat bordering the Fraser River and mudflat within the aquatic portion of the Project site may provide some foraging and resting habitat; however, have also been modified by historical industrial use.

Mammals

Mammal species abundant in urban environments, such as raccoons (*Procyon lotor*) and rats, are expected to occur in the Project site. Small mammals (i.e., rodents), small carnivores (mustelids [i.e., weasels]) and canids (e.g., coyotes [*Canis latrans*]) are expected to occur in the vegetated habitat within and adjacent to the Project site. Large mammals (i.e., large carnivores and ungulates) are not expected to occur in the Project site. Bats may forage in open areas within the Project site.

Invertebrates

The riparian and foreshore of the Fraser River provides habitat for invertebrate species. These species are an important component of the local ecology and food chain, providing a food source for shorebirds (Harrison et al., unknown date), and other insectivore birds and mammals.

3.10.4 Atmospheric Conditions and Acoustic Environment

The area surrounding the Project site is predominately in industrial and marine use. The closest identified sensitive residential receptors (farm dwellings) are located 750 m south of the site on 68th Street, off River Road in Delta. The nearest Metro Vancouver air quality monitoring stations are as follows:

- North Delta;
- Burnaby South;
- Richmond South; and
- Tsawwassen.

Air contaminants, such as particulate matter (i.e., PM_{2.5} and PM₁₀), dust, NO_x, Sulphur Dioxide (SO₂) and Volatile Organic Compounds (VOCs) are emitted from existing industrial activities, shipping traffic and on road traffic in the area surrounding the Project site and have the potential to affect receptors. PMV does not have separate air quality criteria and generally refers to the Greater *Vancouver Regional District to issue Air Quality Management Bylaw No. 1082, 2008*. This bylaw regulates air emissions from large emitters of contaminants in Metro Vancouver. Metro Vancouver is the agency responsible for reviewing any permit applications under this bylaw to allow the release of an air contaminant. The Project is not expected to require a permit under this bylaw.

Human activities in the area surrounding the Project site contribute to the acoustic environment. These activities include commercial shipping on the South Arm of the Fraser River, the loading and unloading of vessels at nearby terminals, and industrial activities at the adjacent properties. In addition, to human activity, natural sounds from wind, rain, waves, and marine wildlife contribute to the acoustic environment.

3.10.5 Socio-economic Setting

The Project site is located within the Corporation of Delta and Metro Vancouver. Delta encompasses 180 km² bordered by the Fraser River on the north, the United States border and Boundary Bay on the south, the City of Surrey on the east and the Strait of Georgia on the west. Delta includes three different communities: Ladner, Tsawwassen and North Delta, with Ladner designated as its administrative centre (Corporation of Delta 2015).

Delta is the seventh largest municipality by population out of 21 municipalities within Metro Vancouver and tenth largest in the province. Delta's population was 99,863 in 2011, or 4.32% of the population of Metro Vancouver (approximately 2.3 million) (Statistics Canada, 2012a, b). The population of Metro Vancouver has grown in recent years, primarily due to international migration, while Delta's population growth has remained relatively stable over the last decade. Population growth in Delta from 2001-2011 decade was small (at 3.0%) relative to Metro Vancouver (at 16.4%) and the B.C. average (at 12.6%) and smaller than several other Metro Vancouver member municipalities (Statistics Canada 2012a, b).

Metro Vancouver is the largest labour market in the province, the third largest in the country and is relatively important within a Canadian and U.S. context. There were 1,363,300 workers in the Metro Vancouver labour force, 55.2% of the province's labour force (2,470,500) in 2013 (Statistics Canada, 2013a). Delta's labour force expanded by a modest 1.8% between 2001 and 2011 to about 53,000 workers, a change reflecting its small population growth. Health care and social assistance, and transportation and warehousing accounted for the greatest proportion of the Delta's labour force in 2011 (10.3% and 8.3% respectively) while the construction industry had a 7.1% share (Statistics Canada, 2013b).

Delta has a limited land base, with almost 50% of the municipal land base part of the Agricultural Land Reserve and 25% covered by the Burns Bog Ecological Conservancy. Delta has historically been dependent on agriculture and fishing, and while these industries have remained important, Delta has considerable industrial development (Corporation of Delta, 2014; The Corporation of Delta, 2015). Delta

is home to Port Metro Vancouver's Deltaport Container Terminals facility and the Westshore Terminals coal shipping facility at Roberts Bank, as well as two industrial parks located along the Fraser River (Tilbury and Annacis Island) (Corporation of Delta, 2014). The Fraser River acts as an important marine corridor for the movement of cargo through the Lower Mainland (Richmond Chamber of Commerce and D.E. Park & Associates Ltd., 2014), as well as from Canada in general.

In addition to its commercial and industrial uses, the Fraser River is used for recreational purposes, including fishing, recreational boating, and marine transportation.

3.10.6 Marine Transportation

There are established deep-sea shipping routes from the Pacific Ocean through the Strait of Juan de Fuca, Haro Strait, Boundary Pass, Strait of Georgia to Sand Heads and along the South Arm of the Fraser River to the Project site (Figure 5). LNG carriers operating in BC coastal waters are expected to require BC Coast Pilots who would board incoming vessels at Brotchie Ledge, near Victoria. BC Coast Pilots would be onboard approaching LNG vessels until the mouth of the Fraser River, at which point Fraser River Pilots would take over the final river transit to the jetty. During river transits, Fraser River Pilots must be advised of bathymetric conditions and the current traffic situation via VHF channel 74, Victoria Traffic. During seasonal fishing openings on the Fraser River, the deep-sea channels within the Fraser River are kept free of interference from fishing vessels with the assistance of the Canadian Lifeboat Institute and DFO patrol vessels.

The estimated transit time for LNG carriers from Brotchie Ledge to Sand Heads is approximately 4.6 hours and the time from Sand Heads to the Project, including vessel slowdown, is approximately 1.5 hours. Within the Fraser River, LNG barges and carriers will transit along a well-established and maintained navigational channel to the Project.

4.0 Potential Environmental, Economic, Social, Heritage and Health Effects

4.1 Potential Project Effects

An outline of the potential environmental, economic, social, heritage and health effects of the Project, based on current knowledge of the Project and the existing environment, is presented in Table 4-1. Potential effects are linked to Project components and activities.

Table 4-1: Identified Issues and Potential Project-related Effects

Issues	Project Components/Activities	Potential Project-related Effects
Environmental		
<p>Fish and Fish Habitat (as defined in the <i>Fisheries Act</i>),</p> <p>Water Quality, Benthic Invertebrates and Marine Plants (as defined in the <i>Fisheries Act</i>)</p>	<ul style="list-style-type: none"> • Construction: Site setup activities, removal of existing abandoned marine infrastructure, ground stabilization works, support pile driving, construction of the marine jetty, dredging activities, shoreline restoration, vessel traffic • Operation: Maintenance dredging activities, berthing and jetty operations • Decommissioning: Removal of Offshore Facilities and Onshore Facilities and site clean-up and reclamation 	<ul style="list-style-type: none"> • Potential changes in water and sediment quality may occur during the removal of existing creosote pilings and concrete infrastructure • Potential changes in water quality may occur in association with dredging activities • Potential changes in fish habitat quality and function associated with construction and maintenance dredging activity • Potential loss or degradation of benthic invertebrate habitat associated with construction and dredging activity • Potential loss or degradation of benthic invertebrate habitat associated with localized changes to depth and currents related to dredging and construction of the jetty • Potential changes in benthic community effecting food availability for fish rearing along the shoreline of the Project site • Potential changes in fish habitat quality and function associated with ocean disposal of dredged material in a designated offshore disposal site • Potential fish habitat loss or degradation associated with site preparation and densification activities both onshore and offshore • Potential fish habitat loss or degradation associated with the placement of the jetty infrastructure into the river channel

Issues	Project Components/Activities	Potential Project-related Effects
		<ul style="list-style-type: none"> • Potential fish habitat loss or degradation associated with changes in local depth and currents related to construction of the jetty and dredge pocket • Potential fish habitat changes associated with changes in currents leading to erosion or sediment deposition • Temporary noise and vibration effects on fish associated with dredging and pile driving activities • Localized shading effects on riparian and aquatic habitat related to the installation of the jetty structure • Land clearing and construction resulting in loss of riparian habitat and sediment transport into the aquatic environment • Potential changes in water and sediment quality associated with a fuel or hydraulic fluid spill during construction • Potential changes in water and sediment quality associated with a spill of LNG during operations • Potential wake and prop-wash impacts to shoreline habitat during construction and operation • Potential fish habitat changes associated with removal of jetty infrastructure during decommissioning <p>Potential effects on marine plants, no marine plants (as defined in the <i>Fisheries Act</i>) are expected to occur at the Project site.</p>

Issues	Project Components/Activities	Potential Project-related Effects
River Processes	<ul style="list-style-type: none"> • Construction: Site setup activities, removal of existing abandoned marine infrastructure, ground stabilization works, support pile driving, construction of the marine jetty, dredging activities, shoreline restoration, vessel traffic • Operation: maintenance dredging activities, berthing and jetty operations, • Decommissioning: Removal of Offshore Facilities and Onshore Facilities and site clean-up and reclamation 	<ul style="list-style-type: none"> • Local changes in hydraulics resulting in changes in water velocity around the structure • Local changes in hydraulics (velocity) resulting in scour and or sedimentation (i.e., development of scour hollows or sediment trapping areas) • Local changes in hydraulics resulting in deflected flow patterns that result in downstream impacts of changed flow conditions, scour and/or sedimentation • Local trapping or scouring of sediment resulting in modified hydraulics (flow direction and velocity) • Migration of the dredge pocket through alteration of the hydraulics (flow direction and velocity) leading to scour at the downstream edge and sedimentation at the upstream edge
Marine Mammals	<ul style="list-style-type: none"> • Construction: Site setup activities, removal of existing abandoned marine infrastructure, ground stabilization works, support pile driving, construction of the marine jetty, dredging activities, shoreline restoration, vessel traffic • Operation: Maintenance dredging activities, berthing and jetty operations and associated noise and light from operation of Project • Decommissioning: Removal of Offshore Facilities and Offshore Facilities and site clean-up and reclamation 	<ul style="list-style-type: none"> • Behavioral response changes, injury, or mortality as a result of Project activities that result in underwater noise, collisions with vessels, changes in marine water quality, reduction in prey availability

Issues	Project Components/Activities	Potential Project-related Effects
Vegetation	<ul style="list-style-type: none"> • Construction: Site setup activities, site clearing, removal of existing abandoned infrastructure, ground stabilization works, support pile driving, construction of the marine jetty, shoreline restoration • Operation: Maintenance dredging activities, • Decommissioning: Removal of Offshore Facilities and Onshore Facilities and site clean-up and reclamation 	<ul style="list-style-type: none"> • Direct loss of vegetation communities during Project construction • Indirect effects to native vegetation from fugitive dust during construction • Indirect effects to native vegetation from accidental spills or releases of deleterious substances • Indirect effects to native vegetation from proliferation of non-native and invasive vegetation • Restoration/ enhancement
Terrestrial Wildlife including migratory birds (as defined in the <i>Migratory Birds Convention Act</i>)	<ul style="list-style-type: none"> • Construction: Site setup activities, site clearing, removal of existing abandoned marine infrastructure, ground stabilization works, support pile driving, construction of the marine jetty and LNG transfer pipe, dredging activities, shoreline restoration, construction vehicle and vessel traffic • Operation: Maintenance dredging activities, berthing and jetty operations and associated noise and light • Decommissioning: Removal of Offshore Facilities and Onshore Facilities and site clean-up and reclamation 	<ul style="list-style-type: none"> • Direct loss of potential foraging, shelter, resting and breeding habitat during Project construction • Indirect effects to foraging, shelter, resting and breeding habitat due to increase in ambient noise levels and artificial light levels during Project construction and operation • Potential habitat fragmentation and creation of movement barriers during Project construction and operation • Potential mortality due to interactions with Project components during Project construction and operation

Issues	Project Components/Activities	Potential Project-related Effects
Air Quality and Climate Change	<ul style="list-style-type: none"> • Construction: Air emissions from site clearing, removal of existing abandoned infrastructure, ground stabilization works, support pile driving, construction of the marine jetty and LNG transfer pipe, dredging activities, fuel combustion, construction vehicle and vessel traffic • Operation: Emissions from berthing and jetty operations transfer of LNG, maintenance dredging, backup power generation (when required) • Decommissioning: Removal of Offshore Facilities and Onshore Facilities and site clean-up and reclamation 	<ul style="list-style-type: none"> • Change in ambient concentrations of selected compounds for Canadian ambient air quality criteria available, including Criteria Air Contaminants (CACs) and VOCs from construction activities, dredging and back up-power generation (if required) • Potential fugitive emissions from LNG loading operations (connecting and disconnecting) • Emissions of GHGs associated with ships at the dock and transportation of dredge material

Issues	Project Components/Activities	Potential Project-related Effects
Noise and Vibration	<ul style="list-style-type: none"> • Construction: Noise emissions site clearing, removal of existing abandoned infrastructure, ground stabilization works, support pile driving, construction of the marine jetty and LNG transfer pipe, dredging activities, fuel combustion, construction vehicle and vessel traffic • Operation: Emissions from berthing and jetty operations transfer of LNG, maintenance dredging, backup power generation (when required) • Decommissioning: Removal of Offshore Facilities and Onshore Facilities and site clean-up and reclamation 	<ul style="list-style-type: none"> • Change in ambient sound in the vicinity of the human populations and displacement and disturbance of wildlife • Increase in low frequency noise • Vibration effects from pile driving • Increase in underwater noise, resulting in physical or biological disturbance to marine mammals
Light	<ul style="list-style-type: none"> • Construction: Light emissions from fixed and mobile light sources, vehicles and vessels calling at the Project for health and safety. • Operations: Light emissions from fixed lighting, vehicles, vessels, navigational lights installed on the jetty for health and safety • Decommissioning: Light emissions from fixed and mobile light sources, vehicles, vessels, navigational lights installed on the jetty for health and safety. 	<ul style="list-style-type: none"> • Change in light trespass and sky glow during nighttime hours

Issues	Project Components/Activities	Potential Project-related Effects
Contaminated Sites	<ul style="list-style-type: none"> • Construction: Site clearing, removal of existing abandoned marine infrastructure, ground stabilization works, support pile driving, construction of the marine jetty and LNG transfer pipe, dredging activities, shoreline restoration • Operation: Maintenance dredging • Decommissioning: Removal of Offshore Facilities and Onshore Facilities and site clean-up and reclamation 	<ul style="list-style-type: none"> • Effects to marine water quality and sediment quality from the removal of potentially contaminated dredge material • Effects to freshwater and marine flora and fauna from: 1) The removal of existing treated wood pilings in the river and associated sediment disturbance; and 2) Disturbance of contaminated fill soil on the foreshore • Effects to human health if contaminated fill soil from the foreshore is excavated and improperly handled and/or disposed during construction work
Economic		
Economic	<ul style="list-style-type: none"> • Construction: All Project construction activities • Operation: All Project operation activities • Decommissioning: All Project decommissioning activities 	<ul style="list-style-type: none"> • Project construction and operations will create new economic opportunities for workers and businesses, which in turn will generate spin- off employment in goods, services, and supply and in retail and personal services. The combination of labour demand and employment income may affect overall community income and disposable income levels. • Project construction and operation may result in local or regional supply shortages and increased costs. • For municipal and regional governments and, where relevant, Aboriginal groups/communities, the Project construction and operation may have fiscal benefits or involve direct fiscal outlays. • The Project's operation-phase business may or may not be compatible with local or regional economic plans and strategies, and/or areas designated in local government

Issues	Project Components/Activities	Potential Project-related Effects
		plans. <ul style="list-style-type: none"> Project construction and operation may displace or affect commercial marine users, including Aboriginal commercial activities and tourism Economic interests and effects (including benefits) on Aboriginal groups.
Social		
Social	<ul style="list-style-type: none"> Construction: All Project construction activities Operation: All Project operation activities Decommissioning: All Project decommissioning activities 	<ul style="list-style-type: none"> Direct demand from the Project during construction and operation on municipal infrastructure, resulting in changes in service and infrastructure capacity utilization, resource requirements, costs, and planning The Project construction and operation may displace recreational activity, affect access to recreational areas, affect the productivity of fish and wildlife, reduce public safety, and may affect certain environmental conditions (noise, air quality, and visual resources) and therefore may affect recreational user Potential effects will be considered for the general population and Aboriginal groups
Heritage		
Archaeological, Historical and Heritage Resources	<ul style="list-style-type: none"> Construction: Site clearing, removal of existing abandoned marine infrastructure, ground stabilization works, support pile driving, construction of the marine jetty and LNG transfer pipe, dredging activities, 	<ul style="list-style-type: none"> Damage or destruction of heritage resources through horizontal and vertical displacement, compaction and changes in soil chemistry.

Issues	Project Components/Activities	Potential Project-related Effects
	shoreline restoration <ul style="list-style-type: none"> • Operations: Maintenance dredging activities, berthing and jetty operations • Decommissioning: Removal of Offshore Facilities and Onshore Facilities and site clean-up and reclamation 	
Health		
Human Health Risk Assessment and Community Health and Well-being	<ul style="list-style-type: none"> • Construction: All Project construction activities • Operation: All Project operation activities • Decommissioning: All Project decommissioning activities 	<ul style="list-style-type: none"> • Increased concentrations of air contaminants and particulate matter (i.e., PM2.5 and PM10), which may cause potential adverse health risk to local communities including recreational users, residents and Aboriginal groups • Deposition of dust to plants and soil, which can result in uptake of metals from dust to plants which are then consumed by people, including Aboriginal users • Changes in downstream water quality may result in potential adverse health effects to humans consuming untreated surface water while undertaking recreational activities • Changes in downstream water quality may result in adverse health effects to people, including Aboriginal groups, consuming fish • Worker and public health and safety • Stress and annoyance (due to environmental changes)

Issues	Project Components/Activities	Potential Project-related Effects
Accidents and Malfunctions (With the potential to effect sensitive or vulnerable environment, economic, social, heritage or health issues)		
Accident or Malfunctions	<ul style="list-style-type: none"> • Construction: Project construction activities • Operation: Project operation activities • Decommissioning: Project decommissioning activities 	<ul style="list-style-type: none"> • Events involving spills of toxic or hazardous materials (e.g., hydrocarbon fuels, lubricants, but not LNG) into environmentally sensitive habitat • Structural failure of a sediment containment measure resulting in erosion and sedimentation on the aquatic environment • Accidents or malfunction of machinery or equipment that leads to a disturbance of environmentally sensitive habitat or accidental mortality of animals • Collision of a Project related vessel with the marine jetty structure leading to potential loss of cargo • Loss of containment of LNG during loading operations • Unplanned facility shutdown, including process upset, or power outage • Fire: <ul style="list-style-type: none"> - During loading of LNG carriers - During transfer of LNG from the Tilbury LNG Plant

4.2 Potential Effects of Changes to the Environment on Aboriginal Peoples

The Project has the potential to result in changes to the environment that may affect Aboriginal peoples in relation to the following *CEAA 2012*, subsection 5(1)(c) factors:

- Health and socio-economic conditions;
- Physical and cultural heritage;
- The current use of lands and resources for traditional purposes; and
- Any structure, site or thing that is of historical, archaeological, paleontological, or architectural significance.

A preliminary identification of potential Project effects as a result of changes to the environment on Aboriginal peoples is presented in Table 4-2. This information is based on consultation and engagement efforts to date with Aboriginal groups, including information presented in Sections 5-1 and 5.2 relating to potential socio-economic and biophysical effects. In the course of ongoing consultation, WesPac will work with Aboriginal groups to confirm and identify potential Project effects to subsection 5(1)(c) factors, including through Project-specific studies.

Table 4-2: Preliminary Identification of Potential Effects of Changes to the Environment on Aboriginal Peoples

Subsection 5(1)(c) Factor	Project Phase	Potential Effects
Health and Socio-Economic Conditions	Construction, Operation, and Decommissioning	<ul style="list-style-type: none"> • See Section 4.1 for potential changes in the environment, including Human Health Risk and Social and Economic conditions as a result of Project activities. How Aboriginal peoples may experience these changes specifically or differently from the general population will be considered in the assessment. • Potential effects of changes to the environment on Aboriginal peoples' health or socio-economic conditions as a result of Project activities may include, but may not be limited to possible increases in: <ul style="list-style-type: none"> ○ exposure to noise, light, and air emissions ○ exposure to biological resource contamination ○ vessel traffic safety risks ○ job and contracting opportunities ○ revenue loss associated with potential disruption to commercial fishing

Subsection 5(1)(c) Factor	Project Phase	Potential Effects
Physical and Cultural Heritage, including any Structure, Site or Thing of Historical, Archaeological, Paleontological or Architectural Significance	Construction, Operation, and Decommissioning	<ul style="list-style-type: none"> • Changes in Visual Resources and Heritage Resources as a result of Project activities that may affect the physical and cultural heritage of Aboriginal peoples, including any structure, site, or thing of historical, archaeological, paleontological or architectural significance. How Aboriginal peoples may experience these effects specifically or differently from the general population will be considered in the assessment. • As a result of Project activities, potential effects of changes to the environment on the physical and cultural heritage of Aboriginal peoples, including any structure, site, or thing of historical, archaeological, paleontological or architectural significance, may include but may not be limited to: <ul style="list-style-type: none"> ○ Physical disturbance to sites or landscapes / waterscapes of cultural importance ○ Changed sense of place
Current Use of Lands and Resources for Traditional Purposes	Construction, Operation, and Decommissioning	<ul style="list-style-type: none"> • Potential changes in the ability to access preferred locations for traditional purposes as a result of Project activities across all Project phases (e.g., navigational closures, safety exclusion zones, increased vessel traffic congestion) • Potential changes in presence or absence, abundance, or spatial distribution of preferred marine, freshwater, terrestrial, or other resources that are currently used for traditional purposes, such as fish (including invertebrates), marine plants, marine mammals, terrestrial vegetation and wildlife, migratory birds, and freshwater fish, leading to potential loss of fishing, hunting, trapping, or gathering opportunities across all Project phases • Potential changes in the quality of preferred resources that are currently used for traditional

Subsection 5(1)(c) Factor	Project Phase	Potential Effects
		<p>purposes, such as marine fish, marine plants, marine mammals, terrestrial vegetation and wildlife, migratory birds, and freshwater, leading to avoidance of traditional foods or otherwise disrupting patterns of use and levels of consumption across all Project phases.</p> <ul style="list-style-type: none"> • Potential changes in the quality of experience associated with the current use of lands and resources for traditional purposes across all Project phases may include but may not be limited to: <ul style="list-style-type: none"> ○ Potential displacement from or avoidance of preferred locations as a result of sensory disturbance (e.g., increased noise, light), perceived health or safety risks (e.g., increased air emissions, vessel traffic), or changed sense of place ○ Potential interference with or loss of ability to achieve cultural purposes associated with use of specific locations or resources, such as intergenerational knowledge transfer of practices, customs, or traditions • See Section 5.3 for further information on current use of lands and resources for traditional purposes by Aboriginal groups identified in Table 7.

5.0 Consultation and Engagement

5.1 Aboriginal Consultation and Engagement

WesPac acknowledges the Aboriginal treaty rights and the proven and asserted Aboriginal rights and title of Aboriginal groups in Canada. WesPac will seek to ensure effective relationship building and engagement throughout all phases of the Project. Aboriginal engagement is a broad term referring to the contact, communication, and consultation efforts with Aboriginal groups with respect to the Project. The Aboriginal consultation and engagement program has been designed to share information about the Project and provide Aboriginal groups with the opportunity to ask questions and provide feedback.

Consultation and engagement with Aboriginal groups has the following objectives:

- Provides Aboriginal groups with access to relevant and meaningful Project information, and communicates technical information to a non-technical audience in a manner that supports understanding and facilitates feedback;
- Provides a communication stream for Aboriginal groups that is separate from the public communications stream, in recognition of the unique history, interests, and concerns of the Aboriginal groups in relation to the Project and Project site;
- Provides a process for tracking and considering input received from Aboriginal groups and reporting how comments will be addressed that will meet requirements and expectations of applicable federal / provincial agencies and programs for the Project;
- Fosters support for the Project from Aboriginal groups;
- Establishes realistic expectations for what the Project will achieve in the short term and the long term;
- Anticipates and address potential issues and concerns brought forth by Aboriginal groups; and
- Reports outcomes of consultations.

The Project consultation and engagement strategy is based on the following principles:

- Providing reasonable opportunities for Aboriginal groups to identify how they wish to engage in the Project, and understand how WesPac can assist in facilitating that engagement;
- Facilitating timely access to relevant and readily understandable (i.e., “plain language”) Project information to promote informed feedback from Aboriginal groups, including meeting with leadership and membership, as appropriate, in their communities;
- Working jointly with appropriate representatives from Aboriginal groups to identify concerns regarding potential effects of the Project on their use of areas near the Project site; and
- Identifying other opportunities for WesPac to work collaboratively with Aboriginal groups, to mutually benefit from the Project.

5.2 Potentially Affected Aboriginal Groups

Based on publicly available information from Aboriginal groups, the Statement of Intent maps available through the BC Treaty Commission, and information derived from the public version of the Consultative Areas Database maintained by the Province of British Columbia, there are 19 Aboriginal groups whose established or asserted traditional territories overlap the Project site. No Métis communities have been identified in the Project site to date. The Aboriginal groups identified to date are presented in Table 5-1; however, this list is neither exhaustive nor exclusive.

Table 5-1: Aboriginal Groups identified for Consultation and Engagement

Aboriginal Group	Location	Approximate Distance
Musqueam Indian Band	The main Musqueam community is located at the mouth of the North Arm of the Fraser River, within the limits of the City of Vancouver.	10.3 km (Reserve)
Tsawwassen First Nation	The main Tsawwassen community is on the southern aspect of the Fraser River delta, on the west side of the peninsula that separates Boundary Bay from the Strait of Georgia.	12.3 km (Treaty Lands)
Cowichan Tribes*+	The main Cowichan reserve is located on Vancouver Island in the community of Duncan and at Cowichan Bay.	61.2 Km (Reserve)
Halalt First Nation*+	The main Halalt community is located on Vancouver Island in the community of Chemainus.	53.0 Km (Reserve)
Lake Cowichan First Nation*	The main Lake Cowichan community is located on Vancouver Island, on the east end of Lake Cowichan approximately 30 km west of the community of Duncan.	83.3 Km (Reserve)
Lyackson First Nation*	The main Lyackson community is located on Vancouver Island, in Chemainus.	46.7 Km (Reserve)
Penelakut Tribe*+	The main Penelakut community is located on Kuper Island off the east shore of Vancouver Island, near Chemainus.	48.5 Km (Reserve)
Stz'uminus First Nation*+	The main Stz'uminus community is located on Vancouver Island in Chemainus.	54.7 Km (Reserve)
Tsleil-Waututh Nation	The main Tsleil-Waututh community is located in North Vancouver, on the shore of Burrard Inlet, approximately 2 km east of the north end of the Second Narrows Bridge, on Burrard Inlet 3.	19.1 Km (Reserve)

Aboriginal Group	Location	Approximate Distance
Semiahmoo First Nation	Semiahmoo has one reserve, fronting Semiahmoo Bay (part of Boundary Bay) at the Canada-United States border, about 1 km southeast of White Rock.	24.7 Km (Reserve)
Katzie First Nation	The main Katzie communities are located in Pitt Meadows (Katzie 1), Langley (Katzie 2), and Barnston Island (Katzie 3).	27.7 Km (Reserve)
Squamish Nation	Squamish reserves are scattered from Vancouver to Gibson's Landing and to the area north of Howe Sound. The largest proportion of Squamish members reside on several urban reserves in the city of Vancouver, North and West Vancouver and the municipality of Squamish, B.C.	18.6 Km (Reserve)
First Nations of the Stó:lō Nation	Member First Nations of the Stó:lō Nation have many reserves located throughout the Fraser Valley, none of which overlap with the Project site. The collective traditional territories of the Stó:lō peoples are centred on the Fraser River and the Project site is within this collective traditional territory	79.2 Km (Office)
First Nations of the Stó:lō Tribal Council	Member First Nations of the Stó:lō Tribal Council have many reserves located throughout the Fraser Valley, none of which overlap with the Project site. The collective traditional territories of the Stó:lō peoples are centred on the Fraser River and the Project site is within this collective traditional territory	96.3 Km (Office)

*These First Nations are members of the Hul'q'umi'num Treaty Group. Hul'q'umi'num assert a collective core (title) territory that includes the lower Fraser River, including the area of the Project.

+These First Nations are members of the Cowichan Nation Alliance. The Cowichan Nation Alliance is collective of First Nations who represent their members in title and rights negotiations.

WesPac will update this list as the Project moves forward, with input from Aboriginal groups and regulatory agencies. WesPac also understands that there may be a requirement by the federal government to consult with the Métis Nation British Columbia and the BC Métis Federation.

A draft version of this Project Description was provided to Musqueam Indian Band (Musqueam), Tsawwassen First Nation (Tsawwassen), and to Cowichan Nation Alliance and their member communities; Cowichan Tribes, Halalt First Nation (Halalt), Penelakut Tribe (Penelakut), and Stz'uminus First Nation (Stz'uminus) for comment prior to the formal submission of this document to the EAO and CEA Agency.

5.3 Aboriginal Interests, Including Current Use of Land and Resources for Traditional Purposes

“Aboriginal Interests” is defined by the EAO as asserted or proven Aboriginal Rights, including Aboriginal Title, and Treaty rights that require consultation and, if appropriate, accommodation. WesPac understands that identifying and recommending measures to address potential adverse effects to Aboriginal Interests from the Project, or from its cumulative interaction with past, present, or reasonably foreseeable projects, will be an important element of the EA.

WesPac also understand that environmental effects on Aboriginal peoples pursuant to subsection 5(1)(c) of CEAA will have to be considered including, but not limited to, their “current use of lands and resources for traditional purposes”.

A review of available information indicates that each of the Aboriginal groups identified in Section 5.2 is known to have or assert claims of:

- Aboriginal title to the lands, waters, and resources within their territories; and/or
- Aboriginal rights related to the use of terrestrial, freshwater, marine, and other resources within these territories for traditional purposes.

These established or asserted Aboriginal rights include, but may not be limited to, fishing, hunting, trapping, and gathering activities for food, trade, ceremonies, medicines, and materials (DFO 2014; EAO and PMV 2012).

The Musqueam have an established right to fish for food, social, and ceremonial (FSC) purposes in the area of Canoe Pass on the South Arm of the Fraser River (SCC 1990; also described therein as “the waters of Ladner Reach and Canoe Passage”). The Musqueam also assert that this Aboriginal right to fish for FSC purposes applies throughout their traditional territory, a broader area that includes an area from the north shore of Burrard Inlet to the south shore of the main channel of the Fraser River including the waters of the three channels by which that river reaches the ocean (SCC 1990). This area includes but is not limited to all waters of the Fraser River – including its North Arm, Middle Arm, and South Arm - downstream of the Port Mann Bridge to the Strait of Georgia, including the Project site (EAO and PMV 2012).

Tsawwassen has treaty rights pursuant to the Tsawwassen First Nation Final Agreement (TFNFA), which came into effect on April 3, 2009. Tsawwassen acquired 725 ha of treaty settlement lands, including 290 ha of former reserves and 370 hectares of former Provincial Crown Land (EAO and PMV 2012). In addition, the TFNFA secures harvesting rights to Tsawwassen in areas located within Tsawwassen Territory, which is defined in the TFNFA as the area of land that Tsawwassen identified in its Statement of Intent to the British Columbia Treaty Commission, and included as a map in the agreement (TFN et al. 2010). This territory extends from the southern Gulf Islands to the area around Pitt Lake. Rights under the TFNFA are limited by measures necessary for conservation, public health, or public safety.

The Project site is approximately 11.5 km from the Tsawwassen settlement lands. The closest reserve to the Project site is Musqueam 4, which is located at Canoe Pass, approximately 10.2 km away.

The ancestral language of all the potentially affected Aboriginal groups listed in Section 5.2, except Semiahmoo First Nation (Semiahmoo), and Squamish Nation (Squamish), is Halkomelem. The downriver dialect is associated with Musqueam, Tsawwassen, and Tsleil-Waututh Nation (Tsleil-Waututh) while the upriver dialect is associated with the First Nations of the Stó:lō Nations and Stó:lō Tribal Council. The island dialect is associated with the Cowichan Tribes, Halalt, Penelakut (including Hwilitsum), Lake Cowichan First Nation (Lake Cowichan), Lyackson First Nation (Lyackson), and Semiahmoo speak a dialect of Northern Straits Salish and the ancestral language of the Squamish people is *Sḵw̓x̓w̓ú7mesh sníchim* (FPLHCC 2014).

There are many Halkomelem place names for locations along the Fraser River. One of the named places is located opposite the Project site on the south shore of Lulu Island and is variously referred to as *Áəqətínes / Dl'akti'nes / tl'ektínes / Tl'uq̓tinus*. This “long shore”, or “beach” was situated on southern shore of Lulu Island, across from Deas and Tilbury Islands. It has been described as a fishing, berry gathering and cultivation, settlement, and trading site, stretched over several kilometres, between Woodward’s Landing at the western end and Lion Island at the eastern end (Barnett 1955; Duff 1952; McHalsie 2001; Turner 2014). Recent studies have attempted to define the extent of this former village and resource utilization site (EAO and PMV 2012).

Based on information regarding the existing conditions and potential Project effects to lands and resources at or near the Project site, WesPac anticipates the Project may affect Aboriginal Interests. These Aboriginal Interests in lands and resources (e.g., freshwater biological resources, marine biological resources, terrestrial vegetation and wetlands, terrestrial wildlife, heritage resources) include access to those lands and resources and their importance to cultural integrity. WesPac is aware that there is a potential interaction of marine aspects of the proposed Project and the importance of use of the Fraser River for fishing to the Aboriginal groups identified above.

Ongoing consultation for the Project with Aboriginal groups will seek to confirm and expand upon WesPac’s current understanding of the following:

1. Current traditional use and Aboriginal Interests in and around the Project site;
2. The potential for adverse or beneficial Project and cumulative effects on current traditional use or Aboriginal Interests; and
3. The appropriate measures to avoid or mitigate any adverse effects.

5.4 Overview of Aboriginal Consultation and Engagement Activities to Date

WesPac has been consulting and engaging with Aboriginal groups since February 2014. To date the engagement and consultation process has taken the form of individual and group meetings, written correspondence, emails, and telephone communications with community leaders and technical and business representatives. Following is a summary of the consultation and engagement activities that WesPac has undertaken with Aboriginal groups to February 28, 2015.

5.4.1 Musqueam

WesPac has engaged with Musqueam through emails, telephone calls, letter correspondences, meetings, and agreements between February 6, 2014 and February 28, 2015, as shown in Table 5-2. During this period:

- Thirty-two emails were exchanged discussing various components of the Project, including meeting arrangements, agreements, and feedback from Musqueam;
- Seven phone calls were made confirming receipts of correspondences, discussing project-specific matters, offering invitations to meetings and/or events, and discussing expectations regarding engagement and consultation;
- Five letters were exchanged that introduced the project and discussed the details of the requirements of consultation;
- Three meetings occurred between WesPac and Musqueam to:
 1. Conduct a boat tour with WesPac to view and discuss Project-specific details at the Project site;
 2. Conduct a community tour and meeting; and
 3. Discuss a draft capacity funding agreement letter.
- Two agreements were finalized between WesPac and Musqueam:
 1. A Capacity Funding Agreement;
 2. A sponsorship agreement for a Musqueam event; and
- A work plan, figure, and application regarding a soil sampling project at Tilbury Island were also shared with Musqueam.

Table 5-2: Chronology of Consultation and Engagement Activities with Musqueam

Date	Method	Activity
February 6, 2014	Letter	WesPac sends letter introduce the company and the Project and to request a meeting.
July 8, 2014	Letter	Musqueam sends letter to WesPac requesting a meeting to hear more about the Project. A copy of a letter Chief Sparrow had sent to Minister Bill Bennett on February 11, 2014 stating that Musqueam must be consulted with respect to the Fortis Tilbury LNG facility expansion is included.
July 18, 2014	Email	WesPac sends email to Musqueam to invite representatives to a Hazard Identification Workshop for the Project on July 29 and 30. An updated Project Description is attached to the email.
July 24, 2014	Letter	Chief Sparrow, on behalf of the Musqueam First Nation, sends letter to WesPac to thank them for supporting Musqueam's Marine Tanker Traffic & Safety Summit held June 9 and 10, 2014.
August 25-27, 2014	Email	Email exchange between WesPac and Musqueam to arrange an introductory meeting on September 5, 2014
September 4, 2014	Meeting	Boat tour of Project site with Musqueam
September 5, 2014	Meeting	Introductory meeting with Musqueam
September 9, 2014	Email	Email from WesPac to Musqueam providing summaries of WesPac's experience with similar types of projects as a follow up to the meeting on September 5, 2014.
October 9, 2014	Meeting	Meeting held between WesPac and Musqueam for WesPac to present their Capacity Funding offer letter.
November 4, 2014	Letter	Musqueam send letter to Minister Bill Bennett stating that the Province has a duty to consult with Musqueam on FortisBC's planned expansion of the Tilbury LNG Plant, as well as the WesPac Project.

Date	Method	Activity
November 4, 2014	Agreement	Musqueam and WesPac sign agreement for capacity funding from WesPac to support Musqueam's participation in consultation on the Project.
November 21, 2014	Meeting	Meeting held between Musqueam and WesPac regarding collaboration on the Project.
December 2, 2014	Email	WesPac emailed Musqueam a letter with draft Aboriginal Consultation Plan, requesting Musqueam's review of it as per their Capacity Funding Agreement.
December 11-16, 2014	Email	Email exchange between WesPac and Musqueam regarding foreshore sediment and water sampling at the Tilbury Island site. WesPac invited Musqueam to send a representative to monitor the work if desired.
December 17, 2014	Meeting	Community tour and meeting held between WesPac and Musqueam.
December 19 – January 12, 2014	Email	Email exchanges regarding WesPac's sponsorship and attendance to Musqueam's <i>čəsna?əm</i> , the city before the city exhibit, held January 21, 2015.
February 13, 2015	Email	Email exchange regarding WesPac's draft Project Description with request for Musqueam's review.

5.4.2 Tsawwassen

WesPac has engaged with Tsawwassen through emails, telephone calls, letter correspondences, meetings, and agreements between June 24, 2014 and February 28, 2015, as shown in Table 5-3. During this period:

- Eighteen emails were exchanged discussing various components of the Project, including meeting arrangements, agreements, and requesting feedback from Tsawwassen;
- Seven telephone calls were made concerning the project, confirming receipts of correspondences, offering invitations to meetings and/or events, and discussing expectations regarding engagement and consultation;
- One letter was sent to Tsawwassen regarding agreements made between WesPac and Tsawwassen;
- Two meetings occurred between WesPac and Tsawwassen representatives to:

1. Conduct a boat tour with WesPac to view and discuss Project-specific details at the Project site and a community tour and meeting; and
2. Discuss a draft capacity funding agreement and expectations regarding the proposed Project.

Table 5-3: Chronology of Consultation and Engagement Activities with Tsawwassen

Date	Method	Activity
June 24 – July 16, 2014	Telephone	Several telephone calls were exchanged during this time period regarding the Project, Tsawwassen’s involvement in the Project, and Project-specific workshops held July 29 and 30.
August 25, 2014	Email	WesPac emailed Tsawwassen requesting a meeting to discuss the Project and to explore opportunities to work together.
September 29 - October 1, 2014	Email	Emails were exchanged regarding WesPac’s completed the Capacity Funding Agreement letter, as well as organizing a meeting time for WesPac representatives to deliver it in person and to take Tsawwassen members on a boat tour of the Tilbury Project site.
October 9, 2014	Meeting	Meeting held for WesPac to deliver to Tsawwassen the Capacity Funding Agreement and conduct a boat tour of the of the Fraser River and Project site at Tilbury Island.
October 24 – November 5, 2014	Email	Email exchanges made between WesPac and Tsawwassen regarding Tsawwassen’s review of the Capacity Funding Agreement letter.
November 5, 2014	Agreement	Fully executed Capacity Funding Agreement established between WesPac and Tsawwassen.
December 11 – 16, 2014	Email Telephone	Email and telephone exchanges between WesPac to Tsawwassen regarding foreshore sediment and water sampling to take place at the Tilbury Island site December 17 for two days. WesPac invited Tsawwassen to send a representative to monitor the work if desired. Included in the email were a Project Review Application form, work plan and figure also submitted to PMV.
December 17, 2014	Meeting	Community tour and meeting between WesPac and Tsawwassen representatives.
February 10 - 16, 2015	Email	Email exchanges concerning WesPac’s draft Project Description and request for Tsawwassen’s review prior to submission to regulators.

Date	Method	Activity
February 26, 2015	Email Telephone	WesPac contacted Tsawwassen to clarify the details of a press release.
February 27, 2015	Email	Emails concerning Tsawwassen’s review of the Tilbury Island Project Description.

5.4.3 Cowichan Tribes, Halalt, Penelakut and Stz’uminus

Cowichan Tribes, Halalt, Penelakut and Stz’uminus instructed WesPac to coordinate engagement through the Cowichan Nation Alliance. All correspondence on the Project to Cowichan Nation Alliance has included the individual First Nations.

WesPac has engaged with Cowichan Tribes, Halalt, Penelakut (including Hwlitsum), Stz’uminus and the Cowichan Nation Alliance through letter and email correspondences, meetings and telephone between October 12, 2014 and February 28, 2015 as shown in Table 5-4. During this period:

- Two letters were exchanged between WesPac and Cowichan Nation Alliance:
 - WesPac sent notification letters introducing the Project to Cowichan Tribes, Halalt First Nation, Penelakut Tribe and Stz’uminus First Nation;
 - WesPac received a letter in response from the Cowichan Nation Alliance, stating that it would act on behalf of Cowichan Tribes, Halalt First Nation, Penelakut Tribe and Stz’uminus First Nation, describing their interests in the area and expectations regarding engagement and consultation;
- One meeting was held between WesPac and representatives from Cowichan Tribes, Halalt, Penelakut, Stz’uminus and the Cowichan Nation Alliance regarding the Project;
- Eight emails were exchanged with the First Nations through the Cowichan Nation Alliance regarding the Project. Email correspondence focused on First Nations’ expectations regarding engagement and consultation, and coordinating meeting times; and
- Three telephone exchanges occurred regarding the Project during the period.

Table 5-4: Chronology of Consultation and Engagement Activities with Cowichan Tribes, Halalt, Penelakut, and Stz’uminus

Date	Method	Activity
October 12, 2014	Letter	WesPac sent out notification letters to Cowichan Tribes, Halalt First Nation, Penelakut Tribe and Stz’uminus First Nation to introduce the Project.
December 3, 2014	Letter / Telephone	In response to WesPac’s notification letters, Cowichan Nation Alliance responded on behalf of Cowichan Tribes, Halalt, Penelakut and Stz’uminus, indicating their interests in the Project and Project site and requesting a meeting with WesPac to discuss further. WesPac responded and a meeting time was established.
January 8, 2015	Meeting	A meeting was held between WesPac, FortisBC and Cowichan Tribes, Halalt, Penelakut and Stz’uminus and Cowichan Nation Alliance regarding the Project and expectations regarding engagement, consultation and accommodation.
January 9, 2015	Email	An email was sent from Cowichan Nation Alliance's legal counsel regarding the asserted traditional territory mapping for Cowichan Tribes, Halalt, Penelakut and Stz’uminus.
January 15 – February 5	Email / Telephone	Email and telephone exchanges were made regarding Project details and establishing a Capacity Funding Agreement.
February 10 – 13, 2015	Email	Email exchanges between WesPac and Cowichan Nation Alliance regarding revisions to the Capacity Funding Agreement and requesting Cowichan Nation Alliance review of the draft Project Description.
February 26, 2015	Email / Telephone	WesPac telephoned and emailed Cowichan Nation Alliance to clarify the details of a press release concerning WesPac’s construction order to build an LNG barge in the US Gulf coast.

5.4.4 Tsleil-Waututh

WesPac has engaged with Tsleil-Waututh through letter and email correspondences between October 12, 2014 and February 28, 2015, as shown in Table 5-5. During this period:

- Three letters were exchanged:
 - A notification letter from WesPac introducing the Project;
 - A letter from Tsleil-Waututh including a copy of the Tsleil-Waututh Stewardship Policy, which identified specific consultation steps;
 - A letter from WesPac including payment of Tsleil Waututh’s Referral Administration File Set-up fee with a copy of the introductory letter previously sent out; and

- Indirect messages were received to WesPac through third-parties, indicating Tsleil-Waututh has been too busy with other projects to respond, though they were aware of WesPac’s desire to meet.

Table 5-5: Chronology of Consultation and Engagement Activities with Tsleil-Waututh

Date	Method	Activity
October 12, 2014	Letter	Notification letter sent to Tsleil-Waututh from WesPac, introducing the Project and providing a Project information brochure.
October 23, 2014	Email/Letter	Responding to WesPac’s notification letter, Tsleil-Waututh attached a copy of their Stewardship Policy identifying specific consultation steps. As per the Policy, Tsleil-Waututh attached an invoice for a Referral Administration File Set-up Fee.
December 2, 2014	Email	Responding to Tsleil-Waututh’s request, WesPac provided the Set-up Fee and attached an additional copy of the project information brochure.
January 27, 2015	Email	WesPac emailed FortisBC’s Community & First Nations Relations Manager to arrange a meeting with Tsleil-Waututh on February 12. FortisBC responded that they had spoken with Tsleil-Waututh, and though they are aware WesPac wanted to meet with them, they were currently too busy with other projects, recommending that they check back in the following week.

5.4.5 Kwantlen

WesPac has engaged with Kwantlen through letter and email correspondences and a meeting between October 12, 2014 and February 28, 2015 as shown in Table 5-6. During this period.

- Two letters were exchanged between WesPac and Kwantlen:
 1. A letter from WesPac to Kwantlen introducing the project;
 2. A response from Kwantlen describing their interests in the Project and Project site, expectations regarding engagement and consultation, and inviting WesPac to their community to present their project and being preliminary discussions;
- Three emails were exchanged to coordinate a meeting; and
- One meeting was held between WesPac representatives from Kwantlen.

Table 5-6: Chronology of Consultation and Engagement Activities with Kwantlen

Date	Method	Activity
October 12, 2014	Letter	Notification letter sent to Kwantlen from WesPac, introducing the Project and providing a Project information brochure.
November 18, 2014	Email/Letter	Responding to WesPac's notification letter, Kwantlen confirmed their interest in the Project and Project site and stating that Kwantlen wanted to ensure WesPac would keep them informed and share all environmental reports completed thus far for their review. Kwantlen also invited WesPac to their community in Fort Langley to present their proposal to Council and begin preliminary discussions.
December 11 – 14, 2014	Email	Email exchanges between WesPac and Kwantlen to coordinating a meeting time, established for February 12.
February 12, 2015	Meeting	A meeting was held between WesPac, FortisBC and representatives from Kwantlen regarding the Project and expectations regarding engagement, consultation and accommodation. Kwantlen noted no opposition to the Project but expressed concerns regarding potential impacts to fish and fish habitat and an interest in entering into a Capacity Funding Agreement with WesPac.

5.4.6 Katzie

WesPac has engaged with Katzie through letter and email correspondences between October 12, 2014 and February 28, 2015 as shown in Table 5-7. During this period:

- One notification letter was sent to Katzie introducing the Project and providing a project information brochure; and
- WesPac received an email and letter describing Katzie's interests in the Project and Project site and their expectations regarding engagement and consultation with WesPac.

Table 5-7: Chronology of Consultation and Engagement Activities with Katzie

Date	Method	Activity
October 12, 2014	Letter	Notification letter sent to Katzie from WesPac, introducing the Project and providing a Project information brochure.
January 29, 2015	Email/Letter	Responding to WesPac's notification letter, Katzie confirmed their interest in the Project and Project site as they consider it within their asserted traditional territory. Katzie outlined expectations regarding archaeological assessments, habitat restoration and environmental monitoring work in their territory.

5.4.7 Additional Aboriginal Groups

WesPac sent out notification letters to introduce the Project but has not yet received a response from the following Aboriginal groups:

- Hwlitsum;
- Lake Cowichan;
- Lyackson;
- Semiahmoo;
- Squamish;
- Seabird Island First Nation;
- Shxw'ow'hamel First Nation;
- Skawahlook;
- Soowahlie First Nation;
- Stó:lō Nation;
- Stó:lō Tribal Council; and
- Tsawout First Nation.

5.5 Key Issues Identified by Aboriginal Groups to Date

WesPac acknowledges that its relationships with Aboriginal groups related to the Project are in the early stages. As such, consultation and engagement will continue. WesPac has maintained records of all communications with Aboriginal groups over the course of consultation and engagement activities, which allows Project team members to track and be responsive to interests and concerns. A summary of the key interests and issues that Aboriginal groups have brought forth is provided in Table 5-8. This list is a high-level summary and is not exhaustive. As WesPac has only received preliminary comments and concerns from a few Aboriginal groups, the following summary is not representative of the comments and concerns for all Aboriginal groups.

Table 5-8: Summary of Preliminary Comments and Concerns from Aboriginal Groups to Date

Issue	Comments
Fish, Fishing and Fish Habitat	<ul style="list-style-type: none"> • Minimizing any impacts of the Project upon traditional activities • Dredging in the Fraser River potentially impacting fish habitat • Use of large ships creating wakes or affecting flow direction • Marine spills • Safe access to Fraser River for fishing • Recognition of fishing windows and timing
Terrestrial Habitat	<ul style="list-style-type: none"> • Construction activities • Environmental stewardship • Restoration of Project site to pre-industrial state • Access to terrestrial component of Project site

Issue	Comments
Heritage Sites	<ul style="list-style-type: none"> • Presence of heritage sites • Protection of heritage sites
Regulatory and Permitting	<ul style="list-style-type: none"> • Environmental assessment process and timeline • Adequacy of the Federal navigation risk assessment process led by Transport Canada • Limitations of First Nations time and resources for environmental assessment • Tsawwassen First Nation Final Agreement has specific requirements related to environmental assessment.
Capacity Funding	<ul style="list-style-type: none"> • Support for Aboriginal participation in the environmental assessment process
Project Benefits	<ul style="list-style-type: none"> • Business opportunities • Support for community initiatives

5.6 Ongoing and Proposed Consultation and Engagement with Aboriginal Groups

WesPac is committed to ongoing consultation and engagement with Aboriginal groups that are interested in the Project. Engagement will be guided by information gathered to date and continued consultation with the potentially affected Aboriginal groups identified in Section 5.2. Consultation and engagement will be initiated with additional Aboriginal groups as required by regulatory agencies. WesPac will work with Aboriginal groups to develop consultation and engagement processes to meet the interests of each Aboriginal group and the requirements of the regulatory process. WesPac will work with Aboriginal groups to support communications within Aboriginal communities to provide timely information on the Project.

Engagement and consultation activities are anticipated to include the following:

- Continued discussions with Aboriginal groups regarding development of the Project;
- Participation in field studies;
- Discussions about potential benefits and opportunities for Aboriginal groups such as employment and training and business opportunities;
- Discussions about potential adverse Project effects and mitigation measures that may be employed; and
- Technical session(s) on specific topics of interest to Aboriginal groups.

WesPac has a process for tracking and considering comments received from Aboriginal groups on the Project. A report of how those comments have been addressed will be included in the EA application.

Should regulators require that additional Aboriginal groups be consulted and engaged, WesPac will seek opportunities to engage those groups as early as possible.

5.7 Public Consultation

The consultation program has been developed to share information about the Project and afford members of the public an opportunity to ask questions and share their feedback. Public consultation helps the public build an understanding about the nature and scope of the Project, address potential misconceptions, and identify public concerns to be addressed during Project design and development.

The objectives of the public consultation program are as follows:

- Provide public access to relevant and meaningful Project information;
- Communicate technical information to a non-technical audience in a manner that supports understanding and facilitates feedback;
- Provide a process for tracking and considering public input received and reporting how comments will be addressed;
- Establish realistic expectations for what this Project will achieve in the short-term and the long-term;
- Anticipate and address potential public issues and concerns; and
- Report outcomes of the consultations.

5.7.1 Identification of Stakeholders & Consultations to Date

Key stakeholders that are located in proximity to the Project or may have interests in the surrounding area are presented in Table 5-9. Preliminary stakeholder discussions have included adjacent landowners, river users, local government and other stakeholders with environmental and economic interests that may relate to the Project.

Table 5-9: Identified Stakeholders & Consultations to February 28th 2015

Stakeholders	Consultations Initiated	Consultation Details
Federal Government Agencies		
Canadian Coast Guard	Yes	HazID Workshop, July 29-July 30, 2014
Canadian Environmental Assessment Agency (CEA)	Yes	Several meetings; Opportunity to comment on Draft Project Description
Environment Canada (EC)	Yes	Submission of a sediment sampling plan
Fisheries and Oceans Canada (DFO)	No	
Navigation Protection Program (NPP)	Yes	Two meetings
National Energy Board (NEB Agency)	Yes	NEB Export Licence Application submitted June 20, 2014; WesPac responded to 3 rounds of Information Requests
Natural Resources Canada (NRCan)	No	
Pacific Pilotage Authority	Yes	HazID Workshop, July 29-July 30, 2014
Port Metro Vancouver	Yes	HazID Workshop, July 29-July 30, 2014; Several additional meetings in 2014-2015 regarding navigational and operational policies
Transport Canada (TC)	Yes	HazID Workshop, July 29-July 30, 2014
Provincial Government Agencies		
BC Environmental Assessment Office (EAO)	Yes	Joint Agency Meeting, September 10, 2014; Several additional meetings; Opportunity to comment on Draft Project Description
BC Ministry of Aboriginal Relations & Reconciliation (MARR)	Yes	Joint Agency Meeting, September 10, 2014
BC Ministry of Environment (ENV)	Yes	Joint Agency Meeting, September 10, 2014
BC Ministry of Forests Lands and Natural Resources (FLNR)	Yes	Joint Agency Meeting, September 10, 2014; Several additional meetings and phone calls in 2014/2015 regarding water lot tenure process and Investigative Use License process
BC Ministry of Jobs, Tourism & Skills Training (JTST)	Yes	Joint Agency Meeting, September 10, 2014

Stakeholders	Consultations Initiated	Consultation Details
BC Ministry of Justice & Attorney General (JAG)	Yes	Joint Agency Meeting, September 10, 2014
BC Ministry of Natural Gas Development (MNGD)	Yes	Joint Agency Meeting, September 10, 2014; Several additional meetings regarding BC LNG Income Tax
BC Oil and Gas Commission (OGC)	Yes	Joint Agency Meeting, September 10, 2014; Several additional meetings and phone calls in 2014/2015 regarding OGC permitting process
Climate Action Secretariat (CAS)	Yes	Joint Agency Meeting, September 10, 2014
Local Government Staff		
Corporation of Delta	Yes	Meetings with CAO, Director of Community Planning and Development, Deputy Director of Community Planning, December 3, 2014 Project briefing presentation planned for March 2015
City of Richmond	No	Planned for Spring 2015
Metro Vancouver	No	
Federal Elected Officials (MPs)		
Hon. Kerry-Lynne Findlay – MP Delta-Richmond East	Yes	Meeting October 2014 Update meeting planned for March 2015
Hon. Alice Wong – MP Richmond	No	
Provincial Elected Officials (MLAs)		
Scott Hamilton – MLA Delta North	Yes	Meeting September 3, 2014 Update meeting February 27, 2015
Vicki Huntington – MLA Delta South	Yes	Meeting September 12, 2014 Update meeting February 27, 2015
Hon. Linda Reid – MLA Richmond East	No	
John Yap – MLA Richmond – Stevenston	No	
Local Elected Officials		
Corporation of Delta Mayor & Council	Yes	Meeting September 3, 2014 Project briefing presentation planned for March 2015

Stakeholders	Consultations Initiated	Consultation Details
City of Richmond Mayor & Council	No	Planned for Spring 2015
Adjacent Land Owner Stakeholders		
FortisBC Tilbury LNG Plant and FortisBC Energy Inc.	Yes	Ongoing meetings
Seaspan Ferries Tilbury Facility	Yes	HazID Workshop, July 29-July 30, 2014; Several additional meetings in 2014/2015
Seaspan International	Yes	HazID Workshop, July 29-July 30, 2014
Dominion Pipe / Varsteel Ltd.	Yes	Ongoing meetings/communications
Economic Development Stakeholders		
Delta Chamber of Commerce	Yes	Membership, September 19, 2014 Project update meeting planned for March 2015
Richmond Chamber of Commerce	No	
BC Business Council	No	
Vancouver Board of Trade	No	
Marine Stakeholders		
Fraser River Pilots Association	Yes	HazID Workshop, July 29-July 30, 2014; Several additional meetings, phone calls and emails regarding navigation policies
British Columbia Coast Pilots	Yes	HazID Workshop, July 29-July 30, 2014
Chamber of Shipping BC	Yes	HazID Workshop, July 29-July 30, 2014; Project update meeting planned for March 2015
BC Wharf Operations Association	Yes	HazID Workshop, July 29-July 30, 2014
Council of Marine Carriers	Yes	HazID Workshop, July 29-July 30, 2014
Marine Communications & Traffic	Yes	HazID Workshop, July 29-July 30, 2014
BC Maritime Employers Association	No	
Greater Vancouver Gateway Council	No	
Fraser Basin Council	No	
Fish Safe	Yes	HazID Workshop, July 29-July 30, 2014

Stakeholders	Consultations Initiated	Consultation Details
BC Seafood Alliance	Yes	HazID Workshop, July 29-July 30, 2014
Georgia Straight Alliance	No	
Fraser River Users Group	No	
Friends of the Fraser	No	
Canadian Lifeboat Institute	Yes	Meeting and Fraser River Tour, June 18, 2014
General Public		
General Public	No	

5.7.2 Overview of Key Comments

A summary of comments and questions identified during meetings with agencies, elected officials and stakeholders to February 28, 2015 is provided in Table 5-10. WesPac is preparing materials and information to be used during the consultation process that will respond to these initial questions and comments.

Table 5-10: Summary of Preliminary Comments and Concerns

General Issue	Comments/Concerns
General	<ul style="list-style-type: none"> • How is the Project related to the existing Tilbury LNG Plant? • Who is WesPac Midstream LLC and what is their experience in LNG Marine Jetties? • What is the timeline for the Project? • What studies are being done for the Project?
Project Site	<ul style="list-style-type: none"> • What will be built at the Project site? • Why was this location selected for the Project? • What power source will be available at the jetty? • Could solar power be considered?
Environmental Impacts and Assessment	<ul style="list-style-type: none"> • What are the anticipated environmental impacts and how will they be mitigated? • What are the anticipated impacts on fish? • What are the anticipated impacts on Pacific migratory birds? • How much dredging will be required? • What regulatory applications is the Project subject to?
Shipping & Marine	<ul style="list-style-type: none"> • Where will the LNG be shipped? • What is the size of the ships that will be using the Project and how do they compare with ships currently on the Fraser? • How many ships will transit the Fraser River to call at the Project? • How will the marine transport impacts be evaluated? • What route will ships use to navigate to the Project?
About LNG	<ul style="list-style-type: none"> • What pressure is LNG under when on a carrier vessel? • Is LNG refrigerated while on the vessel? How is it kept at its required storage temperature. • Who is liable for LNG while it is in transit? • Is shipping LNG safe? What is the industry's safety record? • What safety measures will be in place? • What are the potential impacts of an LNG spill?
Project Economics	<ul style="list-style-type: none"> • How much will this Project cost? • Who is funding the Project? • What property taxes will the Project pay? • What are the benefits to the local community? • How many people will be employed by this Project?
Public Involvement	<ul style="list-style-type: none"> • How can input be provided? • How will input be considered? • Where can people find more information about this Project?

5.7.3 Proposed Consultation Activities

5.7.3.1 Public and Stakeholder Notification:

Public and stakeholder consultations will be carried out before, during and after the EA process. Notifications for public and stakeholders will be undertaken to provide information about the Project and the consultation process, methods for providing feedback and invitation to open house events. Consultations will include participation from the stakeholders listed in Table 5-9, including those with whom consultation has not yet been initiated and additional stakeholders identified during the process. Table 5-11 describes the notification methods proposed for this Project:

Table 5-11: Notification Tools

Proposed Tool	Description & Purpose
Project Website	<ul style="list-style-type: none"> Project announcement, consultation materials and updates about the Project.
Face-to-Face Meetings	<ul style="list-style-type: none"> Between the proponent and key identified stakeholders/groups to introduce the Project, build understanding and collect feedback.
Stakeholder Emails/Phone Calls	<ul style="list-style-type: none"> From the proponent to identified stakeholders to invite participation and provide initial information or follow-up.
Letter	<ul style="list-style-type: none"> From the proponent to identified stakeholders to invite participation and provide initial information.
Newspaper Announcements	<ul style="list-style-type: none"> Advertisements in the following local publications announcing the public open houses: <ul style="list-style-type: none"> South Delta Leader Delta Optimist Richmond News Richmond Review

5.7.3.2 Stakeholder & Agency Consultation

A series of meetings will be undertaken with identified stakeholders and agencies to gain a more comprehensive understanding of required process, permits, potential public issues or concerns and to facilitate communication for the Project. Project staff will continue to inform, update and meet with stakeholders and agencies at each key stage and milestones of the Project work, or as required and determined with individual stakeholders and agencies at initial meetings.

5.7.3.3 Public Consultation

A number of consultation activities are proposed for the Project as part of the EA process and ongoing Project development. The consultation programs are to meet the EAO's consultation requirements and provide meaningful opportunities for participation by members of the public. A summary of proposed consultation and materials are provided in Table 5-12.

Table 5-12: Proposed Public Consultation Materials

Proposed Tool	Description & Purpose
Project Website	<ul style="list-style-type: none"> Overview of the Project, Project timeline, key contacts, opportunities for consultation and input.
Project Informational Brochure	<ul style="list-style-type: none"> Information that assists in answering Project-related enquiries. The brochure will be updated as new issues are raised.
Project Presentation	<ul style="list-style-type: none"> Information used at various events and/or meetings.
Public Open Houses	<ul style="list-style-type: none"> During the pre-application and application review stages of the EA. Interactive display and information panels, brochure, input response form, communication graphics.
Public Comment Periods	<ul style="list-style-type: none"> During the pre-application and application review stages of the EA. to public comments and questions.
Issues Tracking Database	<ul style="list-style-type: none"> Purpose of the contact; Notes, documents, or materials communicated to stakeholders; Issues, attitudes, or interests raised by stakeholders; and, Responses/outcomes from contact.
Public Consultation Reporting	<ul style="list-style-type: none"> Summary of consultations, questions and comments received and resolutions, next steps for consultation.

6.0 Project Permitting Requirements

Along with the provincial and federal EA processes, the Project will also require provincial and federal permits and approvals to proceed. Permit and approvals anticipated based on the current Project design are outlined in Table 6-1. Depending on construction conditions and methodologies, municipal permits from the Corporation of Delta that may be required. These are expected to relate to noise permits, permits to construct, and tree-cutting permits.

As PMV no longer issues water lot leases for the Project's section of the Fraser River (as of January 1 2015), the Project will require a provincial water lot lease administered by FLNR. The Project has already applied for a licence to export LNG from Canada under the *National Energy Board Act Regulations* and a decision on this application is expected soon.

To support Transport Canada's and PMV's review of the Project, a marine navigational risk assessment is currently being prepared on behalf of WesPac by DNV GL. This assessment is independently funded and will address relevant aspects of the Transport Canada (2014) Technical Review Process of Marine Terminal Systems and Transshipment Sites (TERMPOL).

Table 6-1: Preliminary Summary of Permits, Licences and Authorisations Required

Regulation/ Legislation	Regulatory Obligation	Regulator	Activity	Status
Anticipated Provincial Requirements				
<i>Oil and Gas Activities Act and Regulation</i>	Permit	BC OGC	Construction and operation of the facility	Pending
<i>BC Land Act</i>	Investigative Use License	FLNR	Required for access to Crown land in order to conduct baseline studies	Pending
<i>BC Land Act</i>	Crown Licence of Occupation	FLNR	A new waterlot lease extending approximately 150 m along the Fraser River foreshore will be required	Pending
<i>BC Water Act</i>	Section 9 Approval	BC MOE, Water Stewardship Branch	Required for activities in and around a stream including dredging, clearing, shoreline modification activities.	Pending
BC Wildlife Act	Permit	BC MOE, Environmental Stewardship Branch	Wildlife surveys and sampling of wildlife and their habitat	Pending

Regulation/ Legislation	Regulatory Obligation	Regulator	Activity	Status
<i>BC Heritage Conservation Act</i>	Heritage Inspection Permit	FLNR, Archaeology Branch	Archaeological inspections to support the EA on non-federal land.	Pending
<i>BC Heritage Conservation Act</i>	Heritage Investigation Permit	FLNR, Archaeology Branch	Systematic study and data recovery from an archaeological site	Pending
<i>BC Heritage Conservation Act</i>	Site Alteration Permit	FLNR, Archaeology Branch	Alteration of an archaeological site	Pending
<i>BC Environmental Management Act</i> <i>Oil and Gas Waste Regulation</i>	Permit	BC OGC	Solid waste disposal	Pending
Anticipated Federal Requirements				
<i>National Energy Board Act</i>	Export License	NEB Agency	To export LNG outside of Canada to international markets	Application submitted June 20, 2014.
<i>Fisheries Act</i>	Authorization	DFO	<ul style="list-style-type: none"> • Dredging activities • Disturbing a riparian area • Construction of marine jetty infrastructure 	Pending
<i>Navigation Protection Act</i>	Approval	TC	Construction and operation of marine jetty infrastructure	Pending
<i>Canadian Environmental Protection Act and Disposal at Sea Regulation</i>	Permit	EC	Marine disposal of dredge material	Pending

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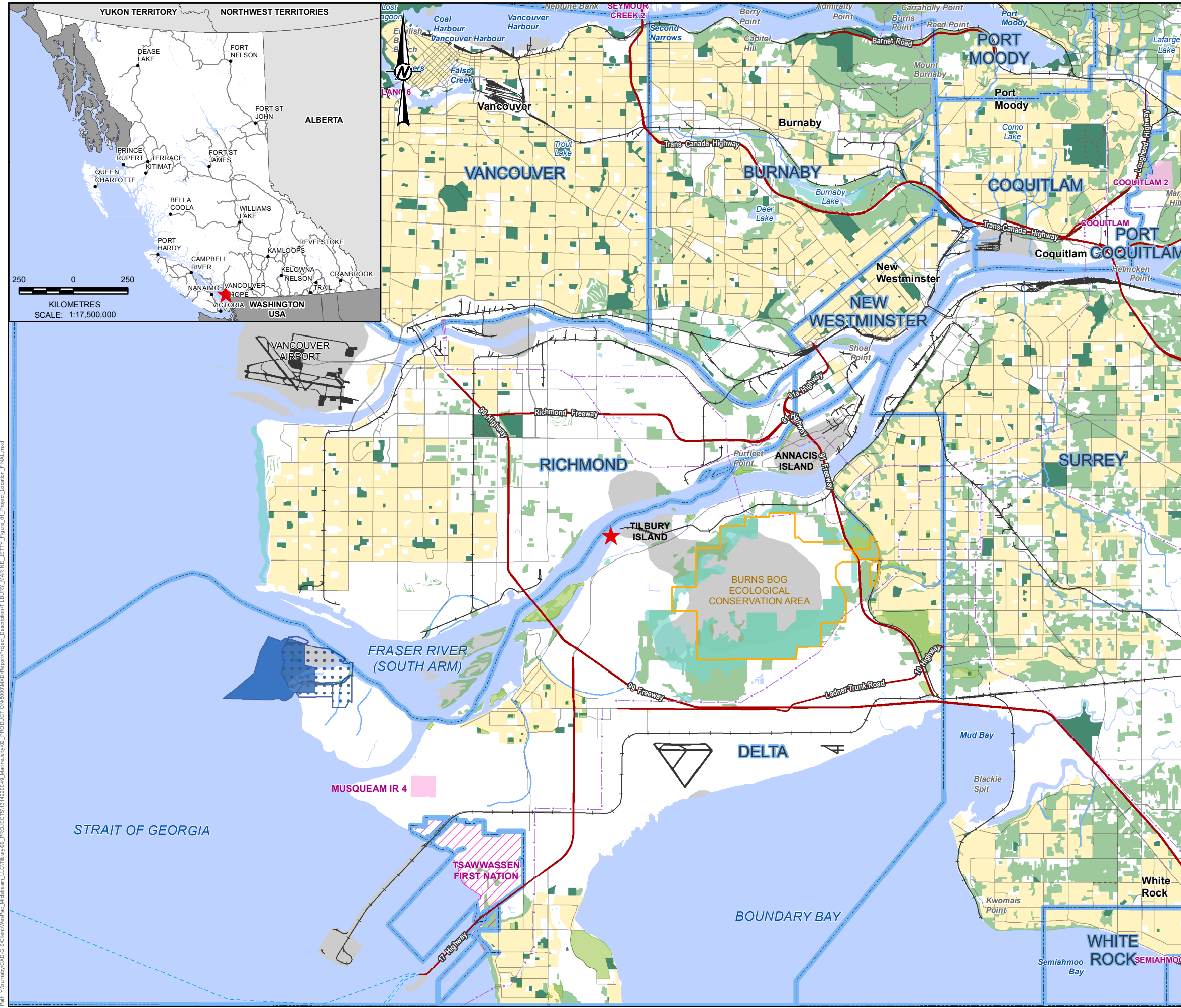
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Figures

**FIGURE 1
PROJECT LOCATION**



LEGEND

- ★ PROJECT LOCATION
- MUNICIPAL BOUNDARY
- INDIAN RESERVE
- TSAWWASSEN FIRST NATION LANDS
- URBAN AREA
- FOREST AREA
- COMMUNITY PARK
- PARK
- WETLAND
- GEORGE C. REIFEL MIGRATORY BIRD SANCTUARY
- ALAKSEN NATIONAL WILDLIFE AREA
- BURNS BOG ECOLOGICAL CONSERVATION AREA
- NON RESIDENTIAL AREA
- AIRPORT
- WATER
- WATERCOURSE
- FERRY ROUTE
- HIGHWAY
- ARTERIAL ROAD
- TRAIL
- RAILWAY
- POWER TRANSMISSION LINE

2.5
0
2.5

SCALE 1:125,000 KILOMETRES

REFERENCE
MUNICIPAL BOUNDARIES AND PROVINCIAL BOUNDARY OBTAINED FROM GEOBASE®. TSAWWASSEN FIRST NATION LANDS, FISHING AREA AND FIRST NATION RESERVES OBTAINED FROM THE PROVINCE OF BRITISH COLUMBIA, COPYRIGHT © 2014. TRANSIT, RAILWAY, WATER, FOREST, PARKS AND URBAN AREA DATA OBTAINED FROM CANVEC © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED
PROJECTION: UTM ZONE 10; DATUM: NAD 83

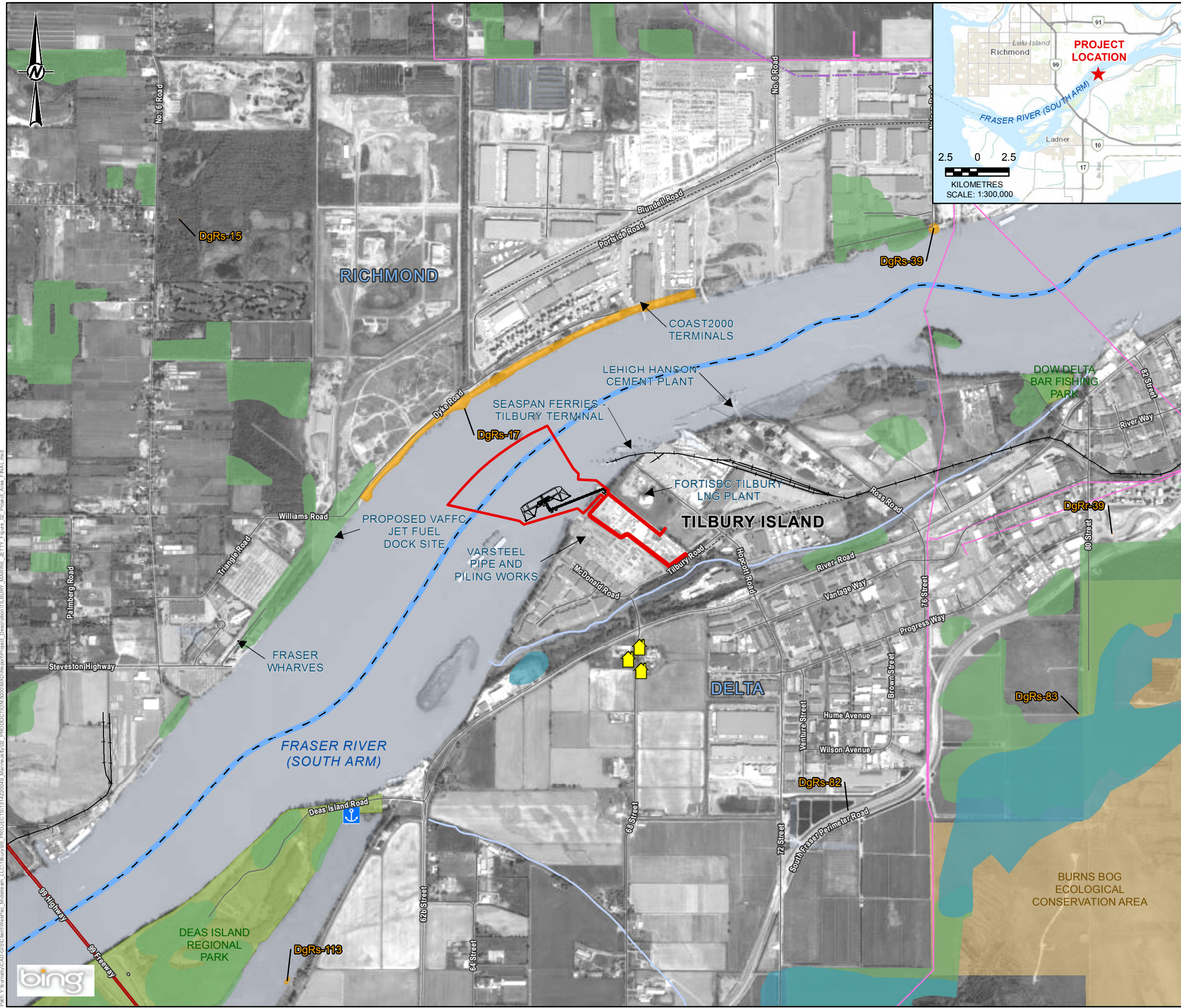
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PROJECT		TILBURY MARINE JETTY	
TITLE		PROJECT LOCATION	
CONSULTANT	YYYY-MM-DD	2015-04-28	
	PREPARED	RH	
	DESIGN	EJC	
	REVIEW	DC	
	APPROVED	BW	
PROJECT NO.	CONTROL	Rev.	FIGURE
13-1422-0049	5000	A	1



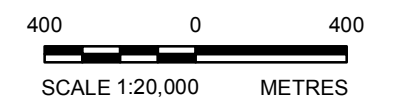
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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET HAS BEEN MODIFIED FROM ANSIB 26mm

**FIGURE 2
PROJECT SITE AND SURROUNDING
AREA**



- LEGEND**
- PROJECT BOUNDARY
 - PRELIMINARY BERTH CONCEPT
 - PROJECT LAYOUT
 - MUNICIPAL BOUNDARY
 - ARCHAEOLOGICAL SITE
 - FOREST AREA
 - PARK
 - WETLAND
 - BURNS BOG ECOLOGICAL CONSERVATION AREA
 - WATER
 - HIGH PRESSURE PIPELINE
 - POWER TRANSMISSION LINE
 - WATERCOURSE
 - ARTERIAL ROAD
 - HIGHWAY
 - RAILWAY
 - 📍 MARINA
 - 🏠 CLOSEST PERMANENT RESIDENCE



REFERENCE
 PRELIMINARY BERTH CONCEPT FROM AUSENCO-100761-0000-W-K50-A 04-17-2015. MUNICIPAL BOUNDARIES OBTAINED FROM GEOBASE®. HIGH PRESSURE PIPELINE OBTAINED FROM IHS ENERGY INC. TRANSIT, RAILWAY, WATER DATA OBTAINED FROM CANVEC © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED. ARCHAEOLOGICAL SITES 20150105 OBTAINED FROM GEOBASE®. IMAGERY OBTAINED FROM BING MAPS FOR ARCGIS PUBLISHED BY MICROSOFT CORPORATION, REDMOND, WA, MAY 2009. TOPO BASEMAP © ESRI AND ITS LICENSORS. SOURCE: GEOEYE IKONOS. USED UNDER LICENSE, ALL RIGHTS RESERVED.
 PROJECTION: UTM ZONE 10; DATUM: NAD 83

CLIENT
 WESPAC MIDSTREAM-VANCOUVER LLC.

PROJECT
 TILBURY MARINE JETTY

TITLE
PROJECT SITE AND SURROUNDING AREA

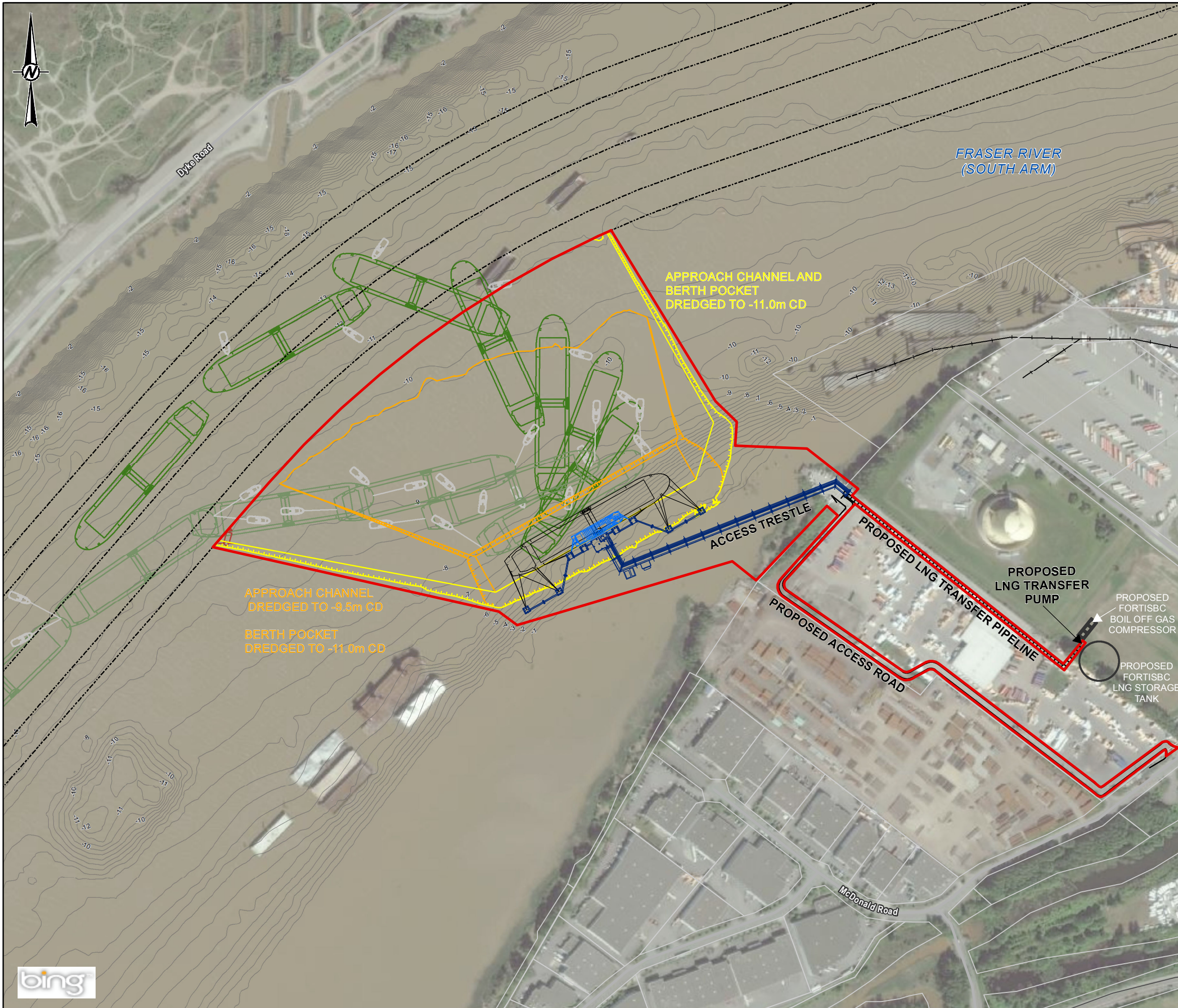
CONSULTANT	DATE
	YYYY-MM-DD 2015-04-28
	PREPARED RH
	DESIGN EJC
	REVIEW DC
	APPROVED BW

PROJECT NO. 13-1422-0049 CONTROL 5000 Rev. A FIGURE 2

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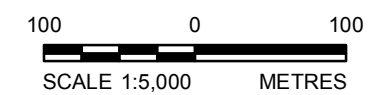
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET HAS BEEN MODIFIED FROM ANSI B

**FIGURE 3
PROJECT CONFIGURATION**



LEGEND

- PROJECT BOUNDARY
- FORTISBC LNG PLANT
- PARCEL
- DREDGING LAYOUT AND BERTH POCKET**
- INITIAL DREDGE AREA
- MAXIMUM DREDGE AREA
- PRELIMINARY BERTH CONCEPT**
- CONVENTIONAL LAYOUT**
- 2,200m³ LNG CARRIER
- 90,000m³ LNG CARRIER
- BERTH STRUCTURE
- SHIP MOVEMENT**
- 90,000m³ VESSEL MOVEMENT - ARRIVAL
- 90,000m³ VESSEL MOVEMENT - DEPARTURE
- TUG
- NAVIGATION**
- NAVIGATION AID
- FRASER RIVER SHIPPING CHANNEL
- LOCAL ROAD
- RAILWAY
- BATHYMETRY (0.5m)



REFERENCE

PRELIMINARY BERTH CONCEPT, SHIP AND FORTIS BC STRUCTURES FROM AUSENCO-100761-0000-W-K50-A 04-17-2015. BATHYMETRY ELEVATIONS RELATIVE TO CHART DATUM. PARCEL DATA FROM CORPORATION OF DELTA. IMAGERY OBTAINED FROM BING MAPS FOR ARCGIS PUBLISHED BY MICROSOFT CORPORATION, REDMOND, WA, MAY 2009. PROJECTION: UTM ZONE 10; DATUM: NAD 83

CLIENT

WESPAC MIDSTREAM-VANCOUVER LLC.

PROJECT

TILBURY MARINE JETTY

TITLE

PROJECT CONFIGURATION

CONSULTANT



YYYY-MM-DD	2015-04-28
PREPARED	RH
DESIGN	EJC
REVIEW	DC
APPROVED	BW

PROJECT NO.
13-1422-0049

CONTROL
5000

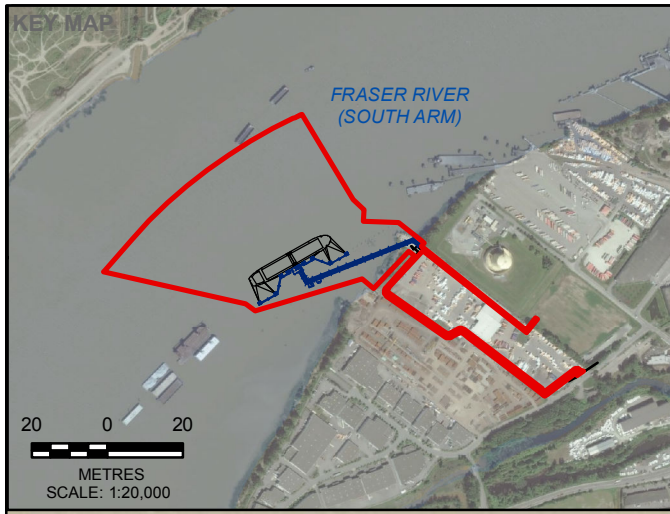
Rev.
A

FIGURE
3



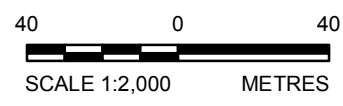
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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET HAS BEEN MODIFIED FROM ANSI B 28mm



**FIGURE 4
ACCESS TRESTLE AND LOADING
PLATFORM DESIGN**

- LEGEND**
- PROJECT BOUNDARY
 - PRELIMINARY BERTH CONCEPT
 - CONVENTIONAL LAYOUT
 - 2,200m³ LNG CARRIER
 - 90,000m³ LNG CARRIER
 - BERTH STRUCTURE
 - - - MIDSHIP
 - BATHYMETRY (0.5m)



REFERENCE
 PRELIMINARY BERTH CONCEPT FROM AUSENCO-100761-0000-W-K50-A 04-17-2015. BATHYMETRY ELEVATIONS RELATIVE TO CHART DATUM. IMAGERY OBTAINED FROM BING MAPS FOR ARCGIS PUBLISHED BY MICROSOFT CORPORATION, REDMOND, WA, MAY 2009.
 PROJECTION: UTM ZONE 10; DATUM: NAD 83

CLIENT
 WESPAC MIDSTREAM-VANCOUVER LLC.

PROJECT
 TILBURY MARINE JETTY

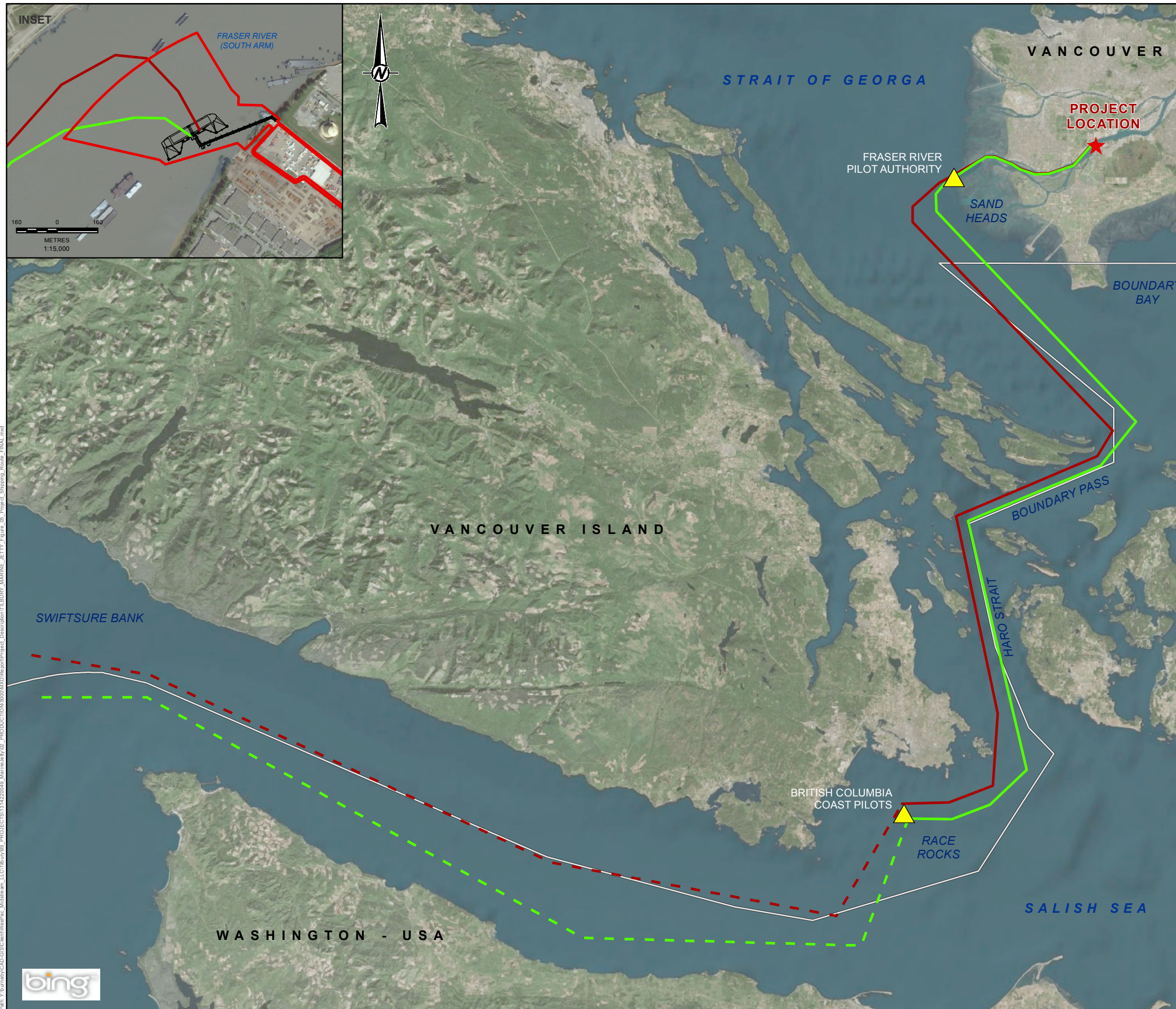
TITLE
ACCESS TRESTLE AND LOADING PLATFORM DESIGN

CONSULTANT	YYYY-MM-DD	2015-04-25
Golder Associates	PREPARED	RH
	DESIGN	EJC
	REVIEW	DC
	APPROVED	BW

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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET HAS BEEN MODIFIED FROM ANSIB 25mm

**FIGURE 5
PROJECT SHIPPING ROUTE**



LEGEND

- PROJECT BOUNDARY
- SHIPPING NAVIGATION ROUTE
- INBOUND
- OUTBOUND
- PRELIMINARY BERTH CONCEPT CONVENTIONAL LAYOUT
- CANADA - USA BORDER
- ▲ PILOT BOARDING POINT

10 0 10
SCALE 1:500,000 KILOMETRES

REFERENCE

SHIPPING AND PILOT DATA PROVIDED BY AUSENCO 20141125.
PRELIMINARY BERTH CONCEPT FROM AUSENCO-100761-0000-W-K50-A 04-17-2015. IMAGERY OBTAINED FROM BING MAPS FOR ARCGIS PUBLISHED BY MICROSOFT CORPORATION, REDMOND, WA, MAY 2009. ESRI IMAGERY COPYRIGHT © 20140514 ESRI AND ITS LICENSORS. SOURCE: GEOEYE IKONOS. USED UNDER LICENSE, ALL RIGHTS RESERVED
PROJECTION: UTM ZONE 10; DATUM: NAD 83

CLIENT
WESPAC MIDSTREAM-VANCOUVER LLC.

PROJECT
TILBURY MARINE JETTY

TITLE
PROJECT SHIPPING ROUTE

CONSULTANT	YYYY-MM-DD	2015-04-21
Golder Associates	PREPARED	RH
	DESIGN	EJC
	REVIEW	DC
	APPROVED	BW

PROJECT NO. 13-1422-0049 CONTROL 5000 Rev. A FIGURE 5

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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET HAS BEEN MODIFIED FROM ANSIB 25mm

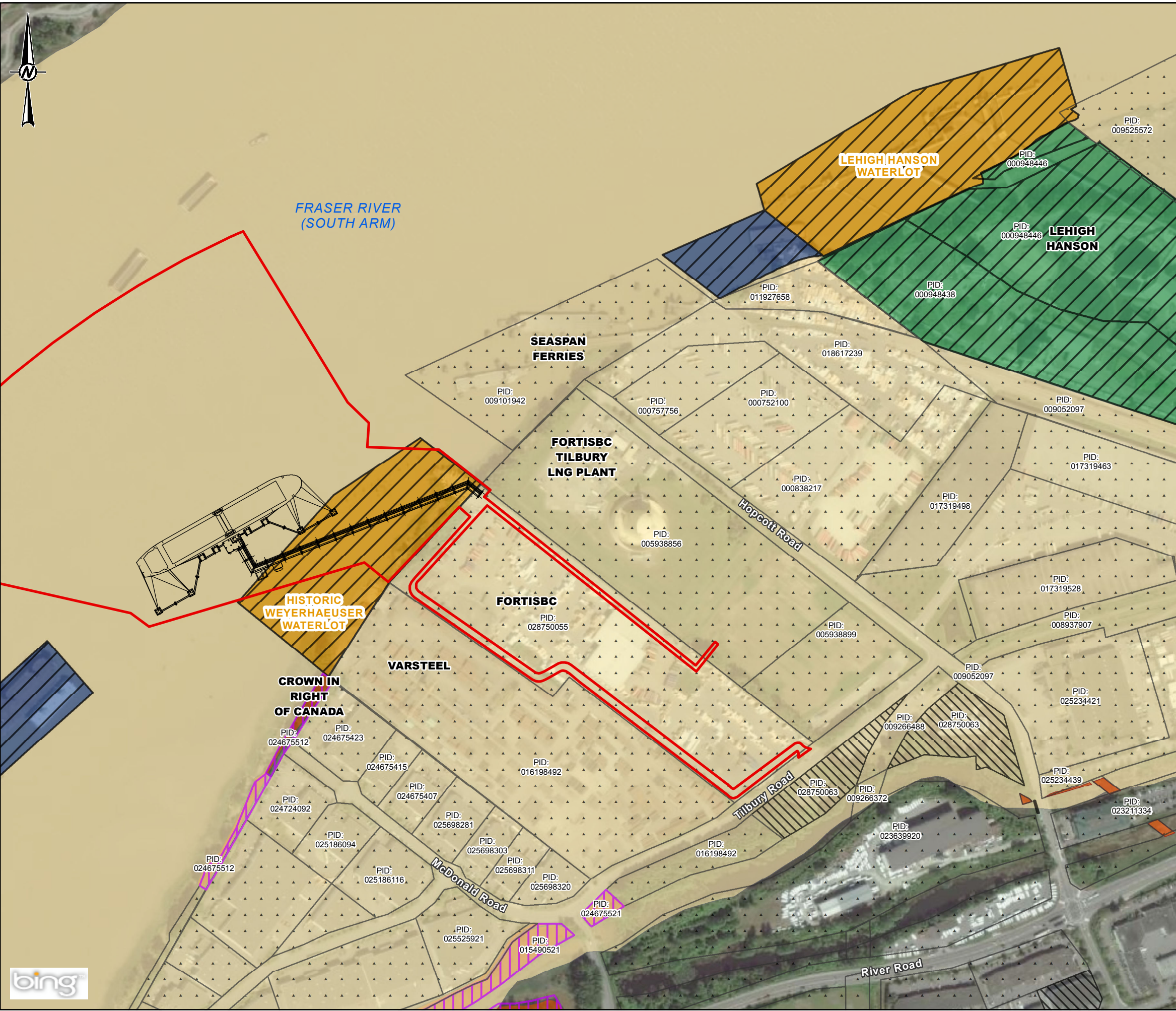


FIGURE 6a
LAND TENURE AND OWNERSHIP

- LEGEND**
- PROJECT BOUNDARY
 - PRELIMINARY BERTH CONCEPT
 - CONVENTIONAL LAYOUT
- LAND OWNERSHIP**
- PRIVATE LAND
 - CROWN FEDERAL LAND
 - CROWN PROVINCIAL LAND
 - CROWN MUNICIPAL LAND
- LAND TENURE TYPE**
- LICENCE - COMMERCIAL (GENERAL)
 - LICENCE - INDUSTRIAL (GENERAL)
 - LEASE - INDUSTRIAL (LIGHT INDUSTRIAL)
 - CROWN - INDUSTRIAL (LIGHT INDUSTRIAL)
 - RIGHT OF WAY - UTILITY (GAS AND OIL PIPELINE)

100 0 100
SCALE 1:5,000 METRES

REFERENCE
PRELIMINARY BERTH CONCEPT FROM AUSENCO-100761-0000-W-K50-A 04-17-2015. TENURE AND LAND OWNERSHIP DATA FROM GOVERNMENT OF BRITISH COLUMBIA AND CORPORATION OF DELTA. IMAGERY OBTAINED FROM BING MAPS FOR ARCGIS PUBLISHED BY MICROSOFT CORPORATION, REDMOND, WA, MAY 2009.
PROJECTION: UTM ZONE 10; DATUM: NAD 83

CLIENT
WESPAC MIDSTREAM-VANCOUVER LLC.

PROJECT
TILBURY MARINE JETTY

TITLE
LAND TENURE AND OWNERSHIP

CONSULTANT	DATE
	YYYY-MM-DD 2015-04-25
	PREPARED RH
	DESIGN EJC
	REVIEW DC
	APPROVED BW

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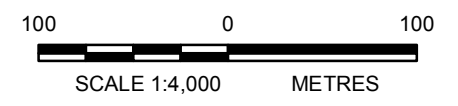
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET HAS BEEN MODIFIED FROM ANSIB 26mm



**FIGURE 7
CONSTRUCTION ACTIVITIES**

- LEGEND**
- OFFSHORE CONSTRUCTION LAYDOWN FEATURE
 - ONSHORE CONSTRUCTION LAYDOWN FEATURE
 - PRELIMINARY BERTH CONCEPT
 - CONVENTIONAL LAYOUT
 - BERTH STRUCTURE
 - BATHYMETRY (0.5m)

CONSTRUCTION LAYDOWN SUBJECT TO FURTHER CONSULTATION WITH FORTISBC



REFERENCE
 PRELIMINARY BERTH CONCEPT FROM AUSENCO-100761-0000-W-K50-A 04-17-2015. CONSTRUCTION LAYDOWN CONCEPT FROM AUSENCO-100761-0000-W-K01-A 01-26-2015. BATHYMETRY ELEVATIONS RELATIVE TO CHART DATUM. IMAGERY OBTAINED FROM BING MAPS FOR ARCGIS PUBLISHED BY MICROSOFT CORPORATION, REDMOND, WA, MAY 2009. PROJECTION: UTM ZONE 10; DATUM: NAD 83

CLIENT
 WESPAC MIDSTREAM-VANCOUVER LLC.

PROJECT
 TILBURY MARINE JETTY

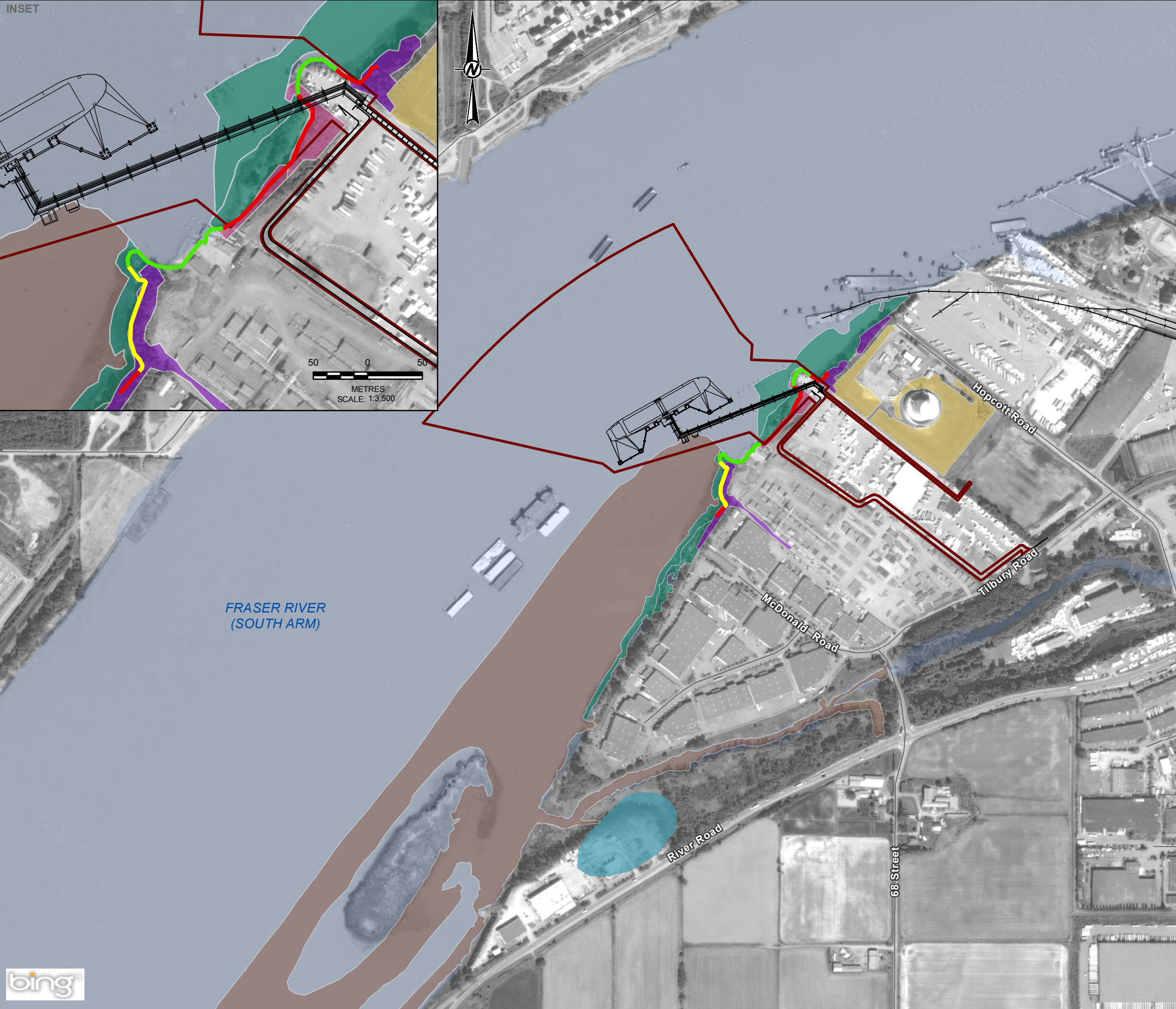
TITLE
CONSTRUCTION ACTIVITIES

CONSULTANT	YYYY-MM-DD	2015-04-25
Golder Associates	PREPARED	RH
	DESIGN	EJC
	REVIEW	DC
	APPROVED	BW

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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET HAS BEEN MODIFIED FROM ANSIB 25mm



**FIGURE 8
ENVIRONMENTAL SETTING**

LEGEND

- PROJECT BOUNDARY
- PRELIMINARY BERTH CONCEPT
- CONVENTIONAL LAYOUT
- WETLAND
- WATER
- WATERCOURSE
- RAILWAY
- SHORELINE (FREMP)**
- HIGH PRODUCTIVITY
- MODERATE PRODUCTIVITY
- LOW PRODUCTIVITY
- FIRST ORDER COMMUNITY (FREMP)**
- MARSH
- MUD
- MEADOW, VASCULAR
- LOW SHRUB WOODLAND
- DECIDUOUS TREE WOODLAND

160 0 160
SCALE 1:8,000 METRES

REFERENCE

FRASER RIVER ESTUARY MANAGEMENT PROGRAM (FREMP) DATA DIGITIZED BASED ON INFORMATION OBTAINED FROM THE BURRARD INLET ENVIRONMENTAL ACTION PROGRAM WEBMAP. PRELIMINARY BERTH CONCEPT FROM AUSENCO-100761-0000-W-K07-A 02-05-2015. IMAGERY OBTAINED FROM BING MAPS FOR ARCGIS PUBLISHED BY MICROSOFT CORPORATION, REDMOND, WA, MAY 2009. PROJECTION: UTM ZONE 10; DATUM: NAD 83

CLIENT

WESPAC MIDSTREAM-VANCOUVER LLC.

PROJECT

TILBURY MARINE JETTY

TITLE

ENVIRONMENTAL SETTING

CONSULTANT



YYYY-MM-DD	2015-04-25
PREPARED	RH
DESIGN	EJC
REVIEW	DC
APPROVED	BW

PROJECT NO.
13-1422-0049

CONTROL
5000

Rev.
A

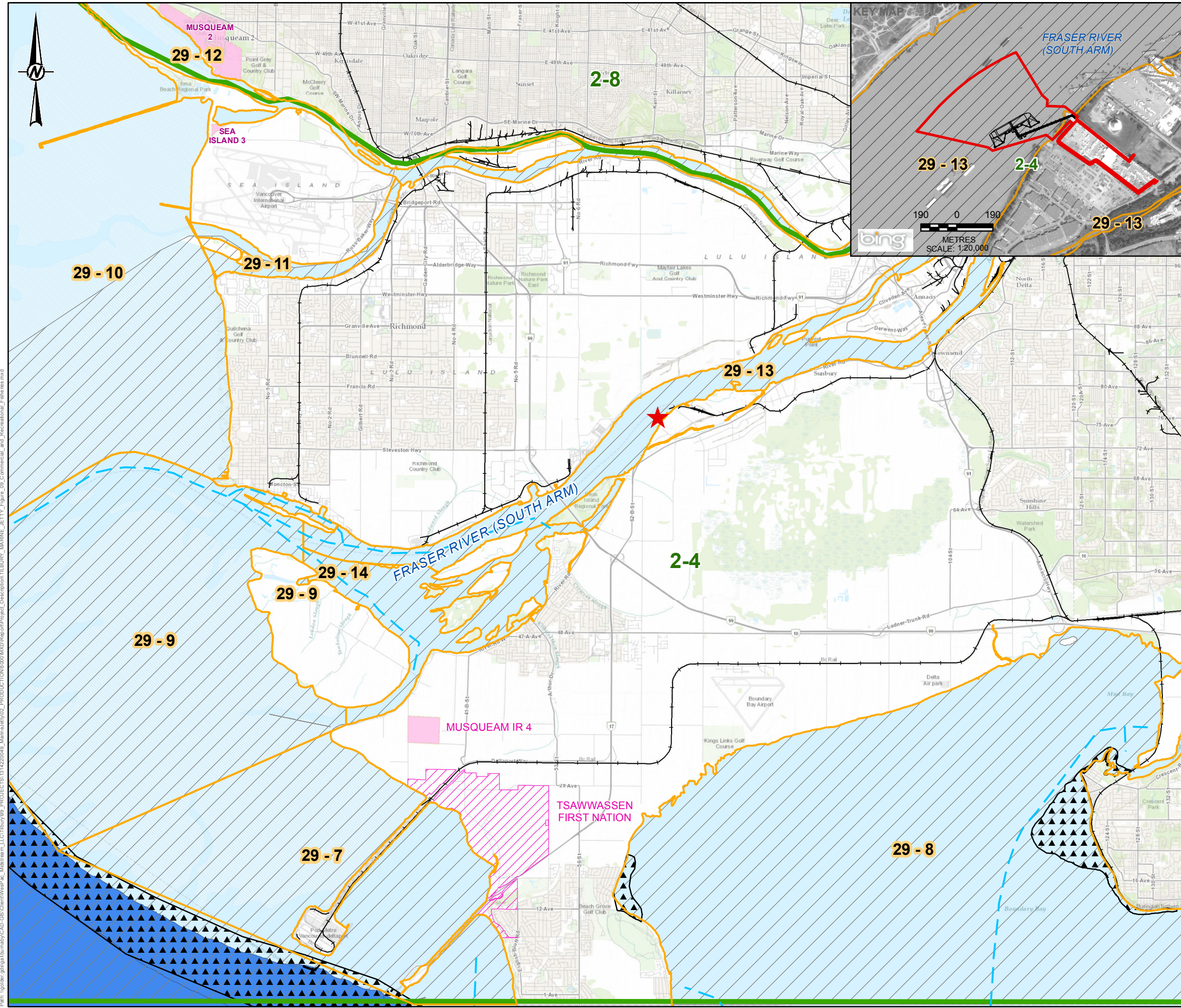
FIGURE
8

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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET HAS BEEN MODIFIED FROM ANSI B

**FIGURE 9
COMMERCIAL AND RECREATIONAL
FISHERIES**



- LEGEND**
- PROJECT LOCATION
 - PROJECT BOUNDARY
 - PRELIMINARY BERTH CONCEPT
CONVENTIONAL LAYOUT
 - RECREATIONAL BOATING ROUTE
 - RAILWAY
 - COMMERCIAL FISHERIES MANAGEMENT AREA 28 -
PACIFIC REGION SUB-AREA
 - BC FISHERIES SUB-REGION
 - RECREATIONAL FISHING AREA - CRAB
 - RECREATIONAL FISHING AREA - ANADROMOUS FISH
 - FIRST NATION FISHING AREA TSAWWASSEN
 - TSAWWASSEN FIRST NATION LANDS
 - INDIAN RESERVE

2 0 2
SCALE 1:100,000 KILOMETRES

REFERENCE
FISHERIES MANAGEMENT DATA DIGITIZED BASED ON MAPS PROVIDED BY THE FEDERAL DFO. BC FISHERIES DATA BASED ON WILDLIFE MANAGEMENT UNITS OBTAINED FROM GEOBASE®. TSAWWASSEN FIRST NATION FISHING AREA AND FIRST NATION RESERVES OBTAINED FROM THE PROVINCE OF BRITISH COLUMBIA, COPYRIGHT © 2014. RECREATIONAL FISHING AREA DATA OBTAINED FROM BCMCA. PRELIMINARY BERTH CONCEPT FROM AUSENCO-100761-0000-W-K07-A 02-05-2015. ESRI BASEMAP COPYRIGHT © ESRI AND ITS LICENSORS. SOURCE: GEOEYE IKONOS. USED UNDER LICENSE, ALL RIGHTS RESERVED PROJECTION: UTM ZONE 10; DATUM: NAD 83

CLIENT
WESPAC MIDSTREAM-VANCOUVER LLC.

PROJECT
TILBURY MARINE JETTY

TITLE
COMMERCIAL AND RECREATIONAL FISHERIES

CONSULTANT	YYYY-MM-DD	2015-04-25
	PREPARED	RH
	DESIGN	EJC
	REVIEW	DC
	APPROVED	BW

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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET HAS BEEN MODIFIED FROM ANSIB 25mm

Appendices


Appendix A:

Photographs of the Project Site




PROJECT		Tilbury Marine Jetty	
TITLE		View upstream of the Project site showing Seaspan's existing terminal	
	PROJECT No. 13-1436-0067	Phase / Task No.	
	DESIGN	SCALE	NTS
	CADD	REV	
	CHECK		
REVIEW		1	




PROJECT				Tilbury Marine Jetty			
TITLE				Existing paved area where car park area will be located			
PROJECT No. 13-1436-0067		Phase / Task No.		SCALE		NTS	
DESIGN	--						----
CADD	--						REV
CHECK	--						
REVIEW	--						
				2			



PROJECT			
Tilbury Marine Jetty			
TITLE			
Shoreline downstream of where the jetty will be located			
PROJECT No. 13-1436-0067		Phase / Task No.	
DESIGN		SCALE	NTS
CADD			REV.
CHECK			
REVIEW			
		3	



PROJECT		Tilbury Marine Jetty	
TITLE		View showing the impacted shoreline downstream of the Project	
PROJECT No. 13-1436-0067		Phase / Task No.	
DESIGN		SCALE	NTS
CADD			
CHECK			
REVIEW			
		4	



PROJECT				Tilbury Marine Jetty			
TITLE				View from the water of existing marine structures to be removed			
PROJECT No. 13-1436-0067		Phase / Task No.		SCALE NTS		REV	
DESIGN				5			
CADD							
CHECK							
REVIEW							






PROJECT		Tilbury Marine Jetty	
TITLE		Location proposed for dredging prior to construction of the marine jetty	
PROJECT No. 13-1436-0067		Phase / Task No.	
DESIGN		SCALE	NTS
CADD			REV.
CHECK			
REVIEW			6





PROJECT			
Tilbury Marine Jetty			
TITLE			
Location of concrete deck where the access trestle will extend from			
PROJECT No. 13-1436-0067		Phase / Task No.	
DESIGN		SCALE	NTS REV
CADD			
CHECK			
REVIEW			
		7	



PROJECT				Tilbury Marine Jetty			
TITLE				View south: showing the corridor where the onshore above ground LNG pipeline will be constructed			
PROJECT No. 13-1436-0067		Phase / Task No.		SCALE NTS		REV	
DESIGN				8			
CADD							
CHECK							
REVIEW							



Appendix B:

Migratory Bird Species



APPENDIX B Migratory Bird Species

Table 1: Regionally Occurring Migratory Birds^{1, 2, 3, 4}

Common Name	Scientific Name	BC Rank	COSEWIC Rank ⁵	SARA Rank ⁶	Seasonal Occurrence	Potential to occur within Project Site
Greater white-fronted goose	<i>Anser albifrons</i>	Yellow	-	-	spring /fall	Yes
Snow goose	<i>Chen caerulescens</i>	Yellow	-	-	fall to spring	Yes
Cackling goose	<i>Branta hutchinsii</i>	Blue	-	-	spring/fall	Yes
Brant	<i>Branta bernicla</i>	Blue	-	-	fall to spring	-
Trumpeter swan	<i>Cygnus buccinator</i>	Yellow	NAR	-	fall to spring	Yes
Tundra swan	<i>Cygnus columbianus</i>	Blue	-	-	fall to spring	Yes
Eurasian wigeon	<i>Anas penelope</i>	No Status	-	-	fall to spring	Yes
Blue-winged teal	<i>Anas discors</i>	Yellow	-	-	spring/summer	Yes
Cinnamon teal	<i>Anas cyanoptera</i>	Yellow	-	-	spring/summer	Yes
Canvasback	<i>Aythya valisineria</i>	Yellow	-	-	fall to spring	Yes
Ring-necked duck	<i>Aythya collaris</i>	Yellow	-	-	fall to spring	Yes
Greater scaup	<i>Aythya marila</i>	Yellow	-	-	fall to spring	Yes
Lesser scaup	<i>Aythya affinis</i>	Yellow	-	-	fall to spring	Yes
Harlequin duck	<i>Histrionicus histrionicus</i>	Yellow	-	-	fall to spring	-
Black scoter	<i>Melanitta americana</i>	Yellow	-	-	fall to spring	-
White-winged scoter	<i>Melanitta fusca</i>	Yellow	-	-	fall to spring	-
Surf scoter	<i>Melanitta perspicillata</i>	Blue	-	-	fall to spring	-
Long-tailed duck	<i>Clangula hyemalis</i>	Blue	-	-	fall to spring	-
Bufflehead	<i>Bucephala albeola</i>	Yellow	-	-	fall to spring	Yes
Common goldeneye	<i>Bucephala clangula</i>	Yellow	-	-	fall to spring	Yes
Barrow's goldeneye	<i>Bucephala islandica</i>	Yellow	-	-	fall to spring	-
Hooded merganser	<i>Lophodytes cucullatus</i>	Yellow	-	-	summer to spring	Yes
Common merganser	<i>Mergus merganser</i>	Yellow	-	-	summer to spring	Yes
Red-breasted merganser	<i>Mergus serrator</i>	n/a	-	-	fall to spring	Yes
Ruddy duck	<i>Oxyura jamaicensis</i>	Yellow	-	-	fall to spring	Yes
Red-throated loon	<i>Gavia stellata</i>	Yellow	-	-	fall to spring	Yes
Pacific loon	<i>Gavia pacifica</i>	Yellow	-	-	fall to spring	-
Common loon	<i>Gavia immer</i>	Yellow	NAR	-	summer to spring	Yes



APPENDIX B Migratory Bird Species

Common Name	Scientific Name	BC Rank	COSEWIC Rank ⁵	SARA Rank ⁶	Seasonal Occurrence	Potential to occur within Project Site
Yellow-billed loon	<i>Gavia adamsii</i>	Blue	NAR	-	fall to spring	-
Horned grebe	<i>Podiceps auritus</i>	Yellow	SC	-	summer to spring	Yes
Red-necked grebe	<i>Podiceps grisegena</i>	Yellow	NAR	-	summer to spring	Yes
Eared grebe	<i>Podiceps nigricollis</i>	Yellow	-	-	fall to spring	-
Western grebe	<i>Aechmophorus occidentalis</i>	Red	SC	-	summer to spring	Yes
Sora	<i>Porzana carolina</i>	Yellow	-	-	spring to summer	Yes
American coot	<i>Fulica americana</i>	Yellow	NAR	-	fall to spring	Yes
Semipalmated plover	<i>Charadrius semipalmatus</i>	Yellow	-	-	spring/summer	Yes
Killdeer	<i>Charadrius vociferus</i>	Yellow	-	-	spring to fall	Yes
Spotted sandpiper	<i>Actitis macularius</i>	Yellow	-	-	summer	Yes
Greater yellowlegs	<i>Tringa melanoleuca</i>	Yellow	-	-	spring/summer to fall	Yes
Lesser yellowlegs	<i>Tringa flavipes</i>	Yellow	-	-	spring/summer to fall	Yes
Whimbrel	<i>Numenius phaeopus</i>	Yellow	-	-	spring to summer	Yes
Marbled godwit	<i>Limosa fedoa</i>	Yellow	-	-	spring/summer	-
Ruddy turnstone	<i>Arenaria interpres</i>	Yellow	-	-	spring/summer	-
Black turnstone	<i>Arenaria melanocephala</i>	Yellow	-	-	summer to spring	-
Surfbird	<i>Calidris virgata</i>	Yellow	-	-	summer to spring	-
Red knot	<i>Calidris canutus</i>	Red	E/T	1-T/E	spring/summer	-
Sanderling	<i>Calidris alba</i>	Yellow	-	-	summer to spring	-
Semipalmated sandpiper	<i>Calidris pusilla</i>	No Status	-	-	summer to fall	Yes
Western sandpiper	<i>Calidris mauri</i>	Yellow	-	-	spring/summer to fall	Yes
Least sandpiper	<i>Calidris minutilla</i>	Yellow	-	-	spring to fall	Yes



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Common Name	Scientific Name	BC Rank	COSEWIC Rank ⁵	SARA Rank ⁶	Seasonal Occurrence	Potential to occur within Project Site
Baird's sandpiper	<i>Calidris bairdii</i>	Unknown	-	-	summer to fall	Yes
Pectoral sandpiper	<i>Calidris minutilla</i>	Yellow	-	-	summer to fall	Yes
Sharp-tailed sandpiper	<i>Calidris acuminata</i>	Yellow	-	-	fall	-
Rock sandpiper	<i>Calidris ptilocnemis</i>	Yellow	-	-	fall to spring	-
Dunlin	<i>Calidris alpina</i>	Yellow	-	-	fall to spring	Yes
Stilt sandpiper	<i>Calidris himantopus</i>	No Status	-	-	late summer	-
Short-billed dowitcher	<i>Limnodromus griseus</i>	Blue	-	-	spring/summer to fall	Yes
Long-billed dowitcher	<i>Limnodromus scolopaceus</i>	Yellow	-	-	spring/summer to fall	Yes
Wilson's snipe	<i>Gallinago delicata</i>	Yellow	-	-	fall to spring	Yes
Wilson's phalarope	<i>Phalaropus tricolor</i>	Yellow	-	-	spring to summer	-
Red-necked phalarope	<i>Phalaropus lobatus</i>	Blue	-	-	summer to fall	-
Franklin's gull	<i>Leucophaeus pipixcan</i>	Yellow	-	-	summer to fall	-
Bonaparte's gull	<i>Chroicocephalus philadelphia</i>	Yellow	-	-	spring/summer to fall	Yes
Heermann's gull	<i>Larus heermanni</i>	Yellow	-	-	spring/summer to fall	-
Mew gull	<i>Larus canus</i>	Yellow	-	-	summer to spring	Yes
Ring-billed gull	<i>Larus delawarensis</i>	Yellow	-	-	spring to fall	Yes
California gull	<i>Larus californicus</i>	Blue	-	-	spring to fall	Yes
Herring gull	<i>Larus argentatus</i>	Yellow	-	-	fall to spring	Yes
Thayer's gull	<i>Larus thayeri</i>	Yellow	-	-	fall to spring	Yes
Western gull	<i>Larus occidentalis</i>	Yellow	-	-	fall to spring	Yes
Glaucous gull	<i>Larus hyperboreus</i>	No Status	-	-	fall to spring	Yes
Caspian tern	<i>Hydroprogne caspia</i>	Blue	-	-	summer	Yes
Common tern	<i>Sterna hirundo</i>	Yellow	NAR	-	spring/summer to fall	Yes



APPENDIX B Migratory Bird Species

Common Name	Scientific Name	BC Rank	COSEWIC Rank ⁵	SARA Rank ⁶	Seasonal Occurrence	Potential to occur within Project Site
Parasitic jaeger	<i>Stercorarius parasiticus</i>	No Status	-	-	spring/fall	-
Common murre	<i>Uria aalge</i>	Red	-	-	fall to spring	-
Pigeon guillemot	<i>Cephus columba</i>	Yellow	-	-	late winter to fall	-
Ancient murrelet	<i>Synthliboramphus antiquus</i>	Blue	SC	1-SC	fall to spring	-
Rhinoceros auklet	<i>Cerorhinca monocerata</i>	Yellow	-	-	summer to fall	-
Band-tailed pigeon	<i>Patagioenas fasciata</i>	Blue	SC	1-SC	spring to fall	-
Mourning Dove	<i>Zenaida macroura</i>	Yellow	-	-	summer	Yes
Common nighthawk	<i>Chordeiles minor</i>	Yellow	T	1-T	summer	-
Black swift	<i>Cypseloides niger</i>	Yellow	-	-	summer	-
Vaux's swift	<i>Chaetura vauxi</i>	Yellow	-	-	summer to fall	-
Rufous hummingbird	<i>Selasphorus rufus</i>	Yellow	-	-	spring to summer	-
Olive-sided flycatcher	<i>Contopus cooperi</i>	Blue	T	1-T	summer	-
Western wood-pewee	<i>Contopus sordidulus</i>	Yellow	-	-	summer	-
Willow flycatcher	<i>Empidonax traillii</i>	Yellow	-	-	summer	Yes
Hammond's flycatcher	<i>Empidonax hammondi</i>	Yellow	-	-	spring to summer	-
Pacific-slope flycatcher	<i>Empidonax difficilis</i>	Yellow	-	-	spring to summer	-
Western kingbird	<i>Tyrannus verticalis</i>	Yellow	-	-	summer	-
Eastern kingbird	<i>Tyrannus tyrannus</i>	Yellow	-	-	summer	-
Northern shrike	<i>Lanius excubitor</i>	Yellow	-	-	fall to spring	-
Cassin's vireo	<i>Vireo cassinii</i>	Yellow	-	-	spring to summer	-
Warbling vireo	<i>Vireo gilvus</i>	Yellow	-	-	spring to summer	Yes
Red-eyed vireo	<i>Vireo olivaceus</i>	Yellow	-	-	summer	-
Horned lark	<i>Eremophila alpestris</i>	Yellow	-	-	spring/fall	-
Purple martin	<i>Progne subis</i>	Blue	-	-	spring to summer	-
Tree swallow	<i>Tachycineta bicolor</i>	Yellow	-	-	spring to summer	Yes
Violet-green swallow	<i>Tachycineta thalassina</i>	Yellow	-	-	spring to summer	Yes



APPENDIX B

Migratory Bird Species

Common Name	Scientific Name	BC Rank	COSEWIC Rank ⁵	SARA Rank ⁶	Seasonal Occurrence	Potential to occur within Project Site
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>	Yellow	-	-	spring to summer	Yes
Bank swallow	<i>Riparia riparia</i>	Yellow	T	-	summer	-
Cliff swallow	<i>Petrochelidon pyrrhonota</i>	Yellow	-	-	spring to summer	Yes
Barn swallow	<i>Hirundo rustica</i>	Blue	T	-	spring to fall	Yes
House wren	<i>Troglodytes aedon</i>	Yellow	-	-	spring to fall	-
Ruby-crowned kinglet	<i>Regulus calendula</i>	Yellow	-	-	fall to spring	Yes
Townsend's solitaire	<i>Myadestes townsendi</i>	Yellow	-	-	fall to spring	-
Swainson's thrush	<i>Catharus ustulatus</i>	Yellow	-	-	summer to fall	Yes
Hermit thrush	<i>Catharus guttatus</i>	Yellow	-	-	summer to fall	-
Gray catbird	<i>Dumetella carolinensis</i>	Yellow	-	-	summer	-
American pipit	<i>Anthus rubescens</i>	Yellow	-	-	fall/spring	Yes
Bohemian waxwing	<i>Bombycilla garrulus</i>	Yellow	-	-	winter to spring	-
Cedar waxwing	<i>Bombycilla cedrorum</i>	Yellow	-	-	spring to winter	Yes
Orange-crowned warbler	<i>Oreothlypis celata</i>	Yellow	-	-	spring to fall	Yes
Yellow warbler	<i>Setophaga petechia</i>	Yellow	-	-	summer to fall	Yes
Yellow-rumped warbler	<i>Setophaga coronata</i>	Yellow	-	-	spring to fall	Yes
Black-throated gray warbler	<i>Setophaga caerulescens</i>	Yellow	-	-	spring to summer	-
Townsend's warbler	<i>Setophaga townsendi</i>	Yellow	-	-	spring to summer	-
American redstart	<i>Setophaga ruticilla</i>	Yellow	-	-	summer	-
MacGillivray's warbler	<i>Geothlypis tolmiei</i>	Yellow	-	-	spring to summer	-
Common yellowthroat	<i>Geothlypis trichas</i>	Yellow	-	-	spring to summer	Yes
Wilson's warbler	<i>Cardellina pusilla</i>	Yellow	-	-	spring to fall	-
Western tanager	<i>Piranga ludoviciana</i>	Yellow	-	-	summer	-
American tree sparrow	<i>Spizella arborea</i>	Yellow	-	-	fall to spring	-
Chipping sparrow	<i>Spizella passerina</i>	Yellow	-	-	spring to summer	-



APPENDIX B Migratory Bird Species

Common Name	Scientific Name	BC Rank	COSEWIC Rank ⁵	SARA Rank ⁶	Seasonal Occurrence	Potential to occur within Project Site
Vesper sparrow	<i>Pooecetes gramineus</i>	Yellow	-	-	spring to fall	-
Savannah sparrow	<i>Passerculus sandwichensis</i>	Yellow	-	-	spring to fall	Yes
Fox sparrow	<i>Passerella iliaca</i>	Yellow	-	-	fall to spring	Yes
Lincoln's sparrow	<i>Melospiza lincolni</i>	Yellow	-	-	fall to spring	Yes
Swamp sparrow	<i>Melospiza georgiana</i>	Yellow	-	-	fall to spring	-
White-throated sparrow	<i>Zonotrichia albicollis</i>	Yellow	-	-	fall to spring	-
Harris' sparrow	<i>Zonotrichia querula</i>	No Status	-	-	fall to spring	-
Golden-crowned sparrow	<i>Zonotrichia atricapilla</i>	Yellow	-	-	fall to spring	Yes
Lapland longspur	<i>Calcarius lapponicus</i>	No Status	-	-	spring/fall	-
Snow bunting	<i>Plectrophenax nivalis</i>	Yellow	-	-	winter to spring	-
Black-headed grosbeak	<i>Pheucticus melanocephalus</i>	Yellow	-	-	summer	-
Lazuli bunting	<i>Passerina amoena</i>	Yellow	-	-	summer	-
Western meadowlark	<i>Sturnella neglecta</i>	Yellow	-	-	fall to spring	-
Bullock's oriole	<i>Icterus bullockii</i>	Yellow	-	-	summer	-
Common redpoll	<i>Acanthis flammea</i>	Yellow	-	-	winter to spring	-
Evening grosbeak	<i>Coccothraustes vespertinus</i>	Yellow	-	-	fall to spring	-

Notes:

1. Bird list obtained from *Seasonal Status of Vancouver Birds* (Toochin 2013) and includes regionally occurring species (i.e., is not specific to the Project site).
2. List does not include families not protected under the Migratory Bird Convention Act (https://ec.gc.ca/nature/default.asp?lang=En&n=496E2702-1#_003)
3. List does not include occasional or accidental occurrences of species
4. List does not include those species protected under the *Migratory Bird Convention Act* that are year-round residents within the Greater Vancouver area
5. E = Endangered, T = Threatened, SC = Special Concern, NAR = Not at Risk
6. 1- = species listed on Schedule 1 of the *Species at Risk Act*



APPENDIX B

Migratory Bird Species

References

Toochin, R. 2013. *E-Fauna BC: Electronic Atlas of the Fauna of British Columbia*. Available at: <http://ibis.geog.ubc.ca/biodiversity/efauna/documents/Vancouver%20Master%20Checklist%20XY.pdf>. Accessed March 12, 2015.

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