

September 2013

Roberts Bank Terminal 2 Project Description



Prepared for:
**The Canadian Environmental
Assessment Agency**
410 – 701 West Georgia Street
Vancouver, BC V7Y 1K8

**The BC Environmental
Assessment Office**
2nd Floor, 836 Yates Street
P.O. Box 9426, Stn Prov Govt
Victoria, BC V8W 9V1

Prepared by:
Port Metro Vancouver
100 The Pointe
999 Canada Place
Vancouver, BC V6C 3T4

PREFACE

The Vancouver Fraser Port Authority, doing business as Port Metro Vancouver (PMV), proposes to build a new container terminal at Roberts Bank, Delta, B.C. The terminal is intended to meet growing demand for container capacity in support of Canada's import and export markets. The proposed project, titled Roberts Bank Terminal 2, and referenced throughout this document as the Project, will involve creating additional land area on the seaward end of the existing Roberts Bank causeway and widening that causeway.

The Project is expected to be subject to both a federal Environmental Assessment (EA) and review process under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012), and a provincial Environmental Assessment and review process under the British Columbia *Environmental Assessment Act* (BCEAA). The Canada-British Columbia Agreement on Environmental Assessment Cooperation (2004) provides for a joint provincial and federal review when a project is subject to review pursuant to both CEAA 2012 and BCEAA.

PMV is filing this Project Description with both the federal Canadian Environmental Assessment Agency (CEA Agency) and the British Columbia Environmental Assessment Office (BC EAO) as required under CEAA 2012 and BCEAA. The Project Description addresses both federal and provincial requirements in a manner consistent with existing guidance documents relevant to the preparation of project descriptions under CEAA 2012 and BCEAA. It is PMV's understanding that the federal and provincial regulators will determine the level of cooperation and the type of EA required after this Project Description has been accepted.

Key steps in the environmental assessment and review process will involve the identification and evaluation of potential effects associated with the construction and operations phases of the Project; the development of mitigation measures that will be used to avoid and/or minimise potential negative effects; and the development of measures to enhance the positive effects of the Project. First Nations, members of the public, stakeholder groups, and other interested parties have been, and will continue to be, consulted and given the opportunity to provide input throughout the EA and review processes.

EXECUTIVE SUMMARY

PROJECT INFORMATION

The proposed Roberts Bank Terminal 2 Project (the Project) consists of a new three-berth marine container terminal located at Roberts Bank, Delta, BC, approximately 35 kilometres (km) south of Vancouver. The Project will be adjacent to the existing Deltaport Terminal and Westshore Terminals. The Project will provide an additional 2.4 million twenty-foot equivalent units (TEUs) of container capacity per year at Roberts Bank. The Vancouver Fraser Port Authority, doing business as Port Metro Vancouver (PMV), proposes development of the Project to ensure the availability of adequate container capacity to meet projected demand to 2030.

PROPONENT CONTACT AND OVERVIEW

Port Metro Vancouver

PMV operates Canada's largest and North America's most diversified port. PMV helps Canadian businesses deliver their goods and products, such as lumber, pulp and paper, and grains to markets around the world, and is an entry point for construction and manufacturing inputs and many consumer goods, including fruits and vegetables, electronics, furniture, and automobiles. Facilities within PMV's jurisdiction include three major railways and 28 major terminals, four of which are container terminals. Container trade is one of the most significant business sectors by tonnage, and benefits both Canadian consumers and producers, as evidenced by the almost equal volumes of import and export containers that travel through PMV.

A more detailed corporate overview of PMV can be found at www.portmetrovancover.com.

The President and Chief Executive Officer at PMV is Robin Silvester:

Robin Silvester
President and Chief Executive Officer
Port Metro Vancouver
100 The Pointe
999 Canada Place
Vancouver, BC V6C 3T4

Communications on behalf of PMV with respect to the Project should be directed to Cliff Stewart as follows:

Cliff Stewart, P.Eng.
Director, Infrastructure Development
Port Metro Vancouver
100 The Pointe
999 Canada Place
Vancouver, BC V6C 3T4

Email: container.improvement@portmetrovancover.com
Phone: 604.665.9337
Fax: 1.866.284.4271

Meeting Demand

In 2012, almost 3.3 million TEUs transited the Canadian West Coast, of which 2.7 million TEUs moved through terminals within PMV's jurisdiction. Annual third-party forecasts show that West Coast container traffic is expected to double over the next 10 to 15 years and triple by 2030 (WorleyParsons Canada and Seaport Consultants Canada Inc. 2011a; Ocean Shipping Consultants May 2012; Ocean Shipping Consultants July 2013). The graph below (**Figure 1.0**) shows container forecasts for Canada's West Coast (Ocean Shipping Consultants July 2013). The stepped lines show projects, both underway and planned, that will accommodate these increases in demand. Container terminals start to lose efficiency when they attempt to operate at higher than 85% of their capacity. Operating at slightly below capacity allows terminals to adapt to seasonal fluctuations in container volumes or disruptions in the supply chain that may impact the volume of imports and exports through the terminal.

Figure 1.0 shows independent container traffic projections between 2011 and 2013 have all demonstrated that existing container capacity on the West Coast of Canada, and in the Lower Mainland, will soon become constrained, requiring additional capacity as early as 2015. Current TEU capacity at Roberts Bank is 1.8 million TEUs; upon completion of the Deltaport Terminal, Road and Rail Improvement Project in 2016/17, this capacity will further increase to 2.4 million TEUs. Even with these improvements at PMV's terminals, as well as planned investments at the Fairview Terminal in Prince Rupert, current demand forecasts indicate the Canadian West Coast will still require additional container capacity by the early 2020s.

Figure 2.0 provides a comparison of actual Canadian West Coast container traffic volumes against a container traffic forecast that was completed by Ocean Shipping Consultants in 2001. Despite the dip in container volumes that occurred in 2009 following the global financial crisis, container traffic still tracked the high case forecast.

In keeping with PMV's mandate to support the growth of Canadian trade, and in direct response to the growing needs of Canadian industry and consumer demand, PMV is proposing infrastructure improvements to enhance container capacity and strengthen Canada's Asia-Pacific Gateway.

PMV's Land Use Plan (2008) requires that the use of existing terminals is maximised before any new facilities are built. In planning for future capacity within the guidelines of the Land Use Plan, PMV considered the following opportunities for creating container capacity:

Increase the Capacity and Efficiency of Existing Container Terminals

Significant improvements were achieved in 2005 at Vanterm and Centerm, container terminals in Burrard Inlet, resulting in a combined increase of 75% (600,000 TEUs) in container capacity. The Deltaport Third Berth Project at Roberts Bank, which opened in 2010, resulted in capacity for moving an additional 600,000 TEUs, equivalent to a 50% increase in capacity. The Deltaport Terminal Road and Rail Improvement Project (DTRRIP), which is scheduled for completion in 2015, will provide a further 600,000 TEUs of container capacity at Roberts Bank.

Converting Existing under-utilised Cargo Terminals to Container Terminals

Lynnterm, an existing break bulk cargo terminal in North Vancouver, was considered for conversion to container handling. However, the terminal's adjacent road network has insufficient capacity to accommodate the number of container trucks required, which limits its potential as a container terminal.

Building a New Terminal

Given the constraints of the options discussed above, PMV has been exploring the potential for a new terminal. The Project is considered to be the most viable option to meet the forecasted need for increased container capacity on the West Coast of Canada.

Roberts Bank is well positioned to accommodate future trade growth, and offers several competitive advantages, including a well-established international shipping route with excellent access to Lower Mainland markets and major North American road and rail transportation corridors.

PMV established the following objectives for the Project:

- Meet demand for containerised trade growth on behalf of Canada and Canadians to 2030;

- Ensure sustainable development objectives continue to play a key role in the design and operation of the Project – considering environmental, social and economic factors;
- Provide economic benefits, including job creation, to the region, British Columbia and Canada;
- Improve the efficiency of moving goods at Roberts Bank, including marine traffic and on-terminal operations; and
- Align with federal and provincial strategies to continue to strengthen Canada's Asia-Pacific Gateway.

PMV works closely with all levels of government and private industries to ensure the efficient movement of goods through the Asia-Pacific Gateway. In addition to marine terminals, rail and trucking service, together with shipping lines, cargo owners, and operators of off-dock facilities are crucial to the performance of the supply chain and the continued growth and success of the Asia-Pacific Gateway.

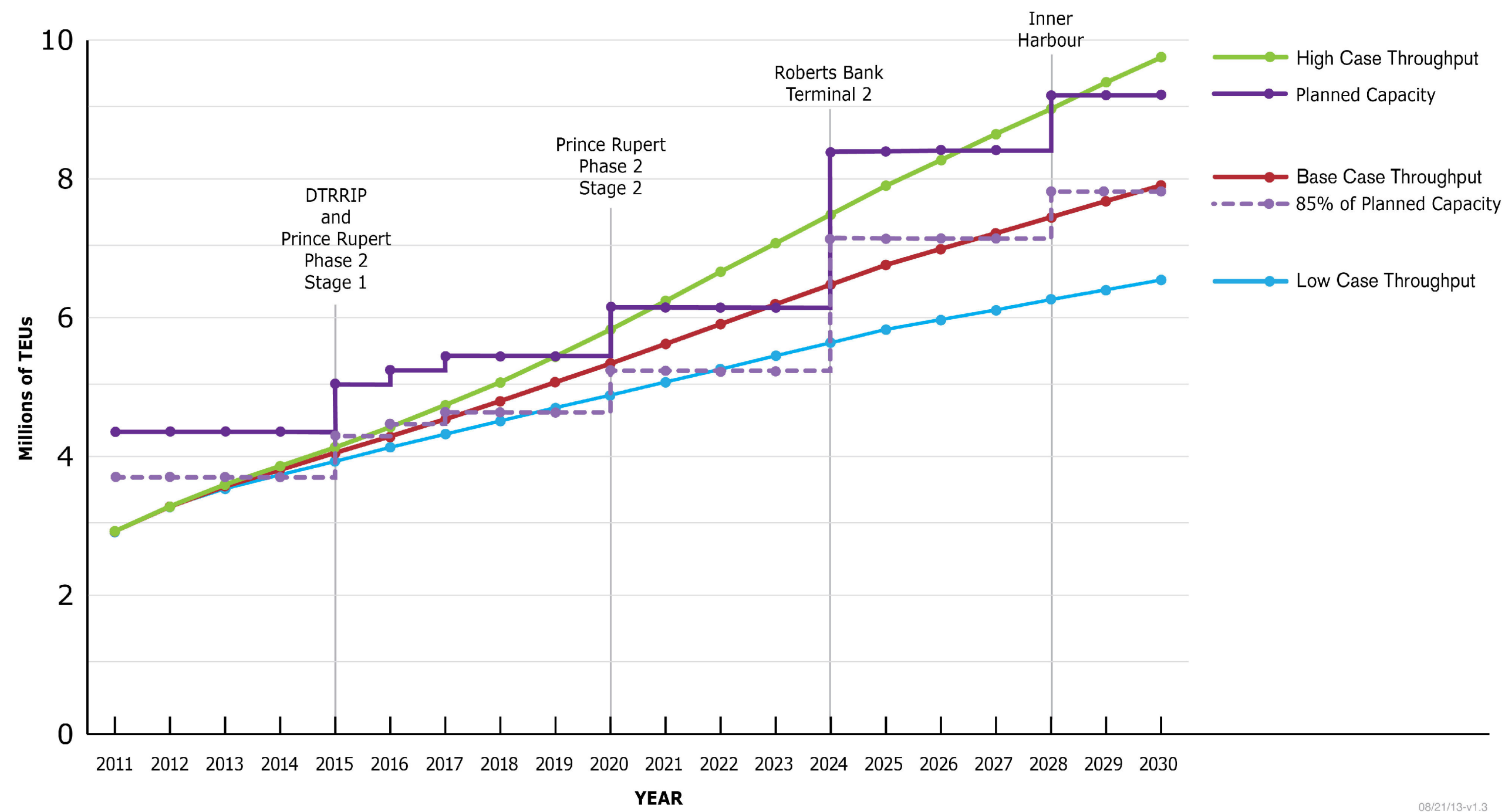
In terms of regional capacity to meet the anticipated growth in container traffic, the terminal and infrastructure improvements will complement other recent and ongoing infrastructure improvements in the Lower Mainland, such as the South Fraser Perimeter Road (SFPR) and the Roberts Bank Rail Corridor Program, which are designed to improve safety, decrease traffic congestion, and increase efficiency of the movement of goods throughout the Lower Mainland of BC.

PROJECT LOCATION AND ORIENTATION

The Project's terminal will be located immediately west of the existing Roberts Bank terminal facilities, located approximately 5.5 km (from the east shore end of the causeway). The Project's geographic coordinates are approximately 49° 01' 6.84" N and 123° 11' 3.33" W. The terminal will be oriented parallel to the shoreline (perpendicular to the causeway) and will extend approximately 600 metres (m) further offshore than the edge of the existing terminal at Roberts Bank. The terminal will be rectangular in shape, with a berth face length of 1,300 m to accommodate the mooring of three ships, and a terminal width of 700 m to support terminal components. The total marine footprint of the terminal will be approximately 117 hectares (ha).

The orientation of the new terminal has been designed to facilitate the berthing of container ships, and to minimise disturbance to marine processes. Please refer to **Figure 3.0** for the location and orientation of the new Project terminal.

WEST COAST - FORECAST AND PLANNED CAPACITY INCREASES



08/21/13-v1.3



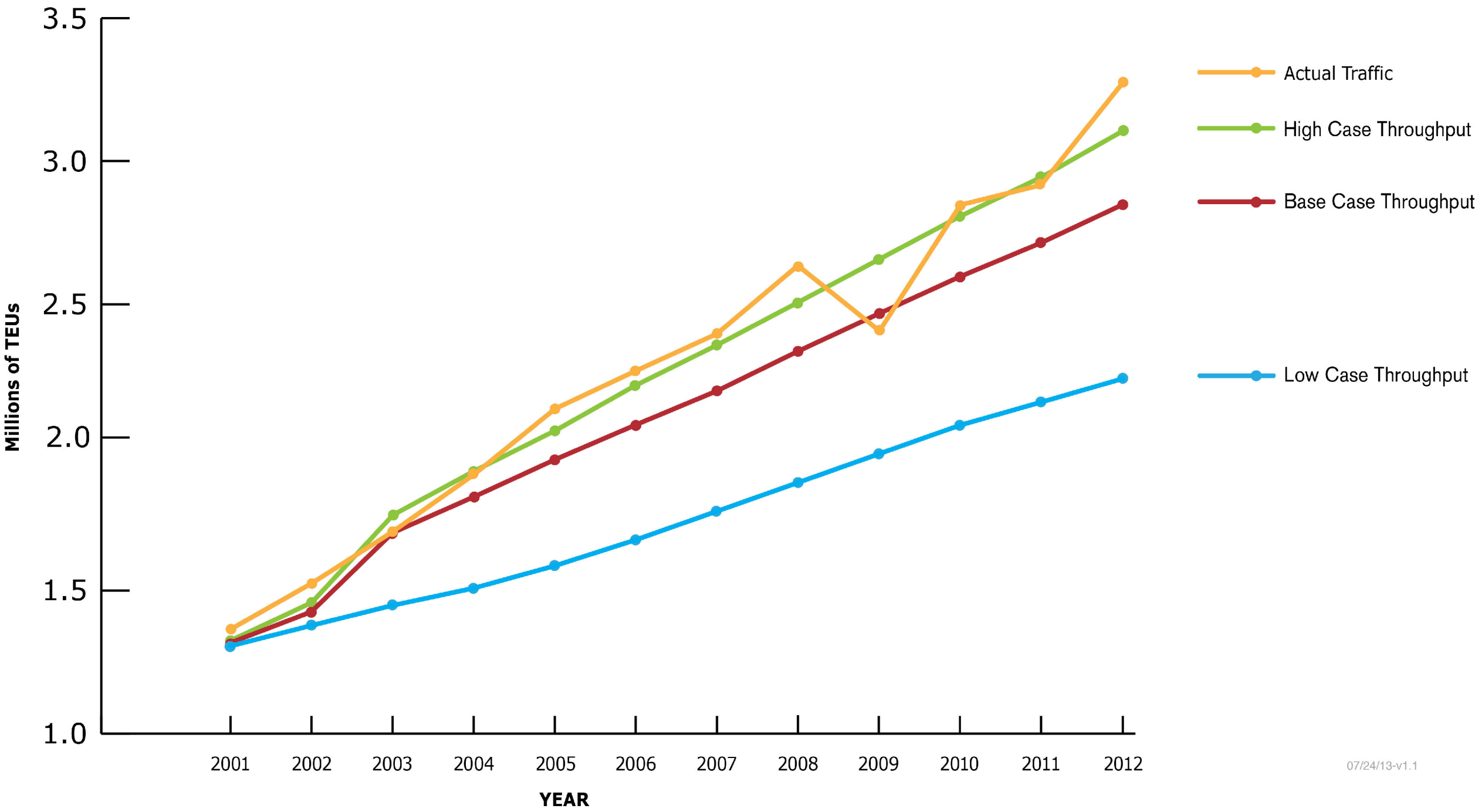
ROBERTS BANK TERMINAL 2

FORECAST AND PLANNED CAPACITY INCREASES

DATE: SEPTEMBER 2013

FIG No. 1.0

West Coast Container Traffic: Forecast (2001) vs. Actual



07/24/13-v1.1

Document Name: 00719-00-GIS-6100_Figure2_Historic_Forecast_Graph

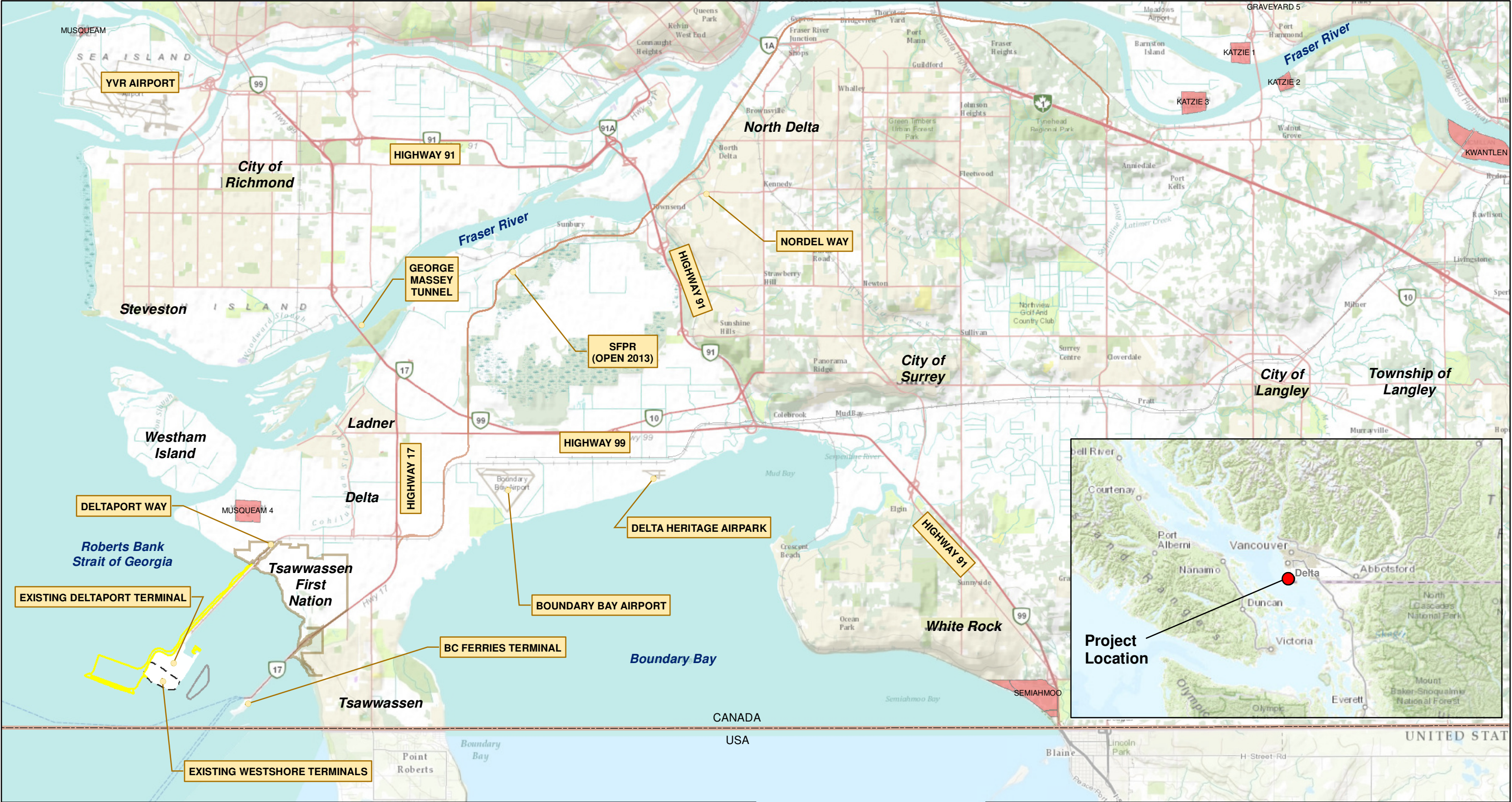


ROBERTS BANK TERMINAL 2

2001 FORECAST AND ACTUAL CAPACITY INCREASES

DATE:	SEPTEMBER 2013	FIG No.	2.0
-------	----------------	---------	-----

Document Name: 00719-00-GIS-6071_Figure3_Project_Location_V7



Legend

BOUNDARY OF PROJECT AREA

TRANSFER PIT

US-CANADA BORDER

FIRST NATIONS RESERVE

N

01,5003,000

Metres

1:120,000

NAD 1983 UTM Zone 10N

PORT METRO
vancouver

ROBERTS BANK TERMINAL 2

PROJECT LOCATION

DATE:SEPTEMBER 2013

FIG No.3.0

Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

PROJECT COMPONENTS AND ACTIVITIES

The Project components and activities listed below, and shown in **Figure 4.0**, are based on preliminary engineering designs and have been confirmed to be technically feasible to accommodate transfer of containers between ships and terminal, and to the road and rail network. Final designs will include changes required to address outcomes from the Environmental Assessment (EA) and regulatory review process.

For the purposes of this Project Description, the Project Area is defined as the land and/or land covered by water occupied by Project facilities and structures.

By way of the proposed construction phase (**Figure 7.0**), the Project components and sub-components will include the following:

- **Berth pocket;**
- **Marine terminal:**
 - Three-berth wharf;
 - Container storage yard;
 - Rail intermodal yard; and
 - Ancillary systems and support facilities.
- **Tug basin expansion;**
- **Causeway expansion:**
 - Rail improvements; and
 - Road improvements.

The Berth Pocket

The berth pocket is the dredged mooring basin adjacent to the terminal wharf structure where the container ships will be berthed and moored to the wharf. The berth pocket and the associated approach and departure angles will measure approximately 1,700 m long by 62 m wide. The berth pocket will feature a depth of 18.4 m to meet safe under-ship clearance, and performance requirements for the adjacent new wharf foundation.

The Marine Terminal

The terminal dimensions are 1,500 m average length, 700 m width, varying 8.75 m to 6.5 m height above mean sea level, and a 1,300 m berth length. It will have an approximate total useable area of 108 ha. To accommodate for this space requirement, the total terminal footprint, including protected marine slopes, and the three-berth wharf will be approximately 117 ha.

The marine terminal consists of:

Three-berth Wharf

The purpose of the wharf structure is to allow berthing and mooring of vessels, support ship-to-shore gantry cranes, and provide vessel shore power and other amenities.

Container Storage Yard

Following the construction of the terminal landmass, a container storage yard with electrically powered stacking cranes or a similar type of equipment will be developed for transferring and storing containers received by ship, rail, or truck.

Rail Intermodal Yard (IY)

A rail IY served by electrically powered rail-mounted gantry cranes, or a similar type of equipment, will be required to transfer containers to and from railcars to mobile equipment.

Ancillary systems and support facility

This will include a truck gate facility, site security systems, civil utility systems, support facilities and power and lighting infrastructure.

Tug Basin Expansion

Expanded tug operations will be required to provide the additional tug capacity required for the Project. The existing tug basin, located in the inter-causeway, has a footprint of 1.4 ha that will be expanded approximately by 2.5 ha, for a total footprint of 3.9 ha, to meet the following functional requirements for the Project:

- Capacity to accommodate two tug operation contractors (one existing and one new), each with separate access and floats for independent operation.

Causeway Expansion

The existing causeway linking the rail network to the existing Roberts Bank terminals will be widened on the north side of the causeway, requiring an additional land area of approximately 42 ha for terminal construction and 1 ha of existing BC Rail (BCR) land for the tie-in tracks to the existing rail network.

The existing causeway is made up of the following rail infrastructure:

- North Yard – four tracks;
- South Yard – seven tracks;
- P Yard – four tracks;

- Intermodal Yard (IY) – ten tracks; and
- Mainline leads – four tracks.

The width of the expanded causeway will vary according to the requirements of the road and rail infrastructure needed for the Project and to minimise impacts on marine habitat.

Causeway rail improvements associated with the Project will include the following:

- Addition of two lead rail tracks to the IY;
- Addition of two new yards; and
- Tie-in of two lead tracks serving the Project to the existing rail network.

Causeway Road Improvements

The existing Roberts Bank Way North will remain two lanes from the DTRRIP overpass to the new Project overpass. Roberts Bank Way North will continue to allow traffic to enter and exit the Roberts Bank terminals, and will also connect to a new three-lane causeway access road to the Project.

The conceptual plan view of the terminal layout is presented in **Figure 5.0**, and the expanded tug basin is shown in **Figure 6.0**. All construction and operations activities related to the Project components described above are outlined in **Table 1**.

Table 1 Summary of Project Components and Activities

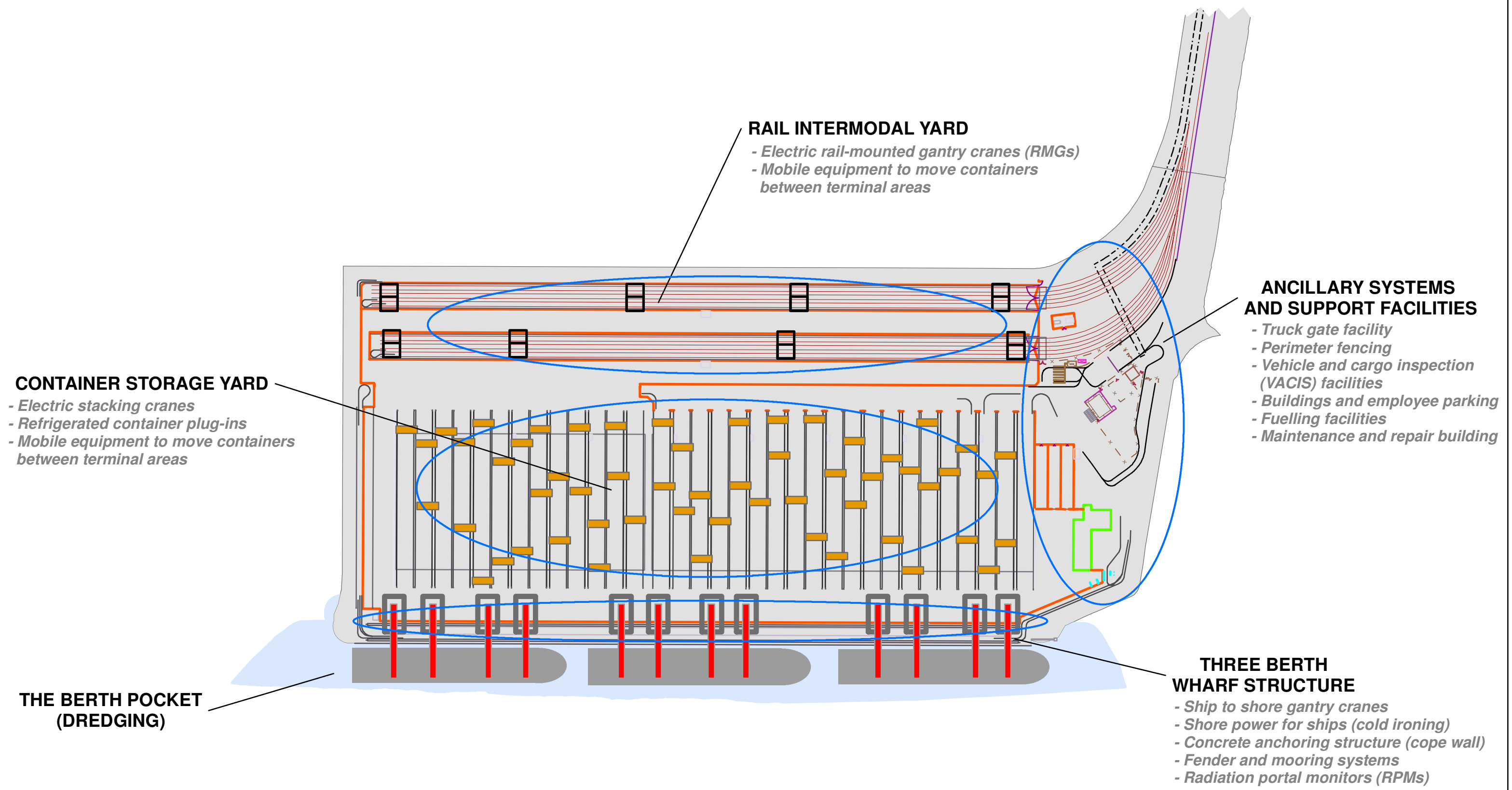
Project Components and Equipment	Construction Activities	Operations Activities
Berth Pocket	• Dredging of <i>in situ</i> soils for berth pocket (17.4 ha) • Pumping of dredged material and discharge for use as terminal fill within the containment dykes • Disposal at sea (DAS) of suspended fines and excess water from dredgeate out of the containment area • Densification of <i>in situ</i> soils below base of dredged berth pocket • Installation of mattress rock to prevent scour from ship and tug propellers, and for stability of the toe of the adjacent caisson structure.	• Movement and berthing of ships • Movement of line-handling vessels and berthing tugs during berthing and de-berthing of container ships • Discharges from ships (de-ballasting) • Maintenance dredging (as required).
Marine Terminal		
	Land Development:	
	• Construction of perimeter and interior dykes (multiple cells) for the terminal area will use part of the 3.7 million m³ of rock, gravel and riprap sourced from local aggregate/quarry suppliers required for all terminal and causeway dyking • Temporary storage of Fraser River dredgeate at underwater transfer pit (10.5 million m³ of dredgeate for both the terminal and causeway expansion) • Dredging of underwater temporary transfer pit for terminal fill and preload • DAS of suspended fines and excess water from dredgeate out of the containment area • Densification of perimeter dyke areas and building locations • Preload areas cell by cell from terminal towards shore • Sell any remaining preload to local sand market.	• Maintenance as required

Project Components and Equipment	Construction Activities	Operations Activities
Three-berth Wharf	• Transportation of caissons to site • Dredging of <i>in situ</i> soils for caisson trench (13.3 ha) • Pumping of dredged material and discharge for use as terminal fill within the containment dykes • DAS of suspended fines and excess water from dredgeate out of the containment area • Densification of <i>in situ</i> soils below base of dredged caisson trench, • Caisson installation (sinking) and internal ballast filling • Installation of concrete cope wall (cap beam) (3 m x 3 m x 1, 300 m) to tie caissons together and provide mooring facilities (bollards, fenders, shore power pits, service pits) • Installation of rock and sand fills between caisson structure and terminal containment dyke • Installation of rip-rap on the seabed at toe of caissons • Installation of six 914 millimetre (mm)-diameter steel pipe piles for the mooring dolphin • Installation of approximately 10 linear metres (m) (on plan) of sheet piling at each of the two wharf end returns, plus 10 m of sheet piling used as dead-man anchor wall at each of those two locations • Marine transport and installation of ship to shore gantry cranes.	• Line handling for ship moorage • Mooring of ships • Ship-to-shore gantry crane movements along the wharf and movement of containers to/from the ships • Transfer of containers to/from wharf area to/from container yard and rail intermodal yard • Supplying shore power to moored ships, • Resupplying of ships (potable water and consumables) • Lighting for 24-hr. operations • Maintenance as required.
Container Storage Yard	• Installation of infrastructure including underground systems for stormwater, water, sanitary, and fibre optic controls • Installation of underground electrical distribution • Construction of pavement structure (base course and asphalt) • Installation of container handling equipment (assumed to be electrical stacking cranes and reefer platforms) • Installation of high mast lighting (may require piled foundations depending on final soil conditions).	• Container handling equipment traffic • Terminal truck traffic • Container storage • Reefer storage and associated electrical connections • Lighting for 24-hr. operations • Maintenance as required.

Project Components and Equipment	Construction Activities	Operations Activities
Rail Intermodal Yard (IY)	• Installation of infrastructure including underground systems for stormwater, water, sanitary, and fibre optic controls • Installation of underground electrical distribution • Installation of rail tracks • Construction of pavement structure between tracks and IY perimeter (base course and asphalt) • Installation of IY-container handling equipment (assumed to be electric rail-mounted gantry (RMG) cranes).	• Container train arrival, unloading and loading, and departure • Rail car inspections and repairs • Container coning and deconing • Lighting for 24-hr. operations • Maintenance as required.
Ancillary Systems and Support Facilities • Truck Gate Facility • Systems to Maintain Site Security • Civil Utility Systems • Support Facilities	• Installation of infrastructure including underground systems for stormwater, water, sanitary, and fibre optic controls • Installation of buildings for Administration, Security, Operations, Electrical, and Maintenance • Installation of perimeter fencing and security systems • Installation of underground electrical distribution and above-ground substations.	• Truck gate operations • Lighting for 24-hr. operation • Stormwater collection and discharge • Sanitary sewer collection, treatment, and discharge • Customs inspections of containers • Security services • Maintenance as required.
Tug Basin Expansion		
	• Dredging to expand and deepen existing Roberts Bank tug basin • Deposit of dredged material into dyked containment areas (140, 000 m³) • DAS of suspended fines and excess water from dredgeate out of the containment area • Installation of riprap for slope and crest protection around the perimeter of the tug basin • Relocation of the existing mooring barge and installation of associated six new piles • Installation of new mooring floats and associated 14 new piles for second operator • Installation of eight new piles for pedestrian trestles and ramps • Installation of three navigation piles • Area lighting and utilities (potable and fire water, sanitary).	• Transiting of tugs between tug basin and Roberts Bank terminal berths • Moorage of tugs and support boats • Maintenance as required • Maintenance dredging as required.

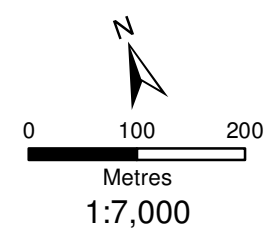
Project Components and Equipment	Construction Activities	Operations Activities
Causeway Expansion		
	Land Development:	
	• Perimeter and internal dykes established for expanded causeway • Bring to subgrade level with Fraser River sand fills • DAS of suspended fines and excess water from dredgeate out of the containment area.	• Maintenance as required
Causeway rail improvements	• Construction of rail sub-ballast structure • Add ties, rails, and ballast for new tracks and rail yards • Add gravel access roads between pairs of tracks • Tie in new lead tracks serving the yards and terminal into an existing mainline lead on the causeway and near the causeway entrance • Relocation of existing rail tracks to accommodate road/overpass construction • Lighting installation at rail switch points.	• Rail traffic • Rail car storage and switching • Rail car repair and locomotive refueling as per current Roberts Bank Terminals practice • Maintenance vehicle traffic • Operations vehicle traffic • Maintenance as required.
Causeway road improvements	• Construction of pavement structure • Add roadbed and asphalt • New overpass construction for road access to the Project • Lighting installation at new overpass • Provision of gravel emergency access road at north side of widened causeway • Installation of vehicle and access control system (VACS) gates and associated controls • New water main installation.	• Road traffic, including truck staging • Vehicle traffic and associated line-ups for VACS clearance • Maintenance as required.

Document Name: 00719-00-GIS-6007 Figure5 Conceptual Plan Terminal Components

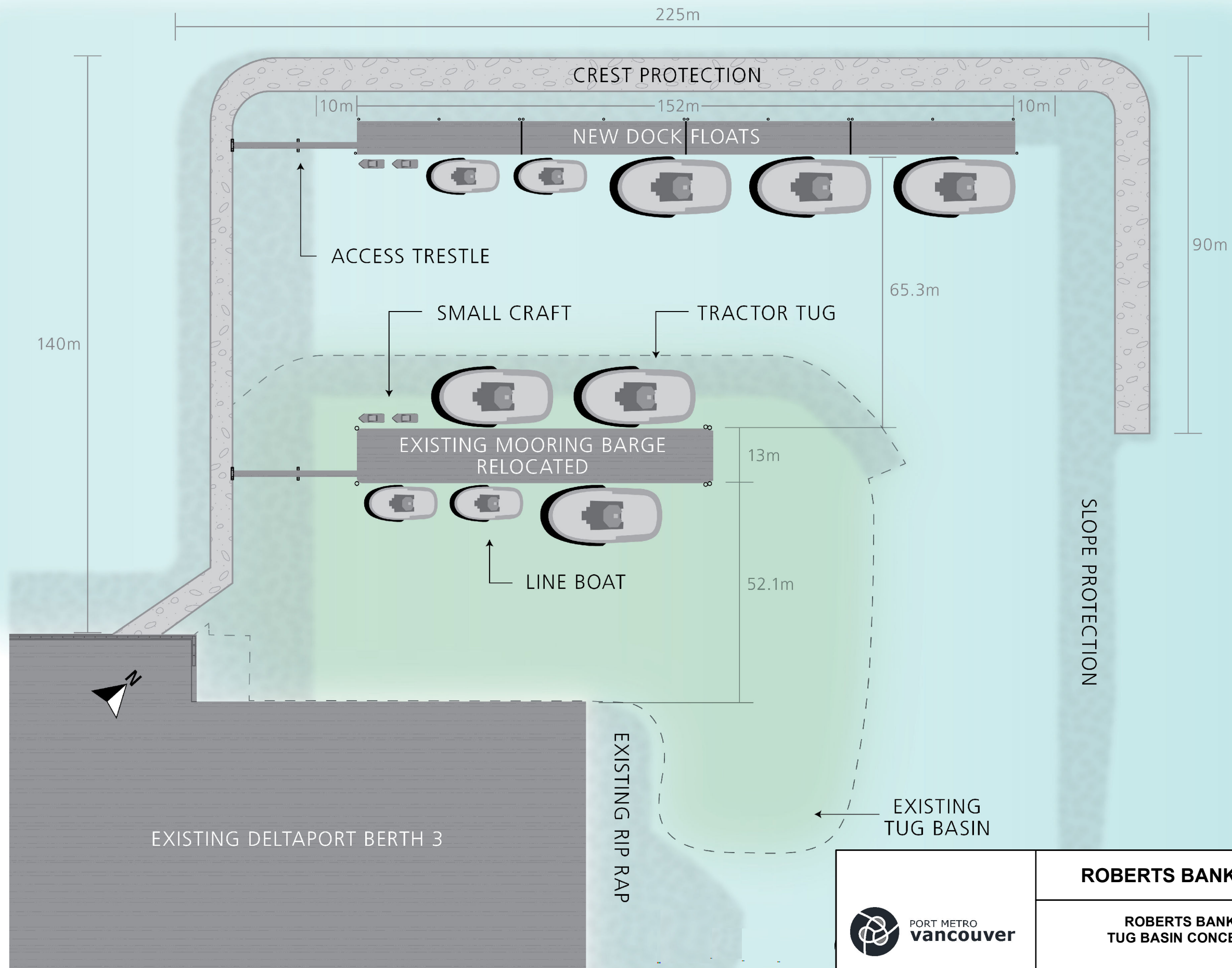


- Additional Components Found Across Terminal**
- CCTV cameras
 - High and Low Mast lighting
 - Civil utility systems - supply of potable and fire protection water, collect and discharge storm-water, and treat and discharge sanitary sewage.

Notes:
Locations and dimensions approximate **NAD 1983 UTM Zone 10N**



	ROBERTS BANK TERMINAL 2	
	CONCEPTUAL PLAN VIEW OF TERMINAL LAYOUT	
	DATE: SEPTEMBER 2013	FIG No. 5.0



ROBERTS BANK TERMINAL 2

ROBERTS BANK TERMINAL 2 TUG BASIN CONCEPTUAL DESIGN

DATE: SEPTEMBER 2013

FIG No. 6.0

PROJECT PHASES AND SCHEDULING

The schedule for the Project construction phase and start of operations will depend, in part, on the schedule of the EA and review process and subsequent environmental approvals, permits, and market conditions. The approximate duration of the Project phases is anticipated to be as follows:

- **Construction:** Approximately six years;
- **Operations:** It is anticipated that partial operations could start approximately four years after construction starts, with full operations starting six years after commencement of construction; and
- **Decommissioning and Abandonment:** There are no plans to decommission and abandon the Project. The land will remain in perpetuity and its future use will be subject to applicable permitting and regulatory requirements.

The schedule anticipated from receipt of approvals to the beginning of operations is shown in **Figure 7.0**. This figure shows the principal construction activities.

Figure 7.0 Anticipated Project Construction Schedule Including Key Activities

Activity	Years of Construction					
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Terminal Dyking	■	■	■	■	■	
Fill Material Stockpiling	■	■	■	■	■	
Dredging of Berth Pocket and Caisson Trench		■	■	■	■	
Caisson Foundation & Wharf Construction		■	■	■	■	
Terminal Fill and Preloading		■	■	■	■	
Terminal Infrastructure		■	■	■	■	■
Causeway Dyking	■	■	■	■	■	
Causeway Fill, Ground Improvement and Preloading		■	■	■	■	
Causeway Infrastructure		■	■	■	■	■
Tug Basin Expansion		■	■	■	■	

SUMMARY OF OPERATIONS ACTIVITY

Terminal operations will involve berthing and mooring vessels at the three-berth wharf. On the terminal, ship-to-shore gantry cranes will transfer containers between ships and the wharf.

Containers will be moved from the wharf to either the container yard or the intermodal yard (IY) via mobile transfer equipment. Containers will be stacked in the container yard for storage using electrically powered stacking cranes (or similar equipment). The container yard will contain special access platforms for storage of refrigerated containers and their required electrical plug-in.

From the container yard, the containers move to the rail IY *via* mobile transfer equipment. Rail tracks will accommodate several strings of rail cars. Electric rail-mounted gantry cranes (or similar equipment) will be used to transfer containers to and from railcars. Alternatively, containers will be loaded to/from truck chassis for road transport.

General railcar maintenance will be performed in the IY. Railcar storage for incoming and outgoing trains will be on the causeway. Light locomotive maintenance and refueling *via* tanker truck will all occur on the causeway in the Distributed Power Setout Yard.

Tugs will be moored in the expanded tug basin with other support boats to serve all of the Roberts Bank terminals. Throughout operations, maintenance activities will be performed as required. Support facilities including administrative buildings and employee parking areas, will also operate on the terminal.

ENVIRONMENTAL ASSESSMENT REQUIREMENTS

The Project may require approvals pursuant to the following federal and provincial Acts:

- *Canadian Environmental Assessment Act, 2012*, administered by the Canadian Environmental Assessment Agency; and
- *BC Environmental Assessment Act*, administered by the BC Environmental Assessment Office.

The Project is expected to require approvals under *CEAA 2012* because it involves the construction of a marine terminal designed to handle vessels larger than 25,000 deadweight tonnes (DWT) to be located on lands not routinely or historically used as a marine terminal or designated for such use in a land use plan that has been the subject of public consultation (Section 27(c) of the *Regulations Designating Physical Activities*).

It is understood that the Project is not located in an area that has been subject to federal regional environmental studies, as described in the *Guide to Preparing a Description of a Designated Project under the Canadian Environmental Assessment Act, 2012* (CEA Agency 2012). However, the Fraser River estuary has been the subject of numerous environmental studies during the past few decades, and is therefore, supported by a large body of contemporary information that will inform an assessment of the Project.

Approvals may also be required under BCEAA because the Project is a new marine port facility, which will require dredging and filling of more than 2 ha of submerged land (*Reviewable Projects Regulation*, (Part 8, **Table 14**, # 4)).

LAND OWNERSHIP – FEDERAL AND PROVINCIAL LANDS

The current ownership of Project lands and legal land ownership descriptions are provided in **Figures 8.0** and **9.0**, respectively. Approximately, 117 ha of the Project will be constructed on federal lands managed by PMV. Approximately 52 ha of the Project will be constructed on submerged lands that are currently provincial Crown lands with no zoning designation. PMV has expressed an interest to the Province of BC to access these lands. It is not anticipated that a tenure agreement will be finalized until after completion of the EA process.

A portion of lands owned by BCR will be required for the causeway widening and construction of the overpass. PMV will negotiate an agreement with BCR for the transfer or use of these lands.

Figure 10.0 shows all federal lands in the Southern Gulf and Lower Mainland.

Federal Involvement – Financial Support and Legislative Requirements

The Project will be developed by PMV through private funding and commercial arrangements. The Project currently does not rely on federal or provincial government funding sources.

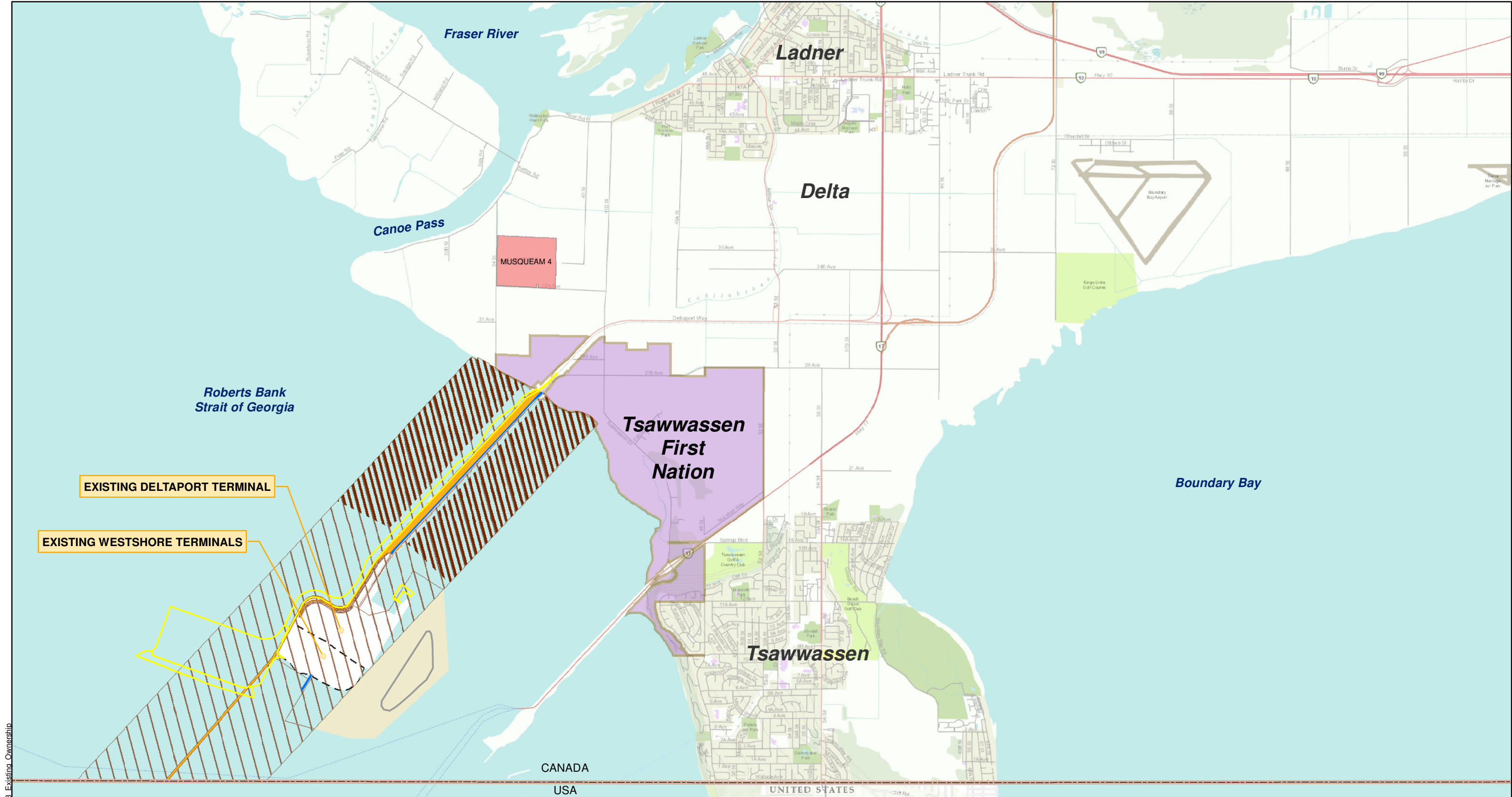
ANTICIPATED PERMITS, APPROVALS, AND AUTHORISATIONS

In addition to the expected requirement for approval under *CEAA 2012* and *BCEAA*, the Project may require the environmental permits and approvals summarised in **Table 2**. PMV will apply for provincial permits which may be required concurrently with the *BCEAA* process.

Table 2 Potential Federal Permits, Approvals and Authorisations

Act	Permit/Approval	Permitted/Approved Activity	Roberts Bank RBT2 Effect
Federal			
<i>Fisheries Act</i> Subsection 35 (2)(b)	Harmful Alteration, Disruption, or Destruction (HADD) Authorisation	Alteration, destruction or disturbance of fish habitat in accordance with terms and conditions in the authorisation, issued by Fisheries and Oceans Canada (DFO).	Potential loss of fish and fish habitat – terminal/causeway footprint and indirect effects (coastal processes).
<i>Fisheries Act</i> Subsection 32	Authorisation	No person shall kill fish by any means other than fishing, in accordance with terms and conditions in the authorisation, issued by DFO.	Potential mortality of fish.
<i>Canadian Environmental Protection Act, 1999</i> Part 7, Division 3	Disposal at Sea Permit	Loading of dredge material from site, and disposal of material at an approved site, in accordance with permit requirements and conditions.	Disposal at sea (DAS) of dredged materials.
<i>Species at Risk Act (SARA)</i> , Section 73(1)	Permit	Authorises activities affecting listed wildlife species, or species' critical habitat or residences.	Construction and operation within southern resident killer whale (SRKW) critical habitat. A SARA permit may be required.
<i>Navigable Waters Protection Act</i> Section 5	Approval	Minister's prior approval for work built or placed in, on, over, under, through, or across any navigable water.	Construction of works within navigable waters.

Document Name: 00719-00-GIS-6054 Figure8 Existing Ownership



Legend

BOUNDARY OF PROJECT AREA

TRANSFER PIT

US-CANADA BORDER

FIRST NATIONS RESERVE

TFN LANDS

BC RAIL

CROWN FEDERAL

CROWN FEDERAL TO BE TRANSFERRED, ASSIGNED OR SUBLEASED TO TSAWWASSEN FIRST NATION

CROWN PROVINCIAL (SURVEYED)

CROWN PROVINCIAL (UNSURVEYED)

CROWN PROVINCIAL (MOTI)

N

05001,000

Metres

1:50,000

NAD 1983 UTM Zone 10N

PORT METRO

vancouver

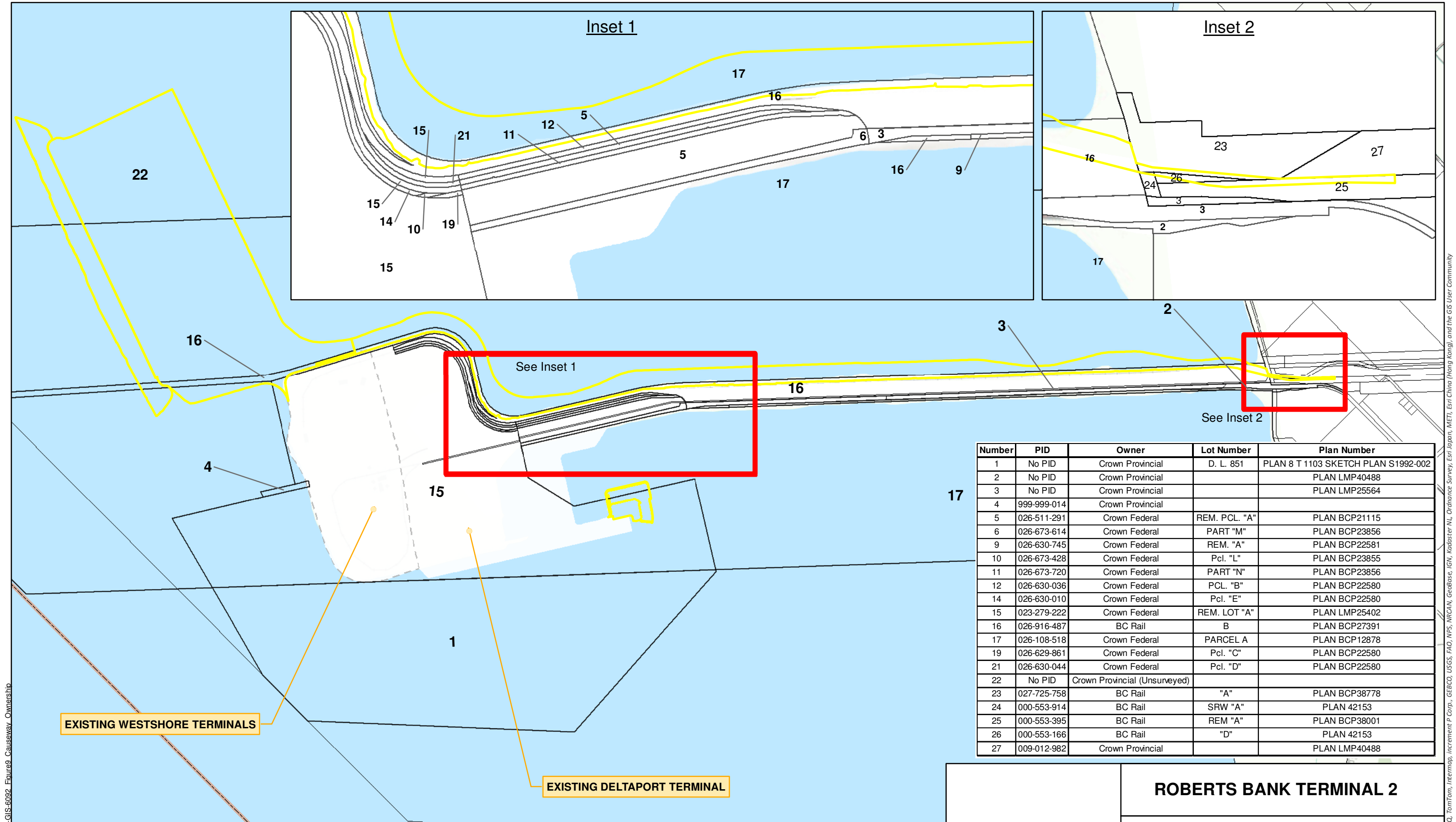
ROBERTS BANK TERMINAL 2

EXISTING OWNERSHIP

DATE:SEPTEMBER 2013

FIG No.8.0

Sources: Esri, Delorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community



Document Name: 00719-00-GIS-6092_Figure9_Causeway_Ownership

Sources: Esri, Delorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

Legend

BOUNDARY OF PROJECT AREA

LOT BOUNDARY

Notes:
Missing numbers in table correspond to parcels at Tsawwassen Terminal which is not shown on this plan.
Lot lines and owner information from PMV drawing s2012-164.
Lot information should be confirmed.

0250500

Metres

1:18,000

NAD 1983 UTM Zone 10N



ROBERTS BANK TERMINAL 2

LEGAL DESCRIPTION OF PROJECT LAND OWNERSHIP

DATE:

SEPTEMBER 2013

FIG No.

9.0

Number	PID	Owner	Lot Number	Plan Number
1	No PID	Crown Provincial	D. L. 851	PLAN 8 T 1103 SKETCH PLAN S1992-002
2	No PID	Crown Provincial		PLAN LMP40488
3	No PID	Crown Provincial		PLAN LMP25564
4	999-999-014	Crown Provincial		
5	026-511-291	Crown Federal	REM. PCL. "A"	PLAN BCP21115
6	026-673-614	Crown Federal	PART "M"	PLAN BCP23856
9	026-630-745	Crown Federal	REM. "A"	PLAN BCP22581
10	026-673-428	Crown Federal	Pcl. "L"	PLAN BCP23855
11	026-673-720	Crown Federal	PART "N"	PLAN BCP23856
12	026-630-036	Crown Federal	PCL. "B"	PLAN BCP22580
14	026-630-010	Crown Federal	Pcl. "E"	PLAN BCP22580
15	023-279-222	Crown Federal	REM. LOT "A"	PLAN LMP25402
16	026-916-487	BC Rail	B	PLAN BCP27391
17	026-108-518	Crown Federal	PARCEL A	PLAN BCP12878
19	026-629-861	Crown Federal	Pcl. "C"	PLAN BCP22580
21	026-630-044	Crown Federal	Pcl. "D"	PLAN BCP22580
22	No PID	Crown Provincial (Unsurveyed)		
23	027-725-758	BC Rail	"A"	PLAN BCP38778
24	000-553-914	BC Rail	SRW "A"	PLAN 42153
25	000-553-395	BC Rail	REM "A"	PLAN BCP38001
26	000-553-166	BC Rail	"D"	PLAN 42153
27	009-012-982	Crown Provincial		PLAN LMP40488

Legend

-  US-CANADA BORDER
 FEDERAL LAND
 FIRST NATIONS RESERVE

Notes:

Federal Lands shown represent military facilities, coastguard stations, historic sites, parks, postal facilities, border crossings and other Government facilities and offices.

Federal Lands shown reflect information supplied by The Treasury Board of Canada. This data may be incomplete and should be checked for accuracy.

1:200,000

NAD 1983 UTM Zone 10N



Strait of Georgia

PROJECT LOCATION

CANADA

USA

UNITED STATES

ROBERTS BANK TERMINAL 2

FEDERAL LANDS IN SOUTHERN GULF AND LOWER MAINLAND

DATE: **SEPTEMBER 2013**

FIG No. **10.0**

PORT METRO
vancouver

ENVIRONMENTAL SETTING

Land Use and Status

The Project Area is substantially west and seaward of the high-water mark on the Roberts Bank morphological unit within the Fraser River estuary and delta. Proximal to the Project Area are lands and waters that have status designated by provincial and federal statutes as described below.

Regional Parks and Ecological Conservancy Areas

Regional parks and ecological conservancy areas located in the vicinity of the Project are illustrated in **Figure 10.0**. Regional parks include:

- Boundary Bay Regional Park in Delta, located approximately 7 km east of the Project;
- Deas Island Regional Park in Delta, located approximately 10 km north east of the Project; and
- Burns Bog Ecological Conservancy Area in Delta, located approximately 14 km north-east of the Project.

Wildlife Management Areas

The following provincial Wildlife Management Areas (WMAs), established under Section 4 of the BC *Wildlife Act*, are located in the Fraser River estuary near the Project Area¹. They include:

- Sturgeon Bank WMA, approximately 13 km north of the Project;
- Roberts Bank WMA, directly to the north of and adjacent to the Project;
- Boundary Bay WMA, located approximately 9 km east of the Project; and
- South Arm Marshes WMA, located approximately 9 km north of the Project.

These WMAs were established to conserve critical, internationally significant habitat for year-round migrating and wintering waterfowl populations, along with important fish and marine mammal habitat, and critical habitat for shorebirds, raptors, songbirds, and small mammals.

Federal Protected Areas

National Wildlife Areas

National Wildlife Areas (NWAs) were established through the *Wildlife Area Regulations* of the *Canada Wildlife Act* for the purposes of wildlife conservation, research, and interpretation. The Alaksen NWA, designated in 1972, is located approximately 9 km north of the Project Area in the Fraser River delta, between the Roberts Bank WMA and the South Arm Marshes WMA (**Figure 11.0**). The Alaksen NWA

¹ The distances to nearby WMAs are calculated as a direct line from the centre of the terminal to the closest boundary of the WMA.

comprises cultivated farmland, remnant wetlands, estuarine habitats, riparian forests, grassland, and urbanised zones. Due to its global significance as a migration stop-over and wintering area for a large number of migratory birds along the Pacific coast, the Alaksen NWA has also been designated as an Important Bird Area², a Ramsar Site³ (No. 243) (Environment Canada 2011), and located within the Fraser River Estuary Western Shorebird Reserve Network site. A section of Alaksen NWA overlaps with the George C. Reifel Migratory Bird Sanctuary (MBS), which is protected by regulations under the *Migratory Birds Convention Act, 1994*. This MBS is also part of the Fraser River Estuary Western Hemisphere Shorebird Reserve Network (Western Hemisphere Shorebird Reserve Network 2009).

Southern Resident Killer Whale Critical Habitat

Southern Resident Killer Whale (SRKW) critical habitat was identified in the *Recovery Strategy for the Northern and Southern Resident Killer Whales (Orcinus orca) in Canada* posted in March 2008 on the *Species at Risk Act (SARA)* Public Registry (DFO 2008). The southern Strait of Georgia was officially designated as SRKW critical habitat by regulation, effective February 2009, as shown in **Figure 11.0**.

Marine Biophysical Setting

The three main physical components of the outer Fraser River delta include the intertidal zone, the subtidal zone, and the delta foreslope. The intertidal zone is from the high-water mark to 0 m; the subtidal zone extends from 0 m to -3 m; the delta foreslope drops from the edge of the subtidal zone at 3 m chart datum (CD) to the ocean floor at -80 m (**Figure 12.0**).

The physical marine environment is influenced by tides, wind, and waves. Tidal current velocities result in net sediment transport to the north within the Project Area. As tidal flow in the Strait of Georgia encounters the shallower portions of the Fraser River delta, flow direction changes and becomes perpendicular to the depth contours of the tidal flats.

Roberts Bank is characterised as a diverse ecosystem that supports biofilm, eelgrass beds, and intertidal marshes in areas shown in **Figure 13.0**. These estuarine habitats support infaunal invertebrate species, which in turn sustain numerous species of shellfish, crustaceans, fish, and birds throughout their life-cycle. The Fraser River Estuary (encompassing Roberts Bank, Sturgeon Bank, and Boundary Bay) supports large numbers of resident, migrating, and/or wintering birds. The Strait of Georgia (also known as the Salish Sea) supports several marine mammal species, including seals and sea lions (*pinnipeds*), toothed whales, dolphins and porpoises (*odontocetes*), and baleen whales (*mysticetes*).

² The Fraser River estuary is designated as an Important Bird Area by Birdlife International.

³ Ramsar sites are wetlands of international significance, designated under the Ramsar Convention.

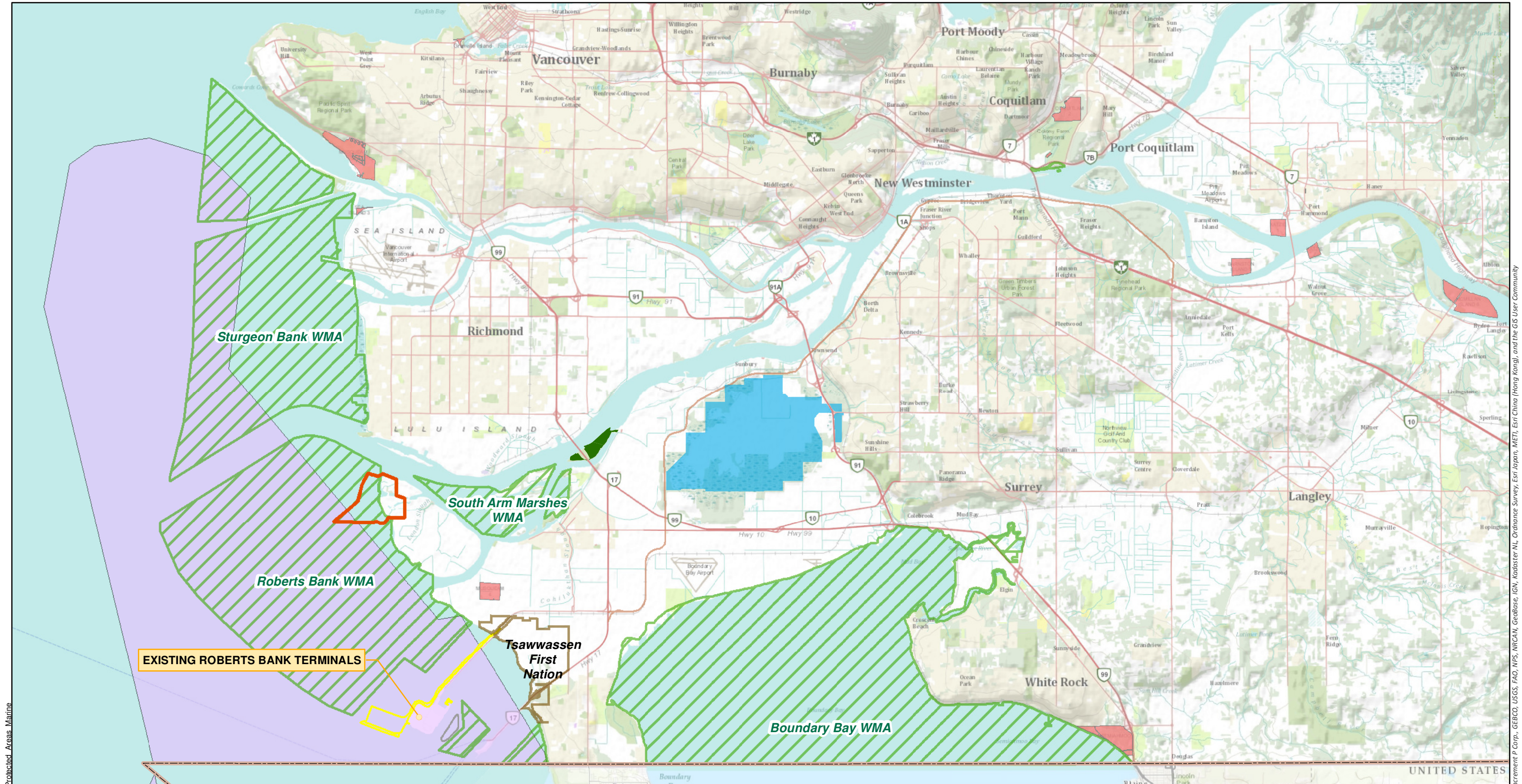
Additionally, the Roberts Bank area provides eelgrass, biofilm, mudflat, and intertidal marsh habitat for coastal birds to forage, rest, roost, and breed. Coastal birds include shorebirds, waterbirds, herons, diving birds, and gulls and terns.

Terrestrial Environment

The Project includes a rail tie-in of a lead track to the BCR rail network, equating to an area of approximately 1 ha within the BCR lands above the high-water mark. The region surrounding the rail tie-in incorporates numerous transportation corridors, including Highway 17 (SFPR)⁴, Highway 17A⁵, Highway 91, Highway 99 and Deltaport Way, the Roberts Bank Rail Corridor and numerous rural roads, and two active commercial and recreational airports. Land use in the region is primarily agricultural or urban/residential, and consequently little native vegetation remains. The dominant vegetation consists of agricultural crops, roadside grass swales, occasional hedgerows, and small stands of trees. Habitat for wildlife in the region includes farm fields, old-fields, shrub land, hedgerows, and ditch-like watercourses.

⁴ SFPR was renamed Highway 17 December 1, 2012.

⁵ Hwy 17A is the former Hwy 17 prior to the development of the South Fraser Perimeter Road.



Document Name: 00719-00-GIS-6055_Figure11_Protected Areas Marine

Legend

BOUNDARY OF PROJECT AREA

TRANSFER PIT

US-CANADA BORDER

FIRST NATIONS RESERVE

WILDLIFE MANAGEMENT AREA (WMA)

GEORGE REIFEL BIRD SANCTUARY

SOUTHERN RESIDENT KILLER WHALE CRITICAL HABITAT

DEAS ISLAND REGIONAL PARK

BURNS BOG ECOLOGICAL CONSERVANCY AREA

N

024

Kilometres

1:150,000

NAD 1983 UTM Zone 10N

Strait Of Georgia

PORT METRO
vancouver

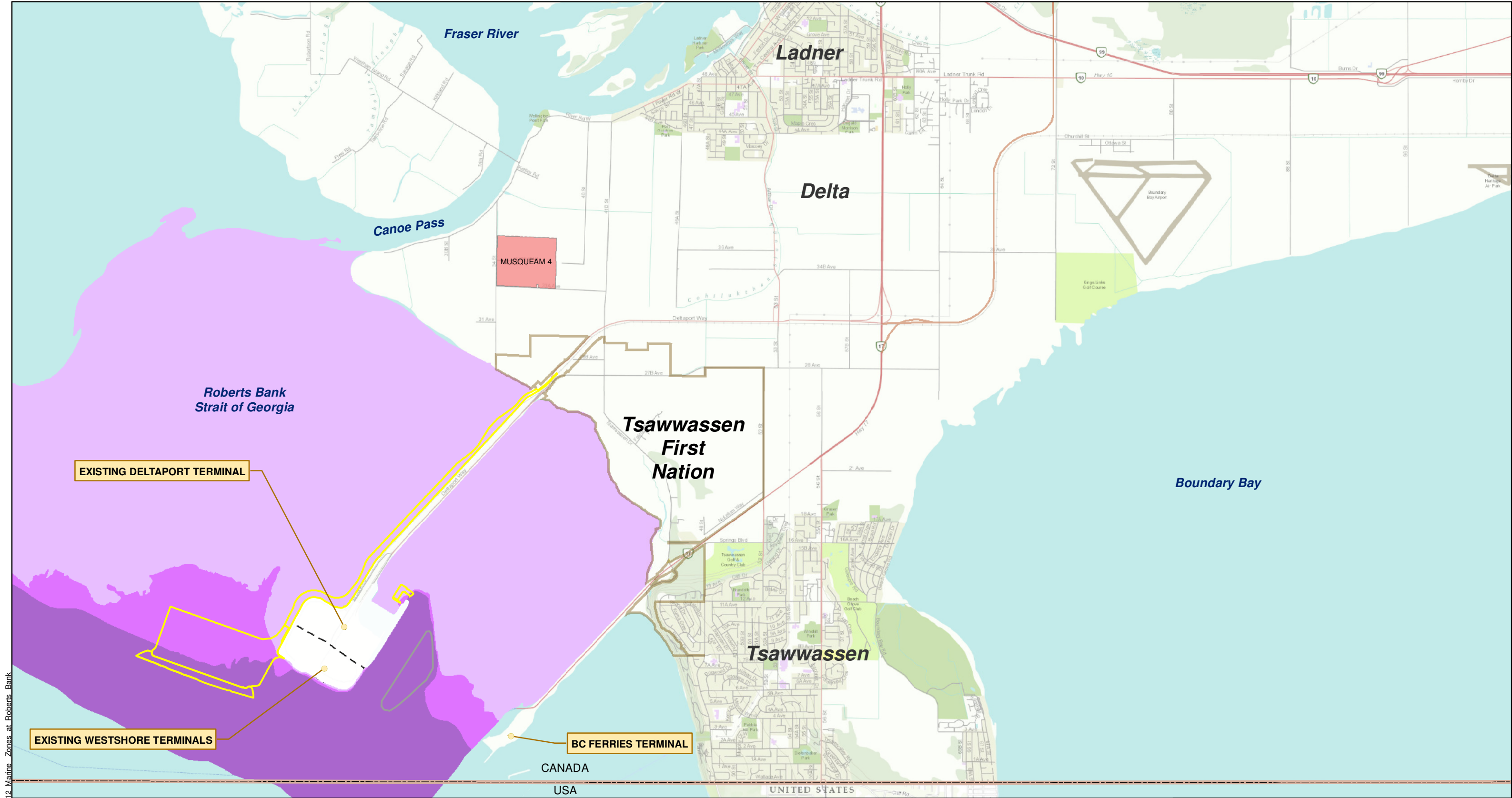
ROBERTS BANK TERMINAL 2

PROTECTED AREAS AT ROBERTS BANK

DATE:SEPTEMBER 2013

FIG No.11.0

Sources: Esri, DeLorme, NAVTEQ, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community



Legend

BOUNDARY OF PROJECT AREA

TRANSFER PIT

US-CANADA BORDER

FIRST NATIONS RESERVE

INTERTIDAL ZONE: HIGH WATER MARK to 0m

SUBTIDAL ZONE: 0m to -3m

DELTA FORESLOPE: -3m to -80m

Notes:

Location of 0m based on Lidar and CHS Chart 3492

Delta Foreslope shown to approx -80m

Locations approx.

N

0 500 1,000

Metres

1:50,000

NAD 1983 UTM Zone 10N

PORT METRO

vancouver

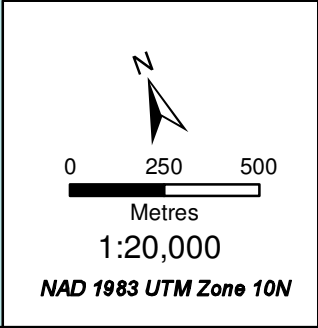
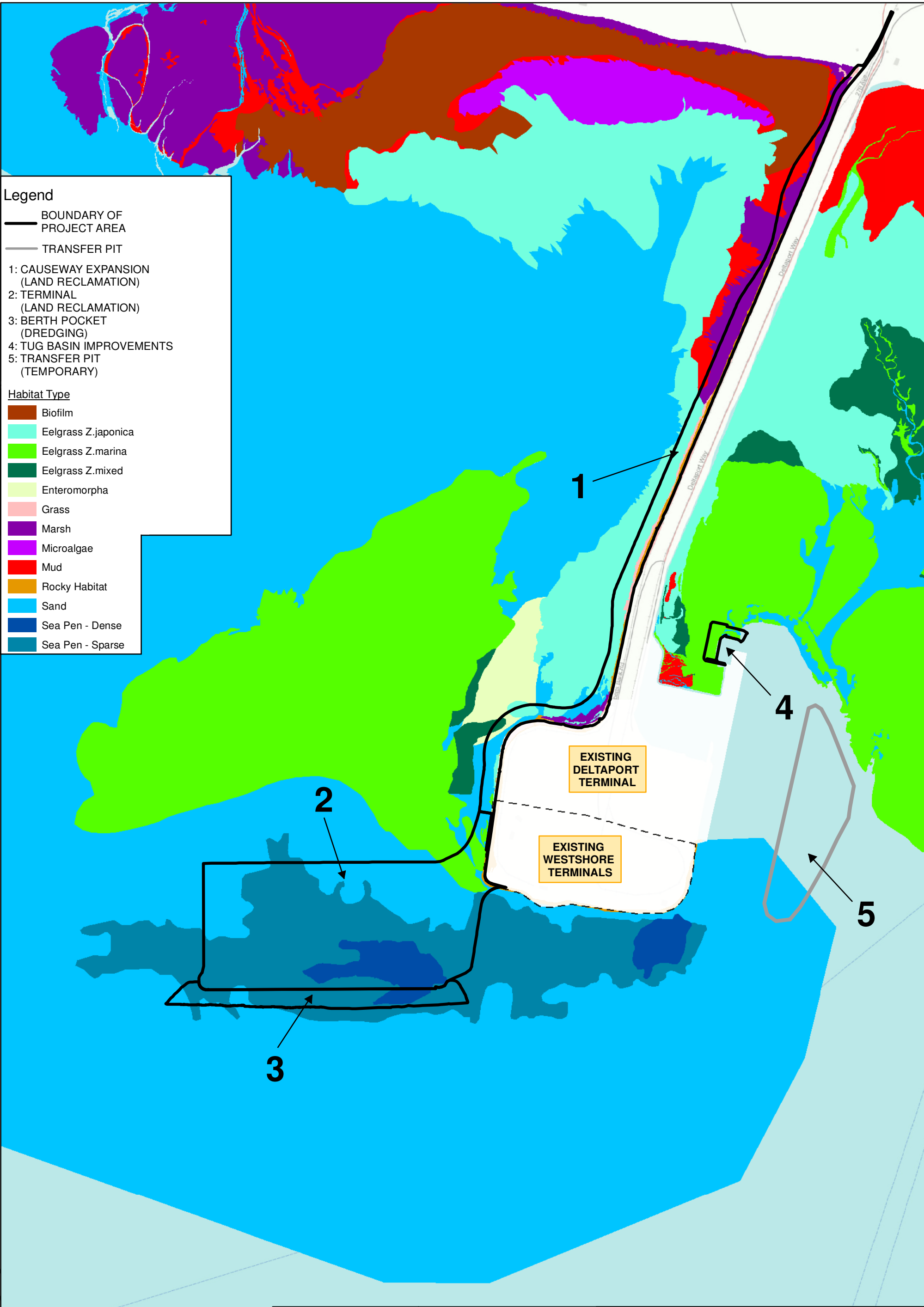
ROBERTS BANK TERMINAL 2

PHYSICAL MARINE ENVIRONMENT

DATE: SEPTEMBER 2013

FIG No. 12.0

Sources: Esri, Delorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community



ROBERTS BANK TERMINAL 2	
EXISTING KNOWLEDGE OF MARINE HABITAT ZONES SURROUNDING THE PROJECT	
DATE: SEPTEMBER 2013	FIG No. 13.0

SOCIO-ECONOMIC SETTING

Local Communities

The closest residential communities to the Project area are the Tsawwassen First Nation (TFN), the Corporation of Delta, the City of Richmond, the City of Surrey, and the City of Langley. **Table 3** outlines these communities and their proximity to the Project.

Table 3 Proximity of Local Communities to the Project

	Community	Population (residents) ¹	Distance from Project (km)
<i>First Nation</i>	Tsawwassen First Nation Treaty Lands	168	Adjacent to Project Area
<i>Corporation of Delta</i> ²	Tsawwassen	21,000	6.2 E
	Ladner	22,000	11 NE
	North Delta	51,000	18 NE
<i>Other Nearby Communities</i> ³	Richmond	190,000	16 N
	Surrey	468,000	27 NE
	Langley	25,000	39 E
	Township of Langley	104,100	40 E

Note: ¹ Tsawwassen First Nation, 2013; Statistics Canada 2006; City of Richmond, 2007; City of Surrey 2012; City of Langley 2013;

² Distances to residential areas within the Corporation of Delta are calculated as a direct line (as the crow flies) from the centre of the terminal to the closest residentially zoned (RS1) property.

³ Distances to cities outside of the Corporation of Delta are calculated as a direct line (as the crow flies) from the centre of the proposed terminal to each community City Hall.

The closest permanent residences to the Project are the TFN, whose treaty lands are adjacent to the Project Area. The TFN community is located on approximately 290 ha of land along the shore of Roberts Bank, between the BC Ferries Tsawwassen Terminal and the Roberts Bank terminals complex.

Within the Corporation of Delta, the Roberts Bank Rail Corridor and Highway 17 are key transportation routes for goods moving to and from port facilities in Delta. Direct employment from port-related industry accounts for 3,300 jobs in Delta and more than \$690 million in economic output (InterVISTAS 2012). Richmond's economy supports more than 135,000 jobs in a variety of sectors and 5,200 direct jobs from port-related activities. Facilities within Richmond's logistics hub and other types of port-related industries along the Fraser River contribute \$870 million in economic output (InterVISTAS 2012). Port-related industries contribute approximately 1,800 jobs and over \$500 million in economic output to the City of Surrey, which is home to many port-related facilities along the Fraser River (InterVISTAS 2012). The City of Langley and the Township of Langley are eastern neighbours to the City of Surrey.

Transportation

Roberts Bank is an established trade gateway for the transfer of cargo from and to ships, trains, and trucks, and is well positioned to accommodate future growth in trade activity. Competitive advantages include proximity to major transportation corridors such as Highways 17, 91 and 99, and Nordel Way. Traffic congestion is known to occur on these roads, in particular on Highway 99 through the Massey Tunnel, River Road, and Highway 17A between Ladner and the Highway 99 Junction.

Several initiatives are currently underway to reduce traffic congestion in the area. When the \$1.26 billion SFPR (Highway 17) is completed by the end of 2013, container trucks departing from Deltaport will reduce congestion by rerouting from Highway 17A and from Highway 10 west of Highway 91 onto the new highway. The \$360 million Roberts Bank Rail Corridor Program (which includes one road network improvement project and eight overpasses in Delta, Surrey, the City of Langley, and the Township of Langley) will separate road and rail traffic, thus improving safety, easing community connections, and reducing train whistling. On September 28, 2012, the Premier of BC also announced plans to engage local governments in initial discussions on a replacement for the George Massey tunnel.

Air Quality and Noise Conditions

Metro Vancouver and the Fraser Valley Regional District operate a network of 26 air quality monitoring stations in the Lower Fraser Valley (LFV). The stations monitor a variety of gaseous emissions including greenhouse gases (GHGs), nitrogen oxides (NO and NO₂), sulphur dioxide (SO₂), carbon monoxide (CO), ozone (O₃), speciated volatile organic compounds (VOCs) in some locations, as well as particulate matter (PM₁₀ and PM_{2.5}).

Various noise studies have been conducted in and around the Project Area during the past few decades. These noise studies indicated that the Project Area and adjacent areas are currently subject to noise emissions from existing port operations, road traffic, rail traffic from the BC Rail line, and from the BC Ferries causeway and terminal. The primary source of noise from Roberts Bank derives from trains (locomotives, wheel/rail noise, coupling), ship operations, and port and terminal operations, such as container gantry crane movement, and vehicles entering and exiting the port.

POTENTIAL EFFECTS

It is anticipated that potential biophysical effects resulting from the Project will be limited primarily to federal and provincial Crown lands in the vicinity of Roberts Bank, with some effects potentially detectable in United States (US) marine waters and at Point Roberts in Washington State.

In October 2012, PMV initiated the formation of four Technical Advisory Groups (TAGs). Members of the TAG included representatives from Environment Canada, Fisheries and Oceans Canada (DFO), academia, non-governmental organisations (NGOs), and relevant technical consulting firms, including

both Canadian and international experts. Meetings were initiated in October 2012 and are expected to continue until the formal initiation of the EA process for the Project. Meetings were facilitated by an independent and neutral facilitator (an outside contractor retained by PMV) and focussed on key environmental components that may be affected by the Project. The goals of the TAGs were to:

- Establish a common understanding of best science;
- Identify new studies to fill existing data gaps;
- Identify collaborative partnerships on issues of common interest; and
- Explore technical issues at the pre-regulatory phase.

Over the course of three to four meetings, each TAG reviewed existing information and field study work plans, identified priority information needs and appropriate methods of effects assessment, and made recommendations to PMV to help support a high-quality EA for the Project.

Furthermore, during the EA process, environmental, socio-economic, heritage, and health studies will be advanced from baseline work to effects assessment, and measures to avoid or mitigate potential effects will be identified. There will be additional opportunities for consultation and input by First Nations, the public, and stakeholders.

An overview of potential Project effects are described in the following sections.

MARINE ENVIRONMENT

The majority of the bio-physical effects potentially resulting from the Project will occur in the marine environment.

Operations activities will result in additional marine vessel berthing activity (increased underwater noise, ship wakes, and propeller/thruster currents), additional surface infrastructure (overhead structures and lighting) and vehicles, treated sewage and storm water effluent discharges, increases in noise and air contaminants, and possibly accidental spills and leaks from ships.

Coastal Geomorphology and Water and Sediment Quality

Dredging, construction of containment dykes, placement of fill and caissons, ship wakes, and propeller/thruster currents may physically alter the tidal flats and delta foreslope in the immediate area of the Project. Indirect effects beyond the Project Area may be associated with changes to the characteristics of existing processes and physical environment which could include, changes in tidal flows and patterns, formation or modification of tidal channels, changes in sediment deposition and erosion, scour induced by modified waves and tidal currents near the Project, and the formation of a wave shadow over the part of the tidal flats.

Underwater Noise

Underwater noise from the Project has the potential to elevate ambient sound levels currently produced in the area due to construction activities (densification) and ship berthing activities during operations.

Potential effects from underwater noise include temporary displacement (e.g. avoidance) and auditory interference of fish and marine mammals primarily.

Marine Vegetation

Project-related effects from construction activities may include direct and indirect mortality of vegetation species (e.g. a variety of salt marsh species, eelgrass and sea lettuce), and alterations in species distribution and composition. Operations activities are unlikely to have direct effects (e.g. direct mortality or change in spatial extent) on marine vegetation, but changes in water and sediment (movement and/or quality) may result in indirect effects (e.g. changes in conditions for growth of marine vegetation). It should be noted that the presence of infrastructure in the marine environment is not necessarily detrimental to marine vegetation communities and, in some cases, may improve habitat quality and/or availability.

Marine Invertebrates

Project interactions with marine invertebrates (e.g. marine worms, bivalve shellfish, and small crustaceans) may cause potential environmental effects such as:

- Direct mortality and physical damage to eggs, larvae, juveniles and adults;
- Direct loss of habitat including decreased spawning and rearing habitat;
- Increased contaminant uptake and bioaccumulation;
- Modification of natural movements; and
- Alterations in species distribution and composition.

Marine Fish

Construction and operations activities may permanently or temporarily alter or fragment fish habitat, leading to direct or indirect fish mortality, disturbance, and/or displacement. Project-related effects could potentially reduce the ongoing productivity for individual fish species. There is also the potential for predator-prey interactions to be affected by construction and operations activities.

Studies will be carried out to assess the potential effects on marine fish and fish habitat.

Marine Mammals

Potential effects of Project construction and operations activities on marine mammals are anticipated to be:

- Direct loss of marine habitat within the Project footprint;
- Disruption of natural behavior of SRKWs, baleen whales or pinnipeds, or their main prey (salmon) from increased underwater noise, reducing their ability to locate prey;
- Increased strikes from marine vessels; and
- Increased contaminant uptake and bioaccumulation in marine mammals resulting from sediment re-suspension.

Studies will be carried out to support the assessment of these effects on marine mammals.

Coastal and Migratory Birds and Waterfowl

Direct and indirect Project-related effects on coastal birds may include:

- Direct loss of intertidal foraging habitats;
- Indirect effects to intertidal food sources;
- Increased mortality from collisions;
- Increased predation risk and associated mortalities from raptors;
- Habitat loss or alteration surrounding the Project footprint; and
- Sensory disturbance.

Studies will be carried out to support the assessment of these effects on coastal birds and waterfowl.

TERRESTRIAL ENVIRONMENT

The Project is not expected to affect terrestrial wildlife and vegetation nor freshwater fish and their habitat. Coastal birds and water fowl will be assessed as noted above.

POTENTIAL TRANSBOUNDARY EFFECTS

Some Project-related effects may be potentially detectable in US marine waters and at Point Roberts in Washington State. They include:

- Air quality at Point Roberts – primarily during operations;
- Airborne noise at Point Roberts – during construction and operations;
- Underwater noise from soil densification and pile driving during construction;
- Underwater noise from ship berthing – during operations;

- Possible changes to the visual landscape including lighting at the facility for residents on the west side of Point Roberts close to the shoreline;
- Accidental spills and leaks, in the marine environment, from construction and operations equipment and activities;
- Marine sediment dispersion – during construction dredging activity;
- Possible indirect effects on fish and migratory birds could relate to changes in water and sediment quality from RBT2 which could in turn affect marine vegetation and environmental conditions required for survival; and
- Possible direct and indirect effects on marine mammals during construction and operations (e.g. collisions with project related vessels and effects on prey, respectively).

The potential for these effects to be detected on US territory will be included in the EA.

POTENTIAL DISCHARGES AND WASTES

Wastes produced during the construction and operations phases of the Project may include the following:

- Surplus dredged material;
- Non-hazardous solid waste;
- Batteries;
- Ozone depleting substances (e.g. fire suppressants and refrigerants)
- Used oil filters, used absorbent materials, and antifreeze; and
- Waste oil, petroleum products, and solvents.

Waste produced during construction and operations will either be disposed of in accordance with applicable regulations, or will be reused and recycled where feasible.

POTENTIAL SOCIO – ECONOMIC EFFECTS

Potential Heritage and Archaeological Effects

Numerous archaeological investigations have taken place in the Project Area in response to infrastructure development during the past 50 years. These investigations suggest that the potential for effects of the Project on archaeological resources is low.

First Nations have indicated a strong interest in ensuring that any traditional use sites within the Project Area are protected, and PMV will continue to collaborate with potentially affected First Nations in this regard.

Mitigation measures and standard practices to reduce potential effects on heritage and archaeological resources will be developed and described during the EA process for the Project.

Potential Health Effects

Potential health effects associated with the Project relate to potential accidents and malfunctions; potential changes to air quality and noise levels and potential uptake of contaminants into edible shellfish.

Potential accidents and malfunctions during construction and operations that could affect human health include those related to worker travel and equipment mobilisation (traffic accidents, transportation of dangerous goods); ship operations (collisions); equipment failure; spills and leaks (fueling); and overall health and safety (major accident or death).

Air Quality

The focus for air emissions studies associated with Project-related construction and operations activities (e.g. Marine vessels, cargo handling equipment, locomotives, on-road vehicles) include:

- 1) Common air contaminants such as nitrogen dioxide (NO₂), carbon monoxide (CO), sulphur dioxide (SO₂), hydrocarbons (HC), total suspended particulate matter (PM), inhalable particulate matter (PM₁₀), and respirable particulate matter (PM_{2.5});
- 2) Selected mobile source air toxins which have been determined to be of significance to human health such as acetaldehyde, acrolein, benzene, 1,3-butadiene, diesel particulate matter, formaldehyde and naphthalene; and
- 3) Compounds related to climate change issues including greenhouse gases such as carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and black carbon.

Noise

Noise generated during the construction and operations phases of the Project may result in increases to ambient noise, low-frequency noise, and vibration levels within approximately 5 km to 6 km of the Project, which may affect some adjacent communities and wildlife. Construction-related activities that may result in a temporary increase in ambient noise include the use of heavy equipment and vehicles. Operations-phase activities that may result in increased ambient noise include operation of trains in the intermodal yard and on the causeway (e.g. running locomotives, wheel/rail noise, coupling); ship operations; and port and terminal operations, such as container gantry crane movement, as well as container trucks and employee vehicles entering and exiting the causeway and terminal.

Visual and Lighting

The Project will result in changes to the visual landscape from some viewpoints due to construction and operations activities, and the installation of temporary and permanent lighting at various locations in the Project Area. Visual (non-lighting related) changes during operations will be primarily associated with the new terminal. Additional vehicles, trucks, and trains travelling to and from the terminal will also contribute to the visual change.

Lighting changes during operations will be associated with the installation of new lighting on the terminal to support a safe working environment. Lighting is also required for security of both the public and property. Key changes to be assessed will include the visual effects on local residents and recreational uses in and around Roberts Bank.

Economic Benefits

Trade stimulates local, regional, and national economies, increases tax revenue for local municipalities and higher levels of government in BC, and increases the number of jobs for British Columbians and Canadians. Container handling activities currently generate more than 11,100 person-years of direct employment, while the handling and distribution of containerised cargo supports nearly 27,200 person-years of employment and generates \$2.6 billion in economic value. The tax revenues from trade activities support essential programs such as health care, education, and other social and environmental priorities.

The preliminary capital cost estimate for the Project is more than \$2 billion, though this estimate will be refined during the Project's final development and design. The Project will be developed by PMV based on private funding and commercial arrangements to maintain financial self-sufficiency within its mandate under the *Canada Marine Act*. The Project currently does not rely on federal or provincial government funding sources.

The Project will facilitate the demand for trade, thereby expanding economic growth and increasing employment opportunities during the construction and operations phases, all of which benefit the Metro Vancouver region, the province of BC, and Canada.

The economic benefits to Canada from the Project will include direct, indirect, and induced employment growth, gains in economic output/gross domestic product (GDP) plus increased government revenues during the construction period and throughout the Project's operating life cycle.

During the **six-year construction period** the following economic effects will be generated (Worley Parsons Canada 2012):

- Construction employment estimated at 2, 500 jobs over six years, estimated at \$690 million in wages;
- Indirect and induced employment estimated at 2, 000 jobs over six years, estimated at \$450 million in wages; and
- Direct, indirect, and induced employment totals at 4, 500 jobs for six years, estimated at \$1.14 billion in wages.

The construction phase will also result in approximately \$4.1 billion of total economic output to the Canadian economy, and approximately \$1.63 billion in resulting GDP, estimated at current price levels. The construction period will also contribute the following to government revenues:

- Federal taxes paid by construction employers and employees totalling approximately \$145 million;
- Provincial taxes paid by construction employers and employees totalling approximately \$177 million; and
- Municipal taxes paid by construction employers and employees totalling approximately \$28 million.

Once **operating at capacity**, the Project is estimated to generate the following economic benefits (WorleyParsons Canada 2012):

- Direct employment estimated at 9,200 jobs, with wages of approximately \$440 million per year;
- Indirect and induced employment estimated at 9,000 jobs, with wages of approximately \$180 million per year; and
- The above direct, indirect, and induced employment totals 18,200 jobs, with wages of approximately \$620 million per year.

The operations-phase increase in economic output for the Canadian economy is estimated at approximately \$3.1 billion per year, and the resulting Canadian GDP increase is estimated at approximately \$1.66 billion per year, based on current price levels.

During the operations phase of the Project, annual payments to the three levels of government are estimated to be as follows:

- Federal taxes paid by operating employers and employees totalling approximately \$126 million per year;
- Provincial taxes paid by operating employers and employees totalling approximately \$63 million per year; and
- Municipal taxes paid by operating employers and employees totalling approximately \$29 million per year (WorleyParsons Canada 2012).

ABORIGINAL ENGAGEMENT AND CONSULTATION

The First Nations groups listed below are those that are thought to have an interest in the Project based on asserted territories or treaty settlement lands, or those that may be affected by the Project based on its proposed design. Refer to **Figure 14.0** for First Nations Boundaries located in the vicinity of the Project. The scope and extent of consultation with each of these First Nation communities will vary with the scope of Aboriginal interests identified by them and the degree to which their respective interests may be

potentially affected by the Project. It is anticipated that the CEA Agency and/or BC EAO will provide additional input and guidance as to which groups will be consulted during the EA phase, as well as the level of consultation required.

The identified First Nations with whom PMV has initiated consultation and engagement activities are as follows:

- Tsawwassen First Nation;
- Musqueam Indian Band;
- Semiahmoo First Nation;
- Tsleil-Waututh Nation;
- Hul'qumi'num Treaty Group;
- Sto:lo Nation;
- Sto:lo Tribal Council;
- Kwantlen First Nation;
- Katzie First Nation; and
- Squamish First Nation.

Planning for First Nations engagement and consultation on the Project began in January 2011. Prior to submitting the Project Description to federal and provincial regulators to initiate the EA process (the Pre-submission phase), two separate rounds of consultation and engagement activities were held with identified First Nations. The purpose of the pre-consultation and Project Definition rounds of consultation and engagement activities was to share initial information related to the Project and to solicit feedback from First Nations regarding potential First Nations issues and concerns.

To date, comments raised by First Nations during Project Definition consultations include issues related to the following:

- Procurement and employment opportunities for First Nations;
- Reduction in crab harvesting area;
- Effects on crab health and population;
- Effects to community health and wellness associated with effects on crabs;
- Effects related to treaty and aboriginal rights;
- Air quality and human health effects;
- Vessel and rail emissions;
- Increase in vessel, train, and vehicle numbers;

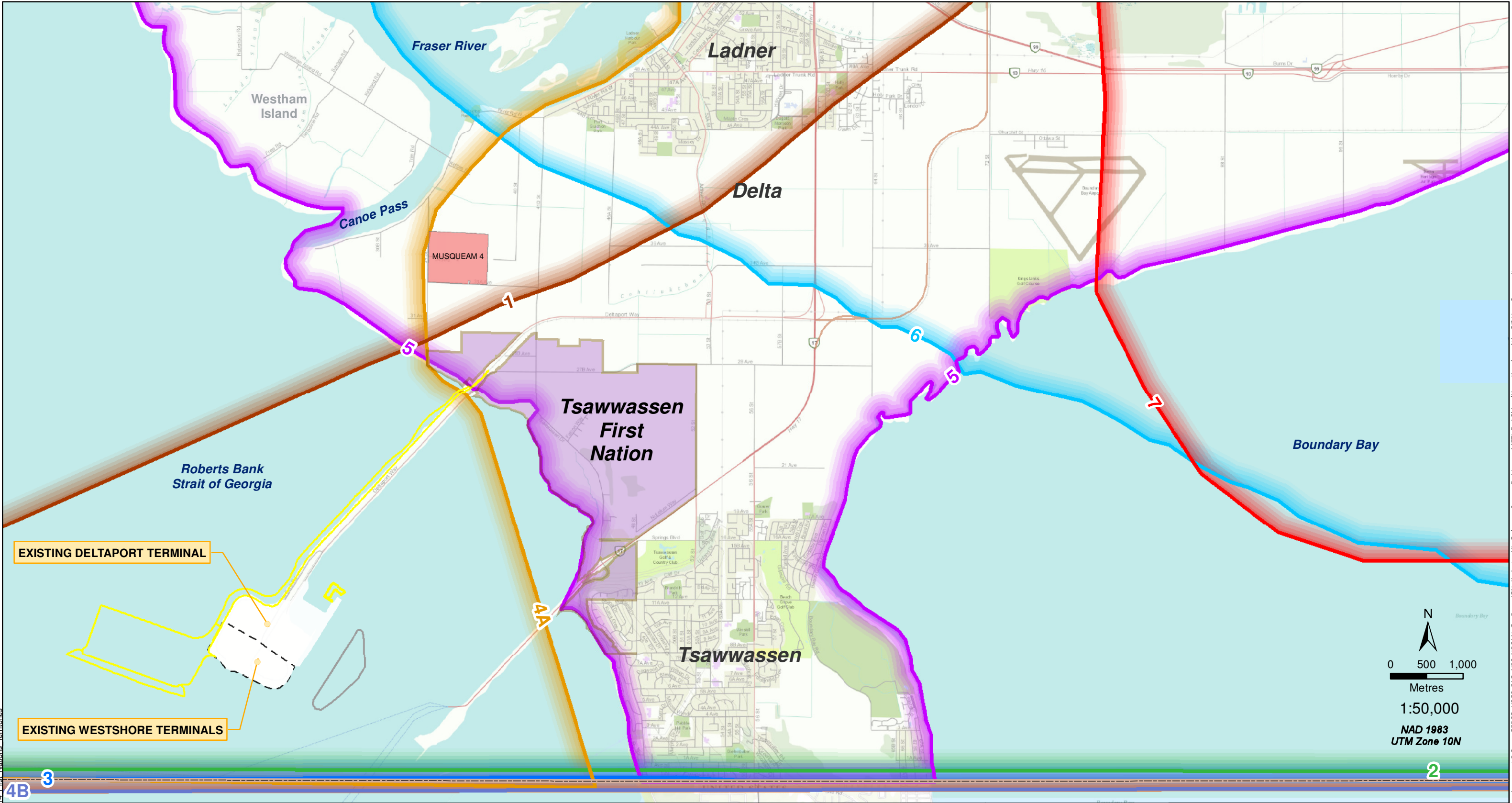
- Loss of marine habitat and fisheries effects;
- Effects on wildlife;
- Terminal design;
- Potential for accidents and spills to affect the marine environment/spill response;
- Cumulative effects from port development at Roberts Bank; and
- Provision of funding for meaningful participation in Project consultation activities and EA review.

PMV will continue consultations with identified First Nations to seek additional information on potential Project effects on First Nations' interests and potential and established Aboriginal and Treaty rights. PMV understands that First Nations have a strong interest in ensuring that any traditional use sites within the Project Area are protected. PMV will continue to collaborate with potentially affected First Nations in this regard.

As of spring 2013, traditional Aboriginal fisheries for crab and salmon have been active within and around the Project Area. Further consultation with First Nations and DFO is required to expand on this understanding and assess potential Project-related effects on First Nations' fisheries. Concerns regarding potential impacts to current use of lands and resources for traditional purposes within the Project Area raised during consultations with First Nations to-date include:

- TFN harvesting areas for Fish and Aquatic Plants;
- Musqueam Indian Band access to and use of marine resources such as fish and crab, as well as fish habitat;
- Semiahmoo First Nation access to and use of marine resources, and health and number of crab populations;
- Tsleil-Waututh Nation access to and use of marine resources and protection of marine habitat; and
- Traditional marine resource harvesting areas important to the Hul'qumi'num First Nations.

In terms of socio-economic effects, PMV also understands that some First Nations members may rely on commercial fishing and crabbing for their livelihood. PMV will also consider the potential effects on these communities should the resources be affected. The potential for health effects for First Nations from the Project and from Project-related effects to traditional activities such as crabbing or fishing will be further understood and assessed through the EA.



Document Name: 00719-00-GIS-6059_Figure 14_First Nations_Territories

Legend

BOUNDARY OF PROJECT AREA

TRANSFER PIT

US-CANADA BORDER

FIRST NATIONS RESERVE

FIRST NATIONS TRADITIONAL TERRITORIES AND TFN LANDS

Tsawwassen First Nation Lands

Musqueam Indian Band

Semiahmoo First Nation

Tsleil-Waututh First Nation (Consultation Area)

4A

4B

5

6

7

Hul'qumi'num Treaty Group (Core Area)

Hul'qumi'num Treaty Group (Marine Area)

Stó:lo Nation (Shared Area)

Katzie First Nation

Kwantlen First Nation

Notes:

Traditional Territories came from various sources, including Aboriginal Affairs & Northern Development Canada and the BC Treaty Commission.

Traditional Territories of other identified First Nations thought to have an interest in the Project are not shown due to scale.

TFN final agreement includes harvesting rights not shown on this map.

This map should not be considered an authoritative source.

PORT METRO

vancouver

ROBERTS BANK TERMINAL 2

FIRST NATIONS BOUNDARIES IN PROXIMITY OF THE PROJECT AREA

DATE: SEPTEMBER 2013

FIG No. 14.0

Sources: Esri, Delorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

CONSULTATION WITH THE PUBLIC AND STAKEHOLDERS

PMV is engaging communities, stakeholders, and the public regarding the Project. The stakeholder categories and groups that may have an interest in the Project are presented below. At a high level, the list includes:

- Local communities and residents;
- Local and regional governments;
- Tenants and terminal operators;
- Railway companies;
- Community organisations;
- Industry groups;
- Agricultural groups;
- Business organisations; and
- Environmental non-governmental organisations.

PMV is undertaking a comprehensive multi-round community, stakeholder, and public consultation process associated with the Project, which launched in January 2011. Consultation is occurring in several phases, and began with pre-consultation in June 2011. In addition to formal consultation periods, PMV is committed to ongoing engagement with communities, local and regional governments, and interested stakeholders throughout the development and review of the Project. **Figure 15.0** illustrates the PMV-led consultation rounds, which will continue throughout Project development.

Figure 15.0 Port Metro Vancouver-Led Consultation

PORT METRO VANCOUVER-LED CONSULTATION¹



Notes: 1. Port Metro Vancouver-led consultation with communities, stakeholders and the public, and Port Metro Vancouver-led consultation with First Nations will continue throughout project development. Other communications and community engagement activities will be undertaken throughout project review.

In addition to comprehensive, multi-round consultation described above, PMV has created a Port Community Liaison Committee (PCLC) to serve as a mechanism for dialogue and communications about port-related issues in Delta. Working in the spirit of collaboration, PCLC is an information-sharing forum that brings together municipal, First Nations, industry, PMV, and community interests to discuss developments, identify concerns and opportunities for timely community input, as well as facilitate two-way communication among respective constituencies about Port operations and development.

PCLC consists of up to 15 individuals, including representatives from the Corporation of Delta, TFN, community organisations, port industry, and PMV, which are appointed by their respective governing bodies. Community representatives provide geographic representation from the entire community (Tsawwassen, Ladner, and North Delta), as well as the diverse mix of interests within the municipality of Delta. PCLC is a key stakeholder group that will be asked to provide input into PMV consultation and other topics throughout development of the Project.

In addition to PMV-led consultation, and as directed by federal and/or provincial regulators, PMV will meet or exceed environmental requirements for public participation during the EA process, as defined by provincial and federal legislation, and regulations. It is anticipated that the EA and review process will involve several rounds of consultation on issues such as the environmental review, the scope and nature of the assessment, the effects assessment report, and regulatory procedures and reports. Feedback is expected to be gathered online, through written submissions, during open houses, and *via* any other means as determined by PMV and the government.

The following issues ranked as being the most important topics for participants during future rounds of consultation:

- Socio-economic elements of the Project, such as road and rail traffic, economic benefits and jobs; local and regional area elements, including issues such as air quality, land use, noise, and light; and
- Wildlife and habitat, water quality and marine species, and local benefits and opportunities.

Key Comments Expressed during Project Definition Consultation

The following represents a summary of the key themes identified during Project Definition Consultation, including through stakeholder meetings, feedback forms, and other written submissions:

- Participants expressed concern about the effects of existing port facilities at Roberts Bank on current and future air quality, noise, and light pollution, as well as potential effects to birds, fish, and agricultural land. Participants asked that PMV responsibly balance environmental, social, and economic needs during planning for the Project.

- Participants questioned PMV's demand forecasts and justification for additional container capacity on the West Coast of Canada. Some participants expressed interest in seeing additional capacity built in Prince Rupert or the use of short-sea shipping as an alternative to building a new terminal.
- Participants expressed interest in having more technical information about the Project, including having access to various Project documents and studies and additional details about the EA process and the baseline field studies currently underway.
- Participants expressed concern about the potential increase in road and rail traffic as a result of the Project and asked that PMV review options for improving the efficiency of container trucks to reduce the number of empty truck trips and eliminate unnecessary trips throughout Metro Vancouver.

A Consultation Summary Report detailing the activities described above is available on PMV's website (<http://www.robertsbankterminal2.com/>), including a Consideration Memo showing how PMV has responded to the feedback received during the consultation period.

FEDERAL AND PROVINCIAL GOVERNMENT CONSULTATION

Meetings between PMV and both provincial and federal regulators in regard to the Project have been ongoing since 2011. The purpose of these meetings has been to introduce the Project, review regulatory procedures and processes, discuss potential issues that might arise during the planning, construction, and operations phases of the Project, and to receive feedback on technical workplans related to various field studies.

Provincial and federal departments that have been consulted in Vancouver, Victoria, and Ottawa include the following;

- CEA Agency;
- BC EAO;
- Environment Canada – Canadian Wildlife Service;
- Environment Canada – Marine Programs;
- Environment Canada – Environmental Protection Branch - Disposal at Sea;
- DFO – Major Projects Unit, Habitats Division, Fisheries Protection, Species At Risk;
- Transport Canada – Environmental Programs; and
- BC Ministry of Transportation and Infrastructure.

PMV is continuing to engage with provincial, federal, and local governments to identify issues and, on a discipline-specific basis, review baseline studies in light of EA regulatory process requirements.

TABLE OF CONTENTS

PREFACE	I
EXECUTIVE SUMMARY	II
LIST OF ACRONYMS AND ABBREVIATIONS.....	LIII
SYMBOLS AND UNITS OF MEASURE.....	LV
1.0 GENERAL INFORMATION AND CONTACTS	1
1.1 PURPOSE OF THE PROJECT DESCRIPTION	1
1.2 NATURE OF THE PROJECT AND LOCATION.....	2
1.3 PORT METRO VANCOUVER OVERVIEW	3
1.4 PROPONENT CONTACT INFORMATION.....	9
1.5 CONSULTATIONS DURING THE PREPARATION OF THE PROJECT DESCRIPTION	10
1.6 ENVIRONMENTAL ASSESSMENT REQUIREMENTS	11
1.7 REGIONAL ENVIRONMENTAL STUDIES.....	11
2.0 PROJECT INFORMATION.....	12
2.1 CONTEXT AND OBJECTIVES OF THE PROJECT	12
2.1.1 Economic Forecast	12
2.1.2 Meeting Demand.....	15
2.1.3 Economic Benefits	17
2.2 PROJECT LOCATION AND ORIENTATION	18
2.3 PROJECT COMPONENTS	21
2.3.1 The Berth Pocket	24
2.3.2 The Marine Terminal.....	24
2.3.2.1 Three Berth Wharf Structure.....	24
2.3.2.2 Container Storage Yard	25
2.3.2.3 Rail Intermodal Yard	25
2.3.2.4 Ancillary Systems and Support Facilities.....	25
2.3.3 Tug Basin Expansion	27
2.3.4 Causeway Expansion	30
2.3.4.1 Causeway Rail Improvements	30
2.3.4.2 Causeway Road Improvements	31
2.3.4.3 Vehicle Access and Control System.....	31
2.3.4.4 Causeway Utility Corridor	31
2.4 CONSTRUCTION AND OPERATION ACTIVITIES	34

2.4.1.1	Creation of Containment Dykes.....	34
2.4.1.2	Dredging	36
2.4.1.3	Soil Densification and Improvements	37
2.4.1.4	Land Development.....	37
2.4.1.5	Building of the Three Berth Wharf Structure.....	38
2.4.1.6	Development of Terminal and Causeway Infrastructure	38
2.4.1.7	Expansion of the Existing Tug Basin	39
2.4.1.8	Summary of Operations Activity	39
2.5	SUMMARY OF PROJECT COMPONENTS AND ACTIVITIES	40
2.6	PROJECT PHASES AND SCHEDULING	45
3.0	PORT LAND USE AND LAND OWNERSHIP.....	46
3.1	LAND USE PLAN	46
3.2	LAND OWNERSHIP – FEDERAL AND PROVINCIAL LANDS.....	46
4.0	FEDERAL INVOLVEMENT – FINANCIAL SUPPORT AND LEGISLATIVE REQUIREMENTS .	50
4.1	FINANCIAL SUPPORT	50
4.2	FEDERAL LANDS.....	50
4.3	ANTICIPATED PERMITS, APPROVALS, AND AUTHORISATIONS.....	50
5.0	ENVIRONMENTAL AND SOCIO-ECONOMIC SETTING	51
5.1	ENVIRONMENTAL SETTING	51
5.1.1	Land Use and Status	51
5.1.2	Regional Parks and Ecological Conservancy Areas.....	51
5.1.2.1	Wildlife Management Areas.....	51
5.1.2.2	Federal Protected Areas.....	52
5.1.3	Physical Components	56
5.1.3.1	Marine Zones.....	56
5.1.3.2	Tides and Waves	56
5.1.3.3	Sediment and Water Quality.....	56
5.1.3.4	Underwater Noise	56
5.1.4	Biological Components	58
5.1.4.1	Marine Vegetation.....	58
5.1.4.2	Marine Invertebrates.....	59
5.1.4.3	Marine Fish	59
5.1.4.4	Marine Mammals	60
5.1.4.5	Coastal and Migratory Birds and Waterfowl	62

5.1.5	Terrestrial Environment.....	63
5.1.5.1	Water Resources – Surface Water and Groundwater	63
5.1.5.2	Terrestrial Wildlife	64
5.1.5.3	Terrestrial Vegetation	65
5.1.5.4	Freshwater Fish	65
5.2	SOCIO-ECONOMIC AND SOCIO-COMMUNITY SETTING	69
5.2.1	Local Communities	69
5.2.2	Jobs and Employment	70
5.2.3	Community Services and Infrastructure.....	70
5.2.4	Recreation	71
5.2.5	Transportation	71
5.2.6	Air Quality, Noise, and Visual Conditions	72
5.2.6.1	Air Quality	72
5.2.6.2	Noise.....	72
5.2.6.3	Visual	73
6.0	POTENTIAL ENVIRONMENTAL EFFECTS.....	75
6.1	POTENTIAL MARINE ENVIRONMENT EFFECTS.....	75
6.1.1	Marine Environment.....	75
6.1.2	Coastal Geomorphology and Water and Sediment Quality.....	76
6.1.3	Underwater Noise	76
6.1.4	Marine Vegetation	76
6.1.5	Marine Invertebrates	77
6.1.6	Marine Fish	77
6.1.7	Marine Mammals.....	77
6.1.8	Coastal and Migratory Birds and Waterfowl	77
6.1.9	Transboundary Effects	78
6.2	POTENTIAL DISCHARGES AND WASTES.....	78
6.3	TERRESTRIAL EFFECTS	79
6.4	POTENTIAL SOCIO-ECONOMIC AND SOCIO-COMMUNITY EFFECTS.....	79
6.4.1	Potential Heritage and Archaeological Effects.....	80
6.4.2	Potential Health Effects.....	80
6.4.3	Air Quality.....	81
6.4.4	Noise	81
6.4.5	Visual and Lighting.....	81

6.5	POTENTIAL EFFECTS OF THE PROJECT ON FEDERAL LANDS	82
6.6	POTENTIAL EFFECTS OF THE PROJECT FOR FIRST NATIONS	82
7.0	ABORIGINAL ENGAGEMENT AND CONSULTATION.....	83
7.1	FIRST NATIONS THAT MAY HAVE AN INTEREST IN THE PROJECT	83
7.2	COMPLETED CONSULTATION AND ENGAGEMENT WITH IDENTIFIED FIRST NATIONS.....	85
7.2.1	Pre-consultation Activities	85
7.2.2	Project Definition Consultation and Engagment Activities	85
7.2.3	PMV's Commitment to Continued and Active Engagement with First Nations ...	87
7.2.4	Results of Consultation and Engagement Activities to Date	87
7.2.5	Key Comments Expressed during Pre-Consultation	87
7.2.6	Key Comments Expressed During Project Definition Consultation	88
7.3	FIRST NATIONS LAND AND RESOURCE USE	89
7.4	POTENTIAL EFFECTS ON FIRST NATIONS	92
8.0	CONSULTATION WITH THE PUBLIC AND STAKEHOLDERS.....	94
8.1	STAKEHOLDERS THAT MAY HAVE AN INTEREST IN THE PROJECT	94
8.2	PUBLIC AND STAKEHOLDER CONSULTATION PROCESS TO DATE.....	94
8.3	HOW INPUT WILL BE USED	95
8.4	ENVIRONMENTAL ASSESSMENT PUBLIC COMMENT PERIODS	95
8.5	ONGOING COMMUNITY ENGAGEMENT.....	96
8.5.1	Port Community Liaison Committee	96
8.5.2	Local Government Liaison Program	96
8.5.3	Ongoing Community Relations	97
8.6	COMPLETED PUBLIC AND STAKEHOLDER CONSULTATIONS	97
8.6.1	Key Comments Expressed during Pre-Consultation	98
8.6.2	Key Comments Expressed during Project Definition Consultation	99
9.0	FEDERAL AND PROVINCIAL GOVERNMENT CONSULTATION	100
9.1	TECHNICAL ADVISORY GROUPS	100
10.0	REFERENCES.....	102
11.0	ACTS AND REGULATIONS	105

List of Tables

Table 1	Consultations during the Preparation of the Project Description	10
Table 2	Roberts Bank Terminal 2 Design Ship Parameters	25
Table 3	Summary of Project Components and Activities	41
Table 4	Approximate Project Land Areas Requirements	45
Table 5	Potential Federal Permits, Approvals and Authorizations	50
Table 6	At-Risk Marine Vegetation Ecological Communities Potentially Within the Project Area	58
Table 7	At-Risk Anadromous Fish Species that Potentially Occur within the Project Area	60
Table 8	At-Risk Marine Mammal Species that Potentially Occur in the Project Area	62
Table 9	At-Risk Coastal Birds Species that Potentially Occur within the Project Area	62
Table 10	Terrestrial Wildlife Species at Risk that Potentially Occur in the Region	64
Table 11	Terrestrial Vegetation Species at Risk that Potentially Occur Proximal to the Rail Tie-in	65
Table 12	Proximity of Local Communities to the Project	69
Table 13	Project Definition Consultation and Engagement Activities to Date	86
Table 14	Completed Public and Stakeholder Consultations – Notification and Participation	97

List of Figures

Figure 1.0	Project Location	6
Figure 2.0	Port Metro Vancouver Federal Managed Lands and Navigation Jurisdiction	7
Figure 3.0	Container Facilities and Infrastructure	8
Figure 4.1	West Coast of Canada Forecast and PMV Planned Capacity Increases	13
Figure 4.2	West Coast of Canada Container Traffic: Forecast (2001) vs. Actual	14
Figure 5.0	Project Orientation	20
Figure 6.0	Project Area and Components	22
Figure 7.0	Conceptual Plan View of Terminal Layout	23
Figure 8.0	Cross-section of Caisson Wharf Structure	28
Figure 9.0	Tug Basin Conceptual Design	29
Figure 10.1	Causeway Road and Rail Improvements	32
Figure 10.2	Causeway Road and Rail Improvements	33
Figure 11.0	Terminal Containment Dykes	35
Figure 12.0	Anticipated Project Construction Schedule Including Key Activities	45
Figure 13.0	Existing Land Ownership	47

Figure 14.0	Legal Description of Project Land Ownership.....	48
Figure 15.0	Federal Lands in Southern Gulf and Lower Mainland	49
Figure 16.1	Protected Areas	54
Figure 16.2	Land Use and Historic Sites.....	55
Figure 17.0	Marine Zones in Roberts Bank Project Area	57
Figure 18.0	Current Knowledge of Marine Habitat Zones Surrounding the Project.....	66
Figure 19.0	Current First Nations Licensed Fisheries.....	67
Figure 20.0	Commercial and Recreational Fishing Areas	68
Figure 21.0	Ground Water Wells and Active Air Quality Monitoring Stations	74
Figure 22.0	First Nations Boundaries.....	84
Figure 23.0	Port Metro Vancouver-Led Consultation.....	95

List of Appendices

Appendix A	Table of Concordance – CEAA 2012 Project Description Requirements
Appendix B	Table of Concordance – BCEAA Project Description Guidelines
Appendix C	Photos of Work Areas
Appendix D	First Nations Contact Information for the Roberts Bank Terminal 2 Project
Appendix E	Legal Descriptions of the Lands and Ownership
Appendix F	Glossary of Terms
Appendix G	Introduction to Species at Risk

LIST OF ACRONYMS AND ABBREVIATIONS

AGV	automated guided vehicle
BC	British Columbia
BC CDC	British Columbia Conservation Data Centre
BCEAA	British Columbia <i>Environmental Assessment Act</i>
BC EAO	BC Environmental Assessment Office
BC MOTI	BC Ministry of Transportation and Infrastructure
BCR	British Columbia Railway Company
CCTV	closed-circuit television camera
CDC	Conservation Data Centre
CD	chart datum
CDFmm	Coastal Douglas-fir moist maritime
<i>CEAA 2012</i>	<i>Canadian Environmental Assessment Act, 2012</i>
CEA Agency	Canadian Environmental Assessment Agency
CH ₄	methane
CN	Canadian National Railway
CO	carbon monoxide
CO ₂	carbon dioxide
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CP	Canadian Pacific
CZBB	Boundary Bay Airport
DAS	Disposal at Sea
DFO	Fisheries and Oceans Canada
DTRRIP	Deltaport Terminal Road and Rail Improvement Project
EA	Environmental Assessment
GDP	gross domestic product
GHG	greenhouse gas
HRSDC	Human Resources and Skills Development Canada ¹
HTG	Hul'qumi'num Treaty Group
IY	intermodal yard
LFV	Lower Fraser Valley
LLW	lower low water
MBS	migratory bird sanctuary

NGO	non-governmental organisation
NO	nitrogen oxide
NO ₂	nitrogen dioxide
N ₂ O	nitrous oxide
NWA	National Wildlife Area
O ₃	ozone
PCLC	Port Community Liaison Committee
PM	particulate matter
PM _{2.5}	respirable particulate matter
PM ₁₀	inhalable particulate matter
PMV	Port Metro Vancouver
Project	Roberts Bank Terminal 2 Project
RBRC	Roberts Bank Rail Corridor
RCMP	Royal Canadian Mounted Police
RMG	rail-mounted gantry crane
RPM	radiation portal monitors
SARA	<i>Species At Risk Act</i>
SFPR	South Fraser Perimeter Road
SO ₂	sulphur dioxide
SRKW	southern resident killer whale
TAG	technical advisory group
TEU	twenty-foot equivalent unit
TFN	Tsawwassen First Nation
TSI	TSI Terminal Systems Inc.
US	United States
VACS	vehicle access and control system
VACIS	vehicle and cargo inspection system
VOC	volatile organic compound
WMA	wildlife management area
YVR	Vancouver International Airport

SYMBOLS AND UNITS OF MEASURE

DWT	deadweight tonnage
ft.	foot/feet
ha	hectare
km	kilometre
km ²	square kilometres
km/hr.	kilometres per hour
L	litre
m	metre
m ³	cubic metre
mm	millimetre
M	million
%	percent
°	degree

1.0 GENERAL INFORMATION AND CONTACTS

The following section provides an overview of the Roberts Bank Terminal 2 Project (the Project), the purpose of the Project Description, the nature and location of the Project, an introduction to Port Metro Vancouver (PMV), and a summary of the consultation activities that have been undertaken to support the development of this Project Description in accordance with the regulations and guidelines under the *Canadian Environmental Assessment Act, 2012 (CEAA 2012)* and the British Columbia *Environmental Assessment Act (BCEAA)*. It also outlines the federal and provincial Environmental Assessment (EA) requirements pertaining to the Project, and provides a summary of the environmental studies that have been undertaken in the vicinity of the Project.

1.1 PURPOSE OF THE PROJECT DESCRIPTION

The purpose of this Project Description is to provide an overview of the Project to inform both federal and provincial regulators about Project plans and details, which will determine the need for the Project and facilitate an assessment of whether the Project meets federal and provincial EA requirements. This document is also intended to officially introduce the Project to First Nations, the public, and stakeholders participating in the EA process.

This Project Description was prepared in accordance with the *Prescribed Information for the Description of a Designated Project Regulations* issued pursuant to CEAA 2012 and the British Columbia *Guidelines for Preparing a Project Description for an Environmental Assessment in British Columbia* (BC EAO 2008).

This Project Description provides an overview of the Project, and includes the following:

- An introduction to PMV, including the context and objectives of the Project;
- Key components of the Project, including proposed construction and operational activities, and an anticipated schedule;
- An overview of the Project Area, including land and water use and a summary of past environmental studies in the region;
- A high-level summary of how the Project may interact with the environment, including potential economic, social, heritage, and/or health effects; and
- A summary of past and planned future consultations and engagement with First Nations, the public, and other parties.

1.2 NATURE OF THE PROJECT AND LOCATION

The Project consists of a new three-berth marine container terminal, which will provide an additional 2.4 million twenty-foot equivalent units (TEUs) of container capacity per year at the Roberts Bank Terminals. Current TEU capacity at Roberts Bank is 1.8 million TEUs; upon completion of the Deltaport Terminal, Road and Rail Improvement Project (DTRRIP) in 2015, this capacity will further increase to 2.4 million TEUs. The Vancouver Fraser Port Authority, doing business as PMV, proposes development of the Project to ensure the availability of adequate container capacity to meet projected demand to 2030.

The Project is located at Roberts Bank in Delta, British Columbia (BC), approximately 35 kilometres (km) south of Vancouver, BC (**Figure 1.0**). The existing facilities at Roberts Bank include Deltaport Terminal, an 85 hectare (ha) container handling facility operated by TSI Terminal Systems Inc. (TSI) and Westshore Terminals, a 54 ha coal handling facility. Near the Roberts Bank terminals is the Tsawwassen Ferry Terminal, operated by the BC Ferries Corporation. The terminals and facilities on the Roberts Bank causeway are connected to road and rail infrastructure that supports the movement of goods within, across, and beyond the region. The geographic coordinates of the existing facilities at Roberts Bank are approximately 49°01'07.40" N and 123°09'40.62" W, and for the proposed new terminal are approximately 49° 01' 6.84" N and 123° 11' 3.33" W.

PMV has developed preliminary plans for the following Project components and sub components:

- **Berth pocket;**
- **Marine terminal:**
 - Three-berth wharf;
 - Container storage yard;
 - Rail intermodal yard (IY); and
 - Ancillary systems and support facilities.
- **Tug basin expansion;**
- **Causeway expansion:**
 - Rail improvements; and
 - Road improvements.

Project component plans are presented in further detail in **Section 2.0**. Final detailed design will be completed following Project approval.

1.3 PORT METRO VANCOUVER OVERVIEW

PMV is a port authority created pursuant to the *Canada Marine Act*. The purpose of the *Canada Marine Act* is to, among other things: promote the success of Canadian ports to contribute to the competitiveness, growth, and prosperity of the Canadian economy; ensure that marine transportation services satisfy the needs of users at a reasonable cost; provide for a high level of safety and environmental protection; and manage marine infrastructure in a commercial manner, taking into account input from users and the community. Port authorities are accountable to the federal Minister of Transport.

PMV operates Canada's largest and North America's most diversified port. PMV helps Canadian businesses deliver their goods and products, such as lumber, pulp and paper, and grains to markets around the world, and provides an entry point for construction and manufacturing inputs and many consumer goods, including fruits and vegetables, electronics, furniture, and automobiles. Facilities within PMV's jurisdiction include three major railways and 28 major terminals, four of which are container terminals (shown in **Figure 3.0**). Container trade is one of the most significant business sectors by tonnage, and benefits both Canadian consumers and producers, as evidenced by the almost equal volumes of import and export containers that travel through PMV.

The port generates an estimated 98,800 jobs, \$6.1 billion in wages, and \$9.7 billion in direct GDP across Canada, handling \$172 billion of cargo each year, or approximately \$475 million every day. This figure represents one-fifth of Canada's total trade by value. PMV supports Canadian trade by providing the port-related infrastructure to connect Canada's markets to trading economies around the world, particularly those in the Asia-Pacific region.

Most lands managed by PMV are federally owned. These include Burrard Inlet to Port Moody including Indian Arm, and the main arm of the Fraser River from Gravesend Reach (approximately 6 km east of the George Massey Tunnel) to Pitt Lake and Langley, as well as the Roberts Bank terminals. These lands border 16 municipalities, one treaty First Nation, and the traditional territories of numerous other First Nations. The Fraser River west of Gravesend Reach is owned by the province and is currently managed by PMV under a head lease. The federal lands managed by PMV are shown on **Figure 2.0**.

The *Canada Marine Act* requires port authorities to create a land use plan, setting out the objectives for the development of the land they manage. PMV's Land Use Plan contains a comprehensive set of policies that shape the way PMV fulfills its mandate, and facilitates PMV's obligation to manage the land and water within its jurisdiction in a manner that supports port activity while respecting the environment and the needs and interests of its neighbours. The Land Use Plan also provides a tool for PMV to communicate land use policies and coordinate land use initiatives with neighbouring communities and external agencies. More on the PMV Land Use Plan is found in **Section 3.0**.

The *Canada Marine Act* also provides port authorities with the authority to direct marine traffic to promote safe and efficient navigation and environmental protection within the navigable waters under their jurisdiction. PMV's navigation jurisdiction is shown on **Figure 2.0**. PMV works with a broad range of stakeholders, including municipalities and provincial and federal agencies, to develop procedures to ensure marine safety. PMV has developed marine safety rules and procedures and maintains a 24-hour operations centre.

Canada's Asia-Pacific Gateway

The Port is an integral component of Canada's Asia-Pacific Gateway, a world-class transportation network of airports, seaports, railways, roadways, and border crossings. Through the Asia-Pacific Gateway and Corridor Initiative, the federal government partners with provincial governments and private industry to facilitate global supply chains between North America and Asia.

In addition to marine terminals, rail and trucking service, together with shipping lines, cargo owners, and operators of off-dock facilities, are all crucial to the performance of the supply chain and the continued growth and success of the Asia-Pacific Gateway. PMV works closely with all levels of government and private industries to ensure the efficient movement of goods through the Asia-Pacific Gateway.

Further information on the Asia-Pacific Gateway can be found at asiapacificgateway.gc.ca and pacificgateway.gov.bc.ca.

The Province of BC is responsible for provincially regulated railways including BCR Port Subdivision Ltd., a subsidiary of the British Columbia Railway Company (BCR). The rail line to the existing Deltaport Terminal and the connecting rail line to Cloverdale is owned by BCR, and are maintained and operated by BCR Port Subdivision Ltd.

The BC Ministry of Transportation and Infrastructure (BC MOTI) is responsible for the provincial road system. The Ministry is currently constructing the South Fraser Perimeter Road (SFPR), which has been designed to improve the safe and efficient movement of goods and people, including anticipated growth in container traffic from the Project, by connecting port, rail, and highway infrastructure. The federal government provided \$365 million in funding for the SFPR project through the federal Asia-Pacific Gateway and Corridor Initiative, with the balance of funding for the \$1.26 billion project provided by the Province of BC.

Pursuant to the requirements of the *Port Authorities Operations Regulations*, PMV established and maintains a truck licensing system, regulating access to port lands by container truck traffic. The truck licensing system regulates compensation of non-union owner operators, requiring truckers transporting containers within the Lower Mainland of BC to be paid at or above established remuneration rates, as well as safety and environmental standards of all container trucks accessing areas within PMV jurisdiction.

Transport Canada is responsible for federally regulated railways, and creates the regulations, standards, and programs to ensure railway safety and security, and to ensure the rail system is accessible, competitive, and environmentally responsible. In 2007 a multi-stakeholder agreement was concluded under the Asia-Pacific Gateway and Corridor Initiative for nine separate road/rail grade separation projects along the Roberts Bank Rail Corridor (RBRC). The \$300 million program is nearing completion and will significantly reduce rail traffic impacts on the communities through which the corridor runs from Delta in the southwest to Langley Township in the northeast. It will also enhance rail operations and accommodate anticipated growth in rail and road traffic, including the increased volumes projected to be generated by the Project. Funding for the RBRC projects has been provided by 12 funding partners, including federal, provincial, and municipal governments, as well as PMV and other key stakeholders, including Canadian Pacific (CP) and Canadian National (CN) Rail. **Figure 3.0** shows the coordinated infrastructure developments.

Sustainable Development in the Pacific Gateway

Port Metro Vancouver operates in a natural environment, rich in biodiversity and home to many species of wildlife, birds, marine mammals and fish. Given the nature of its operations, the Port is mindful of impacts on the quality of air, land, water, and fish and wildlife habitat in its jurisdiction. The Port also recognizes the role it plays in collaborating on a regional, national and global scale to help promote more sustainable operations for port industries and services.

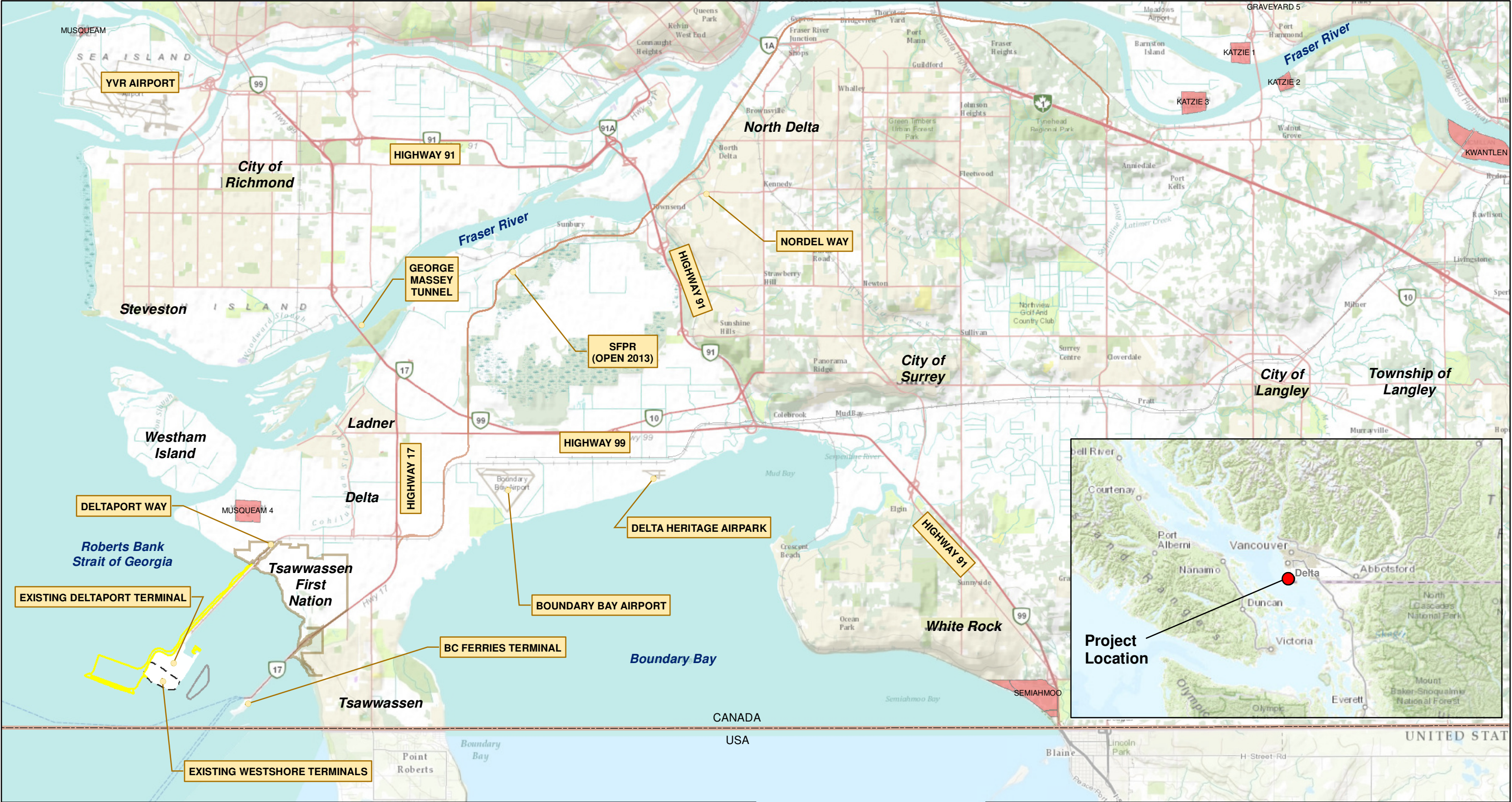
Some of Port Metro Vancouver's recent sustainability highlights include:

- The Marine Mammal Observation Program (which began in 2008) continues to ensure that dredging activities in the Fraser River do not impact at-risk southern resident killer whales.
- The EcoAction Program was improved, exceeding the newly designated North American Emission Control Area requirements to reduce vessel emissions.
- Participation in and provision of funding for Metro Vancouver's air quality station in Delta, part of the Lower Fraser Valley Air Quality Monitoring Network. Data from 2012 showed that air contaminant levels were significantly better than regional air quality objectives.

To read Port Metro Vancouver's 2012 Sustainability Report, please visit:

<http://portmetrovanancouver.com/en/about/corporate/accountability.aspx>

Document Name: 00719-00-GIS-6071_Figure1_Project_Location_V7



Legend

BOUNDARY OF PROJECT AREA

TRANSFER PIT

US-CANADA BORDER

FIRST NATIONS RESERVE

N

01,5003,000

Metres

1:120,000

NAD 1983 UTM Zone 10N

PORT METRO
vancouver

ROBERTS BANK TERMINAL 2

PROJECT LOCATION

DATE:SEPTEMBER 2013

FIG No.1.0

Sources: Esri, Delorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community





ROBERTS BANK TERMINAL 2

**CONTAINER HANDLING FACILITIES
AND INFRASTRUCTURE**

DATE:
SEPTEMBER 2013

FIG No.
3.0

1.4 PROPONENT CONTACT INFORMATION

The President and Chief Executive Officer at PMV is Robin Silvester:

Robin Silvester
President and Chief Executive Officer
Port Metro Vancouver
100 The Pointe
999 Canada Place
Vancouver, BC V6C 3T4

Communications on behalf of PMV with respect to the Project should be directed to Cliff Stewart as follows:

Cliff Stewart, P.Eng.
Director, Infrastructure Development
Port Metro Vancouver
100 The Pointe
999 Canada Place
Vancouver, BC V6C 3T4

Email: container.improvement@portmetrovancover.com
Phone: 604.665.9337
Fax: 1.866.284.4271

A more detailed corporate overview for PMV can be found at www.portmetrovancover.com.

1.5 CONSULTATIONS DURING THE PREPARATION OF THE PROJECT DESCRIPTION

PMV is undertaking a comprehensive multi-round community, First Nations, stakeholder, and public consultation process for the Project. Consultation is occurring in several phases, and began with Pre-Consultation in June 2011. The following table summarises the groups that have been consulted to date. Details of these consultations can be found in **Sections 7.0, 8.0, and 9.0**.

Table 1 Consultations during the Preparation of the Project Description

First Nations
Tsawwassen First Nation
Musqueam Indian Band
Semiahmoo First Nation
Tsleil-Waututh Nation
Hul'qumi'num Treaty Group, representing the following bands: Stz'umius First Nation, Cowichan Tribes, Halalt First Nation, Lake Cowichan First Nation, Lyackson First Nation, Penelakut Tribe.
Sto:lo Nation, representing the following bands: Aitchelitz, Leq'a:mel, Matsqui, Popkum, Shxwha:y Village, Skawahlook, Skowkale, Squiala, Sumas, Tzeachten; Yakweakwoose.
Sto:lo Tribal Council
Katzie First Nation
Kwantlen First Nation
Squamish Nation
Community, Stakeholder and Public Consultation
Local Communities and Residents
Local and Regional Governments
PMV's Tenants and Terminals
Railway companies (BCR, CN, CP)
Community Organisations
Industry Groups
Business Organisations
Environmental Non-Governmental Organisations
Government Consultation
The Canadian Environmental Assessment Agency (CEA Agency)
The BC Environmental Assessment Office (BC EAO)
Environment Canada – Canadian Wildlife Service
Environment Canada – Marine Programs
Environment Canada – Environmental Protection- Disposal at Sea (DAS)
Fisheries and Oceans Canada (Habitats Division, Major Projects Unit, Fisheries Protection, Species At Risk)
Transport Canada – Environmental Programs, Navigable Waters Branch

1.6 ENVIRONMENTAL ASSESSMENT REQUIREMENTS

The Project may require approvals pursuant to the following federal and provincial acts:

- CEAA 2012, administered by the Canadian Environmental Assessment Agency (CEA Agency);
- BCEAA, administered by the BC Environmental Assessment Office (BC EAO).

The Project is expected to require approvals under CEAA 2012 because it involves the construction of a marine terminal designed to handle vessels larger than 25,000 deadweight tonnes (DWT) to be located on lands not routinely or historically used as a marine terminal or designated for such use in a land use plan that has been the subject of public consultation (Section 27(c) of the *Regulations Designating Physical Activities*).

Approvals may also be required under BCEAA because the Project is a new marine port facility, which will require dredging and filling of more than 2 ha of submerged land (*Reviewable Projects Regulation*, (Part 8, Table 14, # 4).

While the scope of the EA has not yet been determined by federal and provincial regulators, for the purposes of this Project Description it is assumed by PMV that the Project will be subject to some form of joint review process.

Provincial and federal permits that may be required to support the Project are described in **Section 4.3**.

1.7 REGIONAL ENVIRONMENTAL STUDIES

It is understood that the Project is not located in an area that has been subject to federal regional environmental studies, as described in the *Guide to Preparing a Description of a Designated Project under the Canadian Environmental Assessment Act, 2012* (CEA Agency 2012). However, the Fraser River estuary has been the subject of numerous environmental studies during the past few decades, and is therefore supported by a large body of contemporary information that will inform an assessment of the Project.

2.0 PROJECT INFORMATION

The following section provides a description of the Project, as well as an overview of the context and objectives of the Project. It also describes the Project components and sub-components, the Project schedule, and Project activities that will be required to support construction and operations activities.

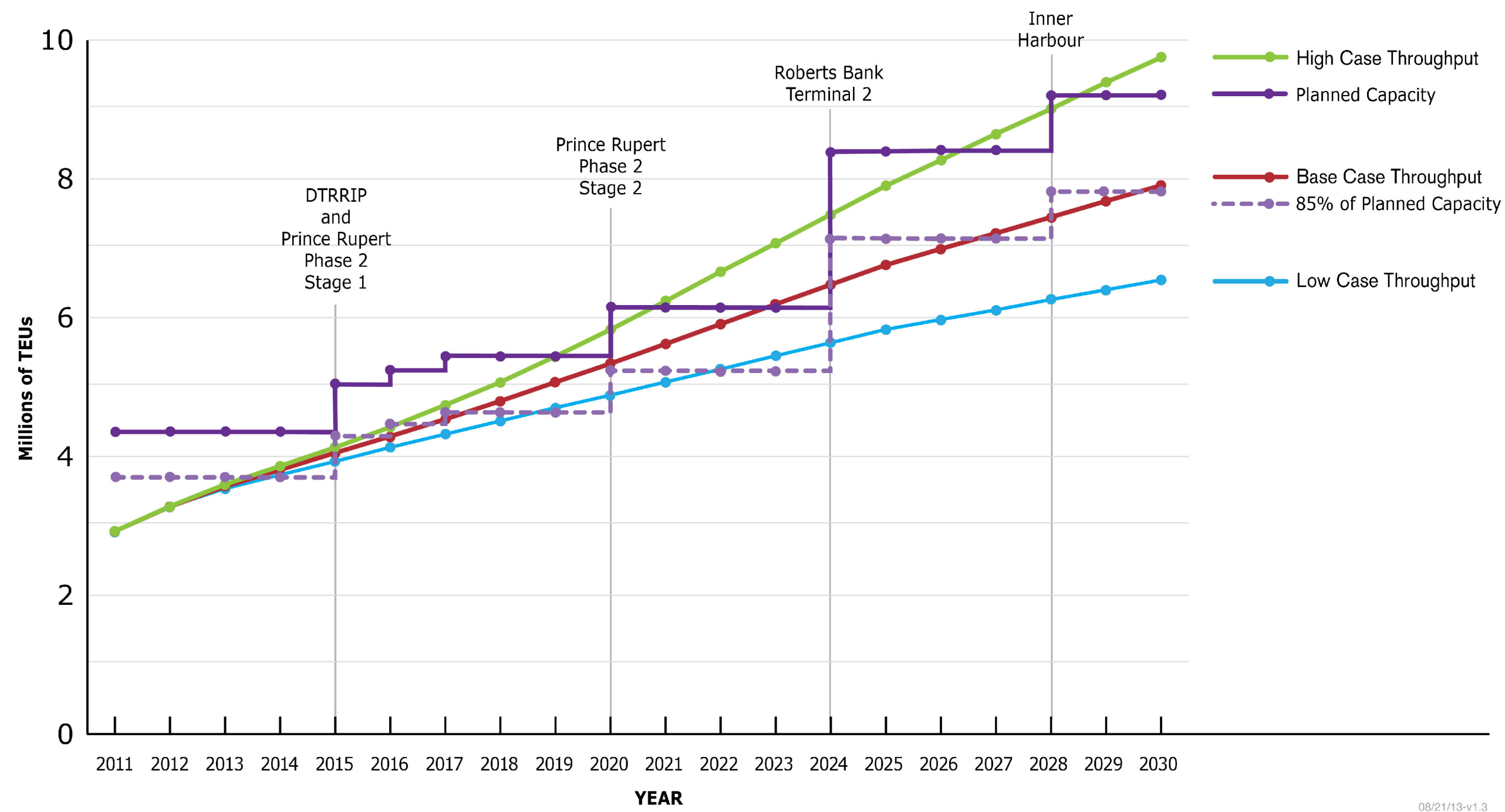
2.1 CONTEXT AND OBJECTIVES OF THE PROJECT

2.1.1 Economic Forecast

In 2012, almost 3.3 million TEUs transited the Canadian West Coast, of which 2.7 million TEUs moved through terminals within PMV's jurisdiction. Annual third-party forecasts show that West Coast container traffic is expected to double over the next 10 to 15 years and triple by 2030 (WorleyParsons Canada and Seaport Consultants Canada Inc. 2011a; Ocean Shipping Consultants May 2012; Ocean Shipping Consultants July 2013). The graph below (**Figure 4.1**) shows container forecasts for Canada's West Coast (Ocean Shipping Consultants 2013). The stepped lines show projects, both underway and planned, that will accommodate these increases in demand. Independent container traffic projections between 2011 and 2013 have all demonstrated that existing container capacity on the West Coast of Canada, and in the Lower Mainland will soon become constrained, requiring additional capacity as early as 2015 (WorleyParsons Canada and Seaport Consultants Canada Inc 2011b). Current TEU capacity at Roberts Bank is 1.8 million TEUs; upon completion of the Deltaport Terminal, Road and Rail Improvement Project in 2016/17, this capacity will further increase to 2.4 million TEUs (PMV 2013). Even with these improvements at PMV's terminals, as well as planned investments at the Fairview Terminal in Prince Rupert, current demand forecasts indicate the Canadian West Coast will still require additional container capacity by the early 2020s.

Figure 4.2. provides a comparison of actual Canadian West Coast container traffic volumes against a container traffic forecast that was completed by Ocean Shipping Consultants in 2001. Despite the dip in container volumes that occurred in 2009 following the global financial crisis, container traffic still tracked the high case forecast.

WEST COAST - FORECAST AND PLANNED CAPACITY INCREASES



08/21/13-v1.3



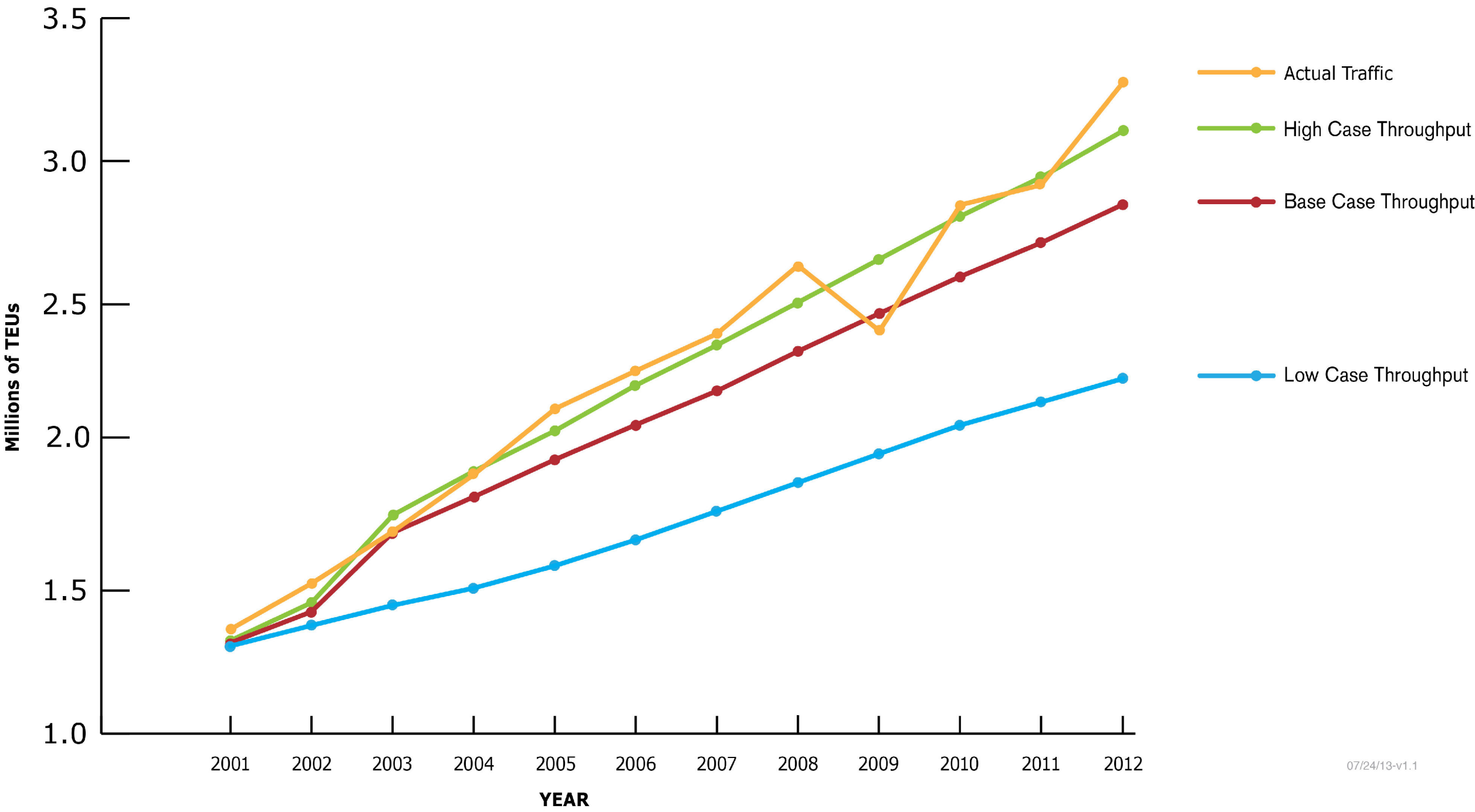
ROBERTS BANK TERMINAL 2

FORECAST AND PLANNED CAPACITY INCREASES

DATE: SEPTEMBER 2013

FIG No. 4.1

West Coast Container Traffic: Forecast (2001) vs. Actual



07/24/13-v1.1



ROBERTS BANK TERMINAL 2

2001 FORECAST AND ACTUAL CAPACITY INCREASES

DATE:	SEPTEMBER 2013	FIG No.	4.2
-------	----------------	---------	-----

2.1.2 Meeting Demand

In keeping with PMV's mandate to support the growth of Canadian trade, and in direct response to the growing needs of Canadian industry and consumer demand, PMV is proposing infrastructure improvements to enhance container capacity and strengthen Canada's Asia-Pacific Gateway.

Container terminals require sufficient water depth for deep-sea vessel access. PMV's Land Use Plan (2008) requires that the use of existing terminals is maximised before any new facilities are built. In planning for future capacity within the guidelines of the Land Use Plan, PMV considered the following opportunities for creating container capacity.

Increase the Capacity and Efficiency of Existing Container Terminals

Significant improvements were achieved in 2005 at Vanterm and Centerm, container terminals in Burrard Inlet, resulting in a combined increase of 75 percent (%) (600,000 TEUs) in container capacity. Further substantial expansion at these terminals is not possible in the near term given that PMV has existing lease agreements in place or does not own or manage the adjacent land needed to further expand the terminals.

The Deltaport Third Berth Project at Roberts Bank, which opened in 2010, resulted in capacity for moving an additional 600,000 TEUs, equivalent to a 50% increase in capacity. The DTRRIP, which is scheduled for completion in 2015, will provide a further 600,000 TEUs of container capacity at Roberts Bank. DTRRIP provides improvements to the existing terminal, increasing the capacity of the IY and improving the efficiency of the road and rail infrastructure leading to the terminal.

Fraser Surrey Docks, a PMV container facility on the Fraser River, has existing container facilities and land available for expansion; however, larger vessels such as those currently visiting Deltaport cannot be turned in the Fraser River due to their length, limiting the ability of the terminal to achieve additional container throughput. Water depth restrictions of the Fraser River also limit access by deep-sea container ships to Fraser Surrey Docks.

Converting Existing Under-utilised Cargo Terminals to Container Terminals

Lynnterm, an existing break bulk cargo terminal in North Vancouver, was considered for conversion to container handling. However, the terminal's adjacent road network has insufficient capacity to accommodate the number of container trucks required, which limits its potential as a container terminal that could meet forecasted demand. Additionally, part of the Lynnterm terminal is being considered for use by its leasee to help accommodate the growth in PMV's bulk sector.

Additional container capacity on the Canadian West Coast was added in 2007 when the Port of Prince Rupert converted its Fairview terminal from a break bulk terminal to a container terminal with a capacity of 750,000 TEUs. Future expansions of the Fairview terminal are expected to increase its capacity to 2 million TEUs. However, based on forecasts, the improvements by PMV and the Port of Prince Rupert will still not be enough to meet the additional container capacity that will be required on the West Coast of Canada during the next 10 to 15 years (see **Figure 4.1**).

Building a New Terminal

Given the constraints of the options discussed above, PMV has been exploring the potential for a new terminal. The Project is considered to be the most viable option to meet the forecasted need for increased container capacity on the West Coast of Canada. Large infrastructure projects like this require a long lead time, which is why PMV is planning now to ensure there is enough capacity to meet future demand for containerised trade.

Roberts Bank is well positioned to accommodate future trade growth, and offers several competitive advantages, including a well established international shipping route with excellent access to Lower Mainland markets and major North American road and rail transportation corridors.

In terms of regional capacity to meet the anticipated growth in container traffic, the terminal and infrastructure improvements will complement other recent and ongoing infrastructure improvements in the Lower Mainland, such as the SFPR and the Roberts Bank Rail Corridor Program, which are designed to improve safety, decrease traffic congestion, and increase efficiency of the movement of goods to North American markets.

PMV established the following objectives for the Project:

- Meet demand for containerised trade growth on behalf of Canada and Canadians to 2030 (**Section 2.1**);
- Ensure sustainable development objectives continue to play a key role in the design and operations of the Project – considering environmental, social, and economic factors;
- Provide economic benefits, including job creation, to the region, BC, and Canada;
- Improve the efficiency of moving goods at Roberts Bank, including marine traffic and on-terminal operations; and
- Align with federal and provincial strategies to continue to strengthen Canada's Asia-Pacific Gateway.

2.1.3 Economic Benefits

Trade stimulates local, regional, and national economies, increases tax revenue for local municipalities and higher levels of government in BC, and increases the number of jobs for British Columbians and Canadians. Container handling activities currently generate more than 11,100 person-years of direct employment, while the handling and distribution of containerised cargo supports nearly 27,200 person-years of employment and generates \$2.6 billion in economic value. The tax revenues from trade activities go to support essential programs such as health care, education, and other social and environmental priorities.

The preliminary capital cost estimate for the Project is more than \$2 billion, though this estimate will be refined during the Project's final development and design stages. The Project will be developed by PMV based on private funding and commercial arrangements to maintain financial self-sufficiency within its mandate under the *Canada Marine Act*. The Project currently does not rely on federal or provincial government funding sources.

The Project will facilitate the demand for trade, thereby expanding economic growth and increasing employment opportunities during construction and operations, all of which benefit the Province of BC and Canada.

The economic benefits to Canada from the Project will include direct, indirect, and induced employment growth, and gains in economic output/gross domestic product (GDP), as well as increased government revenues during the construction period and throughout the Project's operating life-cycle.

During the **six-year construction period** the following economic effects will be generated (Worley Parsons Canada 2012):

- Construction employment estimated at 2, 500 jobs over six years, estimated at \$690 million in wages;
- Indirect and induced employment estimated at 2, 000 jobs over six years, estimated at \$450 million in wages; and
- Direct, indirect, and induced employment totals at 4, 500 jobs for six years, estimated at \$1.14 billion in wages.

The construction phase will also result in approximately \$4.1 billion of total economic output to the Canadian economy, and approximately \$1.63 billion in resulting GDP, estimated at current price levels. The construction period will also contribute the following to government revenues:

- Federal taxes paid by construction employers and employees totalling approximately \$145 million;

- Provincial taxes paid by construction employers and employees totalling approximately \$177 million; and
- Municipal taxes paid by construction employers and employees totalling approximately \$28 million.

Once **operating at capacity**, it is estimated that the Project will generate the following economic benefits (WorleyParsons Canada 2012):

- Direct employment estimated at 9,200 jobs, with wages of approximately \$440 million per year;
- Indirect and induced employment estimated at 9,000 jobs, with wages of approximately \$180 million per year;
- The above direct, indirect, and induced employment totals 18,200 jobs, with wages of approximately \$620 million per year.

The operations-phase, at full capacity, economic output increase for the Canadian economy is estimated to be approximately \$3.1 billion per year, and the resulting Canadian GDP increase is estimated at approximately \$1.66 billion per year, based on current price levels. During the operations phase of the Project, annual payments to the three levels of government are estimated as follows:

- Federal taxes paid by operating employers and employees totalling approximately \$126 million per year;
- Provincial taxes paid by operating employers and employees totalling approximately \$63 million per year; and
- Municipal taxes paid by operating employers and employees totalling approximately \$29 million per year (WorleyParsons Canada 2012).

2.2 PROJECT LOCATION AND ORIENTATION

The Project's terminal will be located immediately west of the existing Roberts Bank terminal facilities, approximately 5.5 km from the east shore end of the causeway. The terminal will be oriented parallel to the shoreline (perpendicular to the causeway) and will extend approximately 600 metres (m) further offshore than the edge of the existing terminal at Roberts Bank. The terminal will be rectangular in shape with a berth face length of 1,300 m to accommodate the mooring of three ships. The terminal width will be 700 m to support terminal components. The total marine footprint of the terminal will be approximately 117 ha.

The orientation of the new terminal has been designed to facilitate the berthing of container ships, and to minimise disturbance to marine processes. Please refer to **Figure 5.0** for the location and orientation of the Project terminal.

The following conventions have been adopted to describe the alignment and orientation of the existing infrastructure based on existing rail user conventions for the causeway, and on terminal operator conventions for the existing terminal land area:

- The causeway, although oriented 45 degrees (°) east of true north, is referred to as running east-west.
- The south shoreline of the causeway is adjacent and parallel to Deltaport Way and Roberts Bank Way South.
- The wharf face of the Project container terminal is referred to as running east-west with the wharf face itself being the south edge. The east edge of this terminal is the edge closest to Westshore Terminals.



Document Name: 00719-00-GIS-6073 Figure5 Project Orientation

	ROBERTS BANK TERMINAL 2	
	ROBERTS BANK TERMINAL 2 PROJECT ORIENTATION	
	DATE: SEPTEMBER 2013	FIG No. 5.0

2.3 PROJECT COMPONENTS

The following section describes the components and activities of the Project, which will facilitate an additional 2.4 million TEUs per year of container capacity at Roberts Bank. The Project includes the new terminal and expanded causeway to accommodate the transfer of containers between the ship and the terminal. The Project location and components are illustrated in **Figure 6.0**.

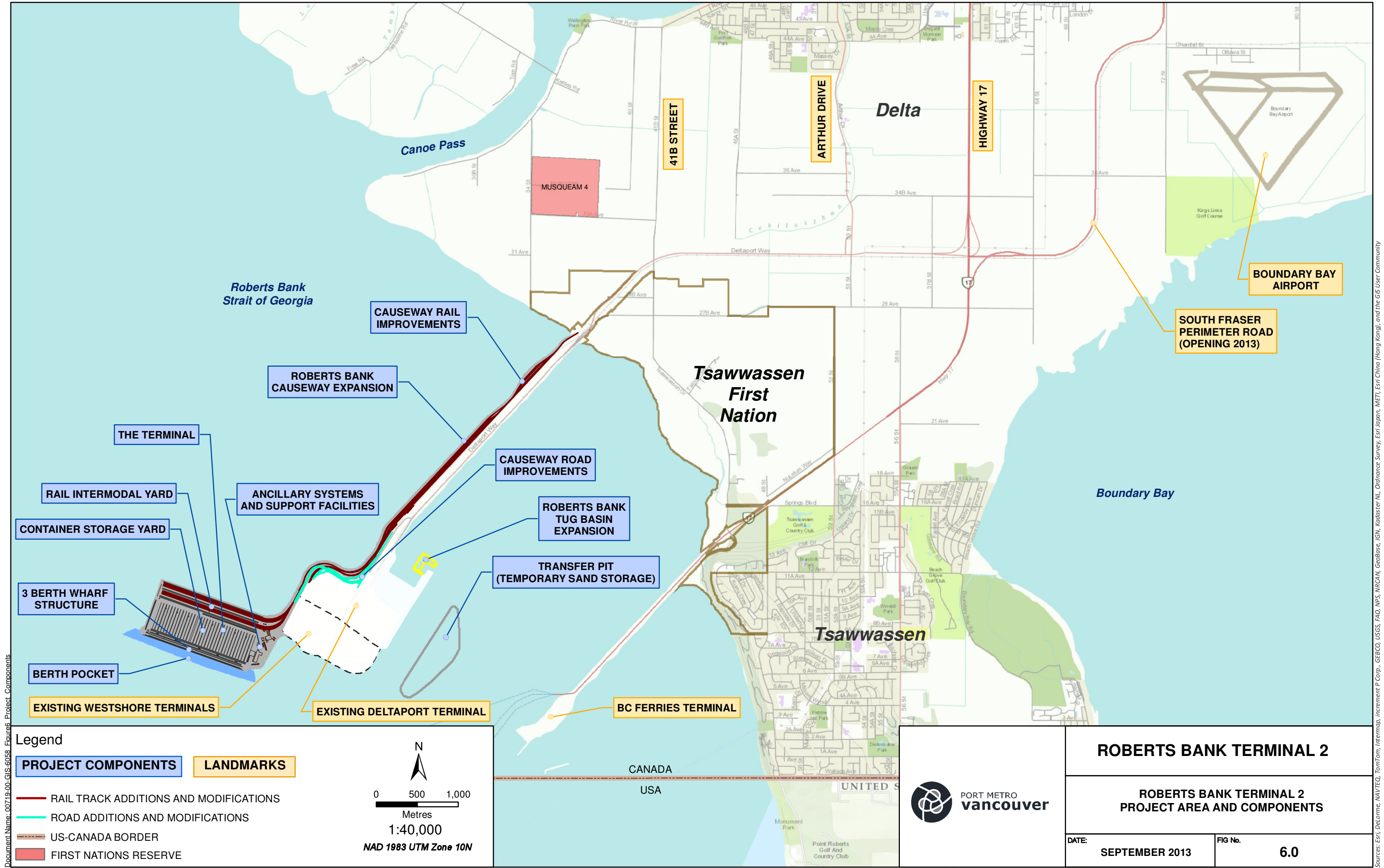
The Project components and activities listed below are based on preliminary engineering designs, and have been confirmed to be technically feasible to accommodate transfer of containers between the ship and terminal to the road and rail network. Final designs will include changes required to address outcomes from the EA and regulatory review process. A preliminary synopsis of potential Project effects is described in **Section 6.0**.

For the purposes of this Project Description, the Project Area is defined as land and/or land covered by water that is occupied by Project facilities and structures.

By way of the proposed construction phasing, as stated in **Section 2.4** and summarised in **Section 2.5**, the Project components and sub-components will include the following (also outlined in **Table 3**):

- **Berth pocket;**
- **Marine terminal:**
 - Three-berth wharf;
 - Container storage yard;
 - Rail IY; and
 - Ancillary systems and support facilities.
- **Tug basin expansion;**
- **Causeway expansion:**
 - Rail improvements; and
 - Road improvements.

The conceptual plan view of the terminal layout is presented in **Figure 7.0**, and the expanded tug basin is shown in **Figure 9.0**.



Document Name: 00719-00-GIS-6058_Figure6_Project_Components

Legend

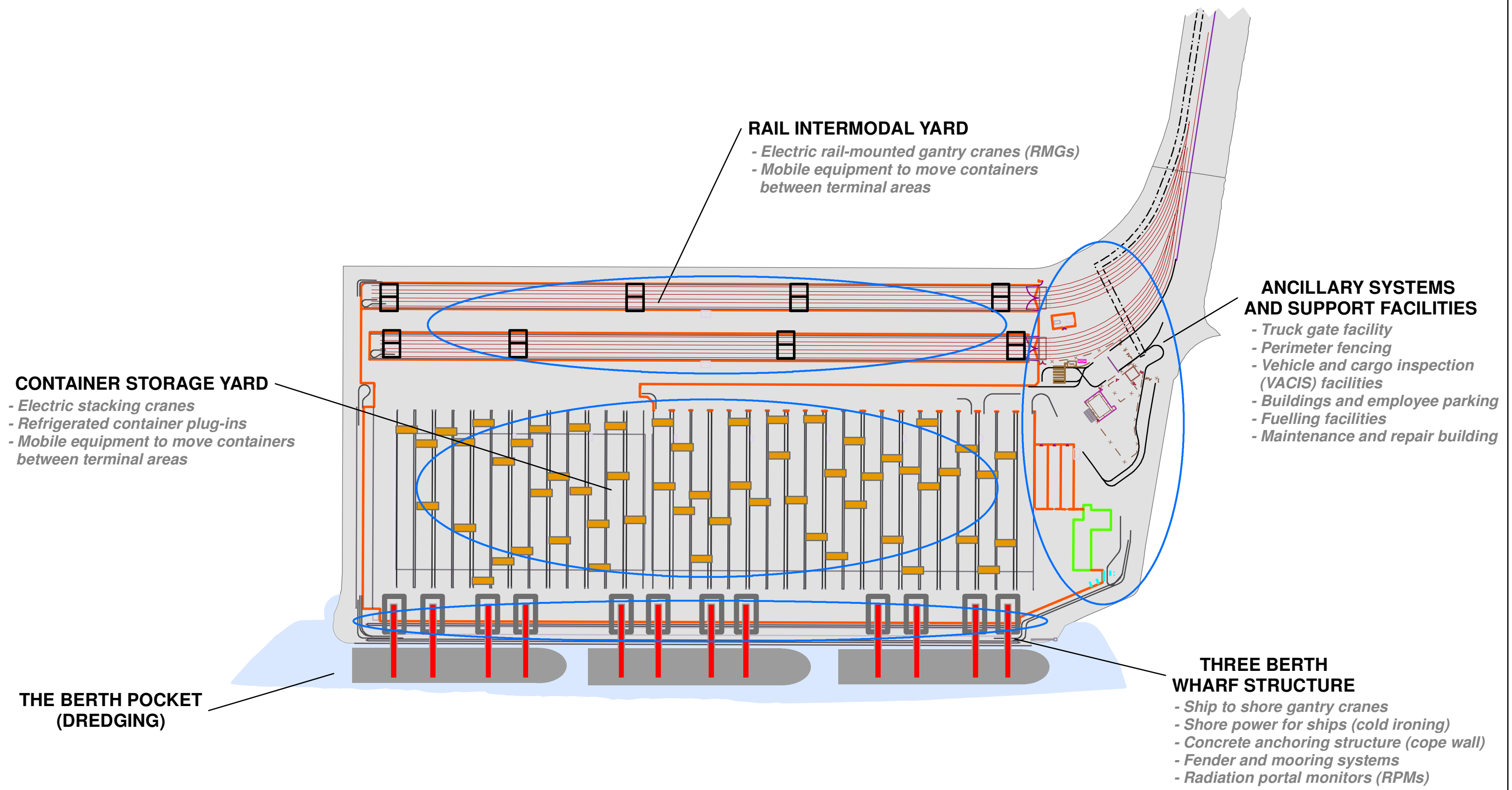
PROJECT COMPONENTS	LANDMARKS
RAIL TRACK ADDITIONS AND MODIFICATIONS	EXISTING WESTSHORE TERMINALS
ROAD ADDITIONS AND MODIFICATIONS	EXISTING DELTAPORT TERMINAL
US-CANADA BORDER	BC FERRIES TERMINAL
FIRST NATIONS RESERVE	

0 500 1,000
Metres
1:40,000
NAD 1983 UTM Zone 10N

ROBERTS BANK TERMINAL 2	
ROBERTS BANK TERMINAL 2 PROJECT AREA AND COMPONENTS	
DATE: SEPTEMBER 2013	FIG No. 6.0

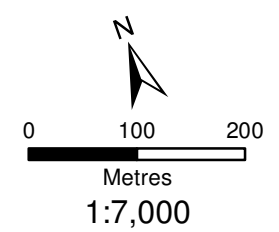
Sources: Esri, Delorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

Document Name: 00719-00-GIS-6007 Figure7 Conceptual Plan Terminal Components



- Additional Components Found Across Terminal**
- CCTV cameras
 - High and Low Mast lighting
 - Civil utility systems - supply of potable and fire protection water, collect and discharge storm-water, and treat and discharge sanitary sewage.

Notes:
Locations and dimensions approximate **NAD 1983 UTM Zone 10N**



	ROBERTS BANK TERMINAL 2	
	CONCEPTUAL PLAN VIEW OF TERMINAL LAYOUT	
	DATE: SEPTEMBER 2013	7.0

2.3.1 The Berth Pocket

The berth pocket is the dredged mooring basin adjacent to the terminal wharf structure where the container ships will be berthed and moored to the wharf. The berth pocket and the associated approach and departure angles will measure approximately 1,700 m long by 62 m wide. It will be dredged to a depth of approximately 20 m below the existing seabed at the proposed berth face, densified, and backfilled to a level 11.6 m below the current seabed (after densification). This dredging, densifying, and backfilling activity will be conducted to provide adequate depths for safe navigation of container ships while accessing the three-berth wharf and stabilisation of the seabed to avoid scouring due to propeller wash. The berth pocket will feature a depth of 18.4 m at lower low water (LLW) level to meet the performance requirements for the adjacent new wharf foundation.

2.3.2 The Marine Terminal

The marine terminal consists of:

- Three-berth wharf;
- Container storage yard;
- Rail IY; and
- Ancillary systems and support facility.

The terminal dimensions are 1,500 m average length, 700 m width, varying 8.75 m to 6.5 m height above mean sea level, and a 1,300 m berth length. It will have an approximate total useable area of 108 ha. To accommodate for this space requirement, the total terminal footprint, including protected marine slopes, and the three-berth wharf will be approximately 117 ha.

2.3.2.1 Three Berth Wharf Structure

The purpose of the wharf structure is to allow berthing and mooring of vessels, support ship-to-shore gantry cranes, and provide vessel shore power and other amenities (see **Figure 8.0**). The gantry cranes are used to move containers between the ships and the terminal. Shore power will allow the ships to turn off their diesel engines and associated electrical generators and reduce air emissions by plugging into an electrical power source at the wharf.

The wharf length was based on an analysis of the world shipping fleet and future trends in container shipping. The 1,300-m berth length, berth pocket, and navigation approaches will be designed to accommodate the simultaneous mooring of three ships: one Post Panamax EEE type vessel with a capacity of 18,000 TEU and a draught of 15.5 m, and two Panamax 2014 vessels with capacities of 12,000 TEU and draughts of 15.2 m (ship parameters are summarised in **Table 2**).

Table 2 Roberts Bank Terminal 2 Design Ship Parameters

Ship Parameters	Panamax 2014 (Launched in 2006)	Post Panamax EEE Type (Launched in 2013)
Length Overall	366 m	400 m
Deadweight	140,000 tonnes	165,000 tonnes
Draught	15.2 m	15.5 m
Beam	49 m	59 m
Capacity	12,000 TEU	18,000 TEU

The wharf will be constructed using open-top concrete caissons tied together at the wharf face with a concrete cope wall (cap beam). The elevation, relative to chart datum (CD), of the wharf structure is 8.75 m, which is designed to minimise wave overtopping during storm events and accommodate projected future sea level rise in the twenty-first century (BC MOE 2011) as well as long-term settlements.

In addition a mooring dolphin will be installed at the east end of the wharf.

A cross-section of the caisson wharf structure is presented in **Figure 8.0** below.

2.3.2.2 Container Storage Yard

Following the construction of the terminal landmass, a container storage yard with electrically powered stacking cranes or a similar type of equipment will be developed for transferring and storing containers received by ship, rail, or truck. In addition to the electrically powered stacking cranes, mobile (horizontal transfer) equipment will be used to move containers between terminal areas, and may include shuttle carriers, automated guided vehicles (AGVs), and/or tractor trailers. Refrigerated container plug-ins on access platforms will also be located within the container yard.

2.3.2.3 Rail Intermodal Yard

A rail IY served by electrically powered rail-mounted gantry cranes (RMGs), or a similar type of equipment, will be required to transfer containers to and from railcars to mobile equipment. The mobile (horizontal transfer) equipment will be used to move containers between the container and IYs.

2.3.2.4 Ancillary Systems and Support Facilities

Truck Gate Facility

A multi-lane truck gate facility will be used to control truck entry and exit for the terminal, and will be equipped with control gates, truck scales, and various security and inspection features, including cameras and scanning equipment.

Systems to Maintain Site Security

Site security systems will be located throughout the terminal to ensure that port operations meet expected community, national, and international standards. Security equipment will include perimeter fencing, closed-circuit television (CCTV) cameras, radiation portal monitors (RPMs), and vehicle and cargo inspection system (VACIS) facilities.

Civil Utility Systems

Potable water will be supplied from the Corporation of Delta's water system and distributed throughout the site for domestic supply to terminal buildings and ships moored at the berths. Hydrants will also be located throughout the site for fire water supply.

Sanitary discharge will be collected from serviced buildings and piped to a new sewage treatment plant on the east side of the terminal. The new plant will be similar to the existing plant at Roberts Bank, updated to current standards, and expected to treat a volume of 60 cubic metres (m³) of effluent per day.

The stormwater system will include oil interceptors to trap any surface oil and grit that reaches the drainage system; each outfall will be fitted with shutoff valves to terminate flow if required.

Support Facilities

Various buildings will be located on the terminal site, most of which will be situated at the east side of the terminal. Buildings that house facility infrastructure and equipment (such as electrical substations) will be simple, low-rise, flat-roofed buildings. An employee parking area will also be located on the east side of the terminal, near the entrance gate.

Fueling facilities for terminal equipment only will be located near the maintenance and repair building, located at the southeast corner of the terminal. There is no plan to, or facility for, bunkering/fuelling of container ships.

One system for both gasoline and diesel fuel will service manually operated terminal equipment. A second system will service any automated equipment that may be required in the yard, and will include fuelling stations. Infrastructure for fuelling facilities will include above-ground, monitored, double-walled tanks for fuel storage protected on all sides by guard posts and sized as follows:

- Diesel Fuelling Tank: 150,000 litres (L)
- Gasoline Fuelling Tank: 19,000 L

Power and Lighting

Electrical power will be obtained from the existing BC Hydro transmission line on the Roberts Bank causeway. The line to the new terminal's substation will transition to an underground cable from the existing Deltaport and Westshore Terminals distribution point. Power distribution within the terminal area will all be *via* an underground distribution system from the terminal's main substation.

No new overhead transmission line will be required to satisfy the power requirements for the Project. For safety considerations, lighting will be installed on the terminal to enable 24-hour operations. Some of the light poles will be equipped with fibre optics and power for cameras, receivers, and transmitters to interface with the terminal's operation control system.

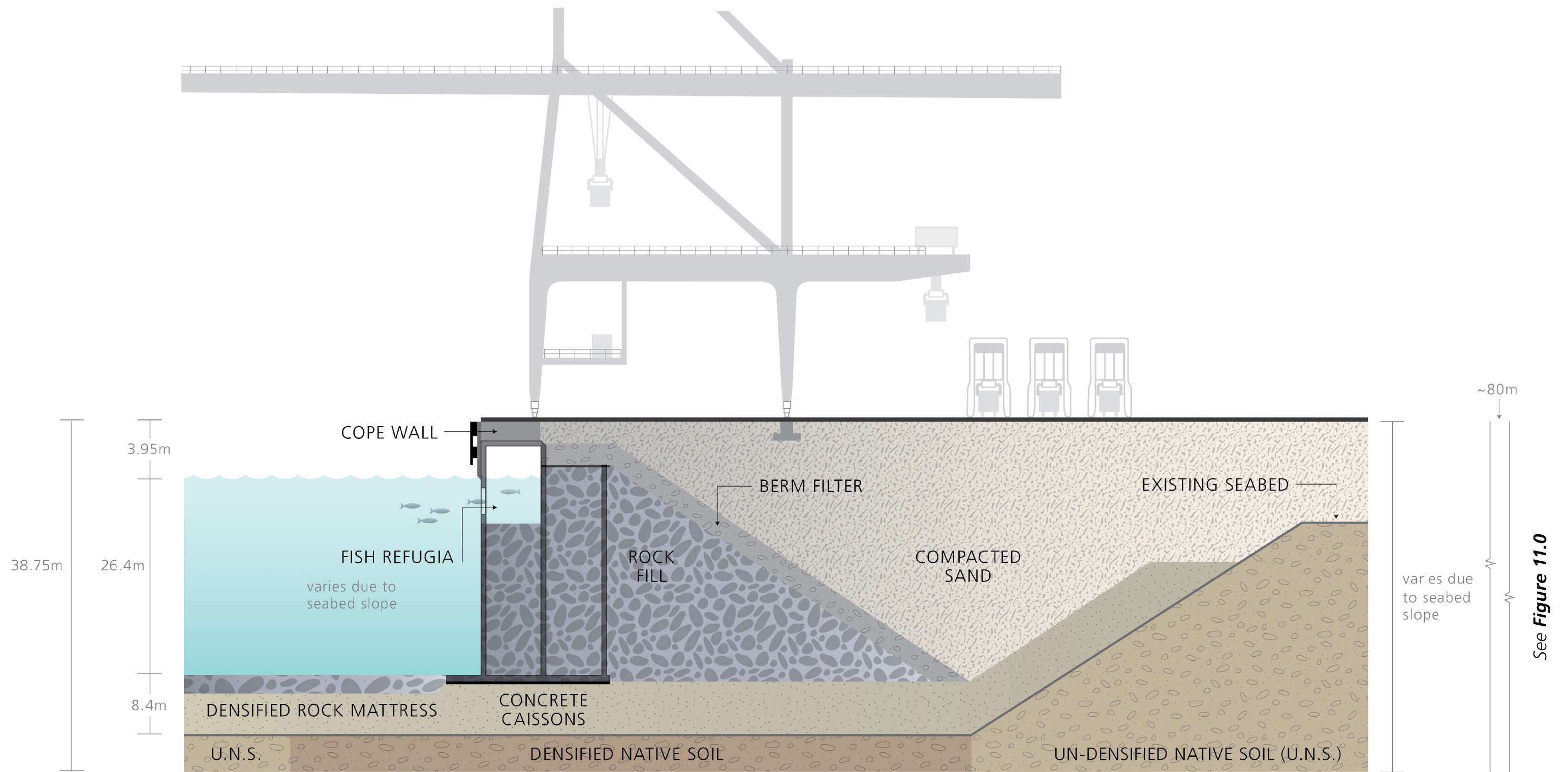
2.3.3 Tug Basin Expansion

Expanded tug operations will be required to provide the additional tug capacity required for the Project. The existing tug basin, located in the inter-causeway, has a footprint of 1.4 ha that will be expanded by approximately 2.5 ha, for a total footprint of 3.9 ha, as shown in **Figure 9.0** to meet the following functional requirements for the Project:

- Capacity to accommodate two tug operation contractors (one existing and one new), each with separate access and floats for independent operation;
- Provision for each tug operator moorage for three 30 m, 80 tonne pull tractor tugs; two 18 m line handling boats, and two 6-m small crafts; and
- Tugs from the expanded basin are expected to be fueled in the Burrard Inlet fueling station as per existing tug operator's practice. No tug operator fuel storage facilities are planned at Roberts Bank

Figure 9.0 illustrates a conceptual design for the tug basin.

Document Name: 00719-00-GIS-6074 Figure8 Wharf Structure

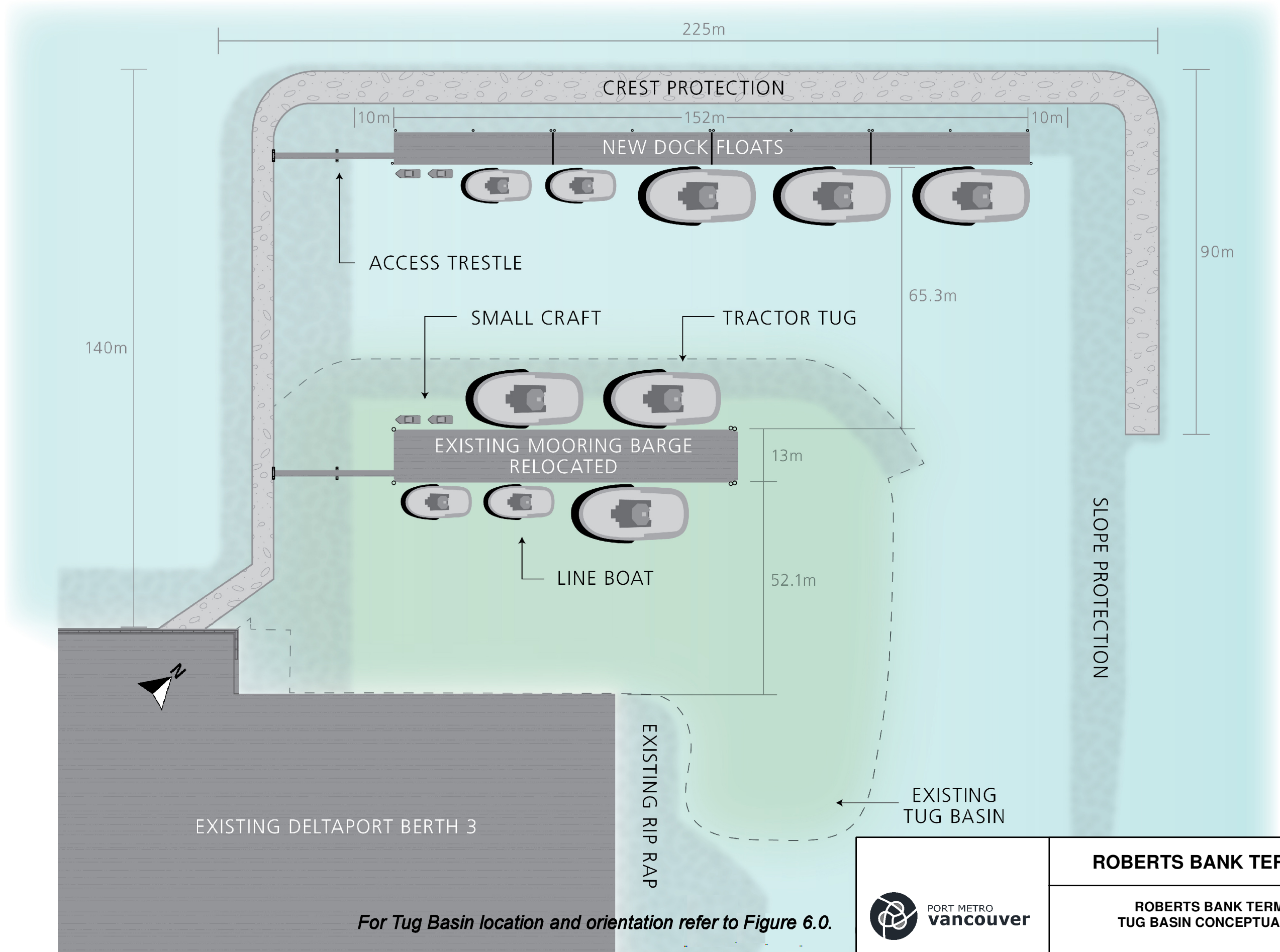


ROBERTS BANK TERMINAL 2

ROBERTS BANK TERMINAL 2 CROSS SECTION OF CAISSON WHARF STRUCTURE

DATE:
SEPTEMBER 2013

FIG No.
8.0



For Tug Basin location and orientation refer to Figure 6.0.

	ROBERTS BANK TERMINAL 2	
	ROBERTS BANK TERMINAL 2 TUG BASIN CONCEPTUAL DESIGN	
DATE:	SEPTEMBER 2013	FIG No. 9.0

2.3.4 Causeway Expansion

The existing causeway linking the rail network to the existing Roberts Bank terminals will be widened on the north side of the causeway, requiring an additional land area of approximately 42 ha for terminal construction and 1 ha of existing BCR land for the tie-in tracks to the existing rail network.

The existing causeway is made up of the following rail infrastructure:

- North Yard – four tracks
- South Yard – seven tracks
- P Yard – four tracks
- Intermodal Yard (IY) – ten tracks
- Mainline leads – four tracks

The width of the expanded causeway will vary according to the requirements of the road and rail infrastructure needed for the Project and to minimise impacts on marine habitat.

Causeway components are expected to include the following:

- Causeway rail improvements including:
 - New lead tracks and tie-in to existing rail network; and
 - Two new rail yards-T Yard and Locomotive/Bad Order Setout Yard.
- Causeway road improvements including:
 - Overpass structure;
 - Access road; and
 - Emergency access road.
- Vehicle access and control system;
- Causeway Utility Corridor.

2.3.4.1 Causeway Rail Improvements

Causeway rail improvements associated with the Project are expected to include the following:

- Addition of two lead rail tracks to connect to the 12 new 1,250 m (4,100 foot (ft.))⁶ working tracks in the intermodal yard (IY);
- Addition of seven 1,830 m (6,000 ft) support and switching rail tracks in a new yard (T-Yard);

⁶ For railway track and train lengths, the common practice by railway users is to express lengths in feet rather than metres.

- Addition of a new locomotive and bad-order car setout yard consisting of four 305 m (1,000 ft.) to 610 m (2,000 ft.) bad order railcar set-out tracks and two 550 m (1,800 ft.) locomotive set-out tracks;
- Relocation of existing coal tracks adjacent to Roberts Bank Way North to accommodate the overpass and road access; and
- Tie-in of two lead tracks serving the Project to the existing rail network.

Figure 10.1 and **10.2** illustrate these rail improvements.

2.3.4.2 Causeway Road Improvements

The existing Roberts Bank Way North will remain two lanes from the DTRRIP overpass to the new Project overpass. Roberts Bank Way North will continue to allow traffic to enter and exit the Roberts Bank terminals, and will also connect to a new three-lane causeway access road to the Project. These proposed road improvements are illustrated in **Figure 10.1** and **10.2**.

A new overpass will separate road traffic bound for the Project from traffic bound for Westshore Terminals or the Deltaport terminal. The overpass will be built on the north side of the existing causeway, near the offshore end, and will extend onto the widened causeway. The overpass will span the North Yard tracks leading to Westshore Terminals, and will connect Roberts Bank Way North to the Project access road.

The access road to the Project, north of the new overpass structure, will follow the rail alignment that connects to the IY. The access road has been configured with two westbound lanes and one eastbound lane.

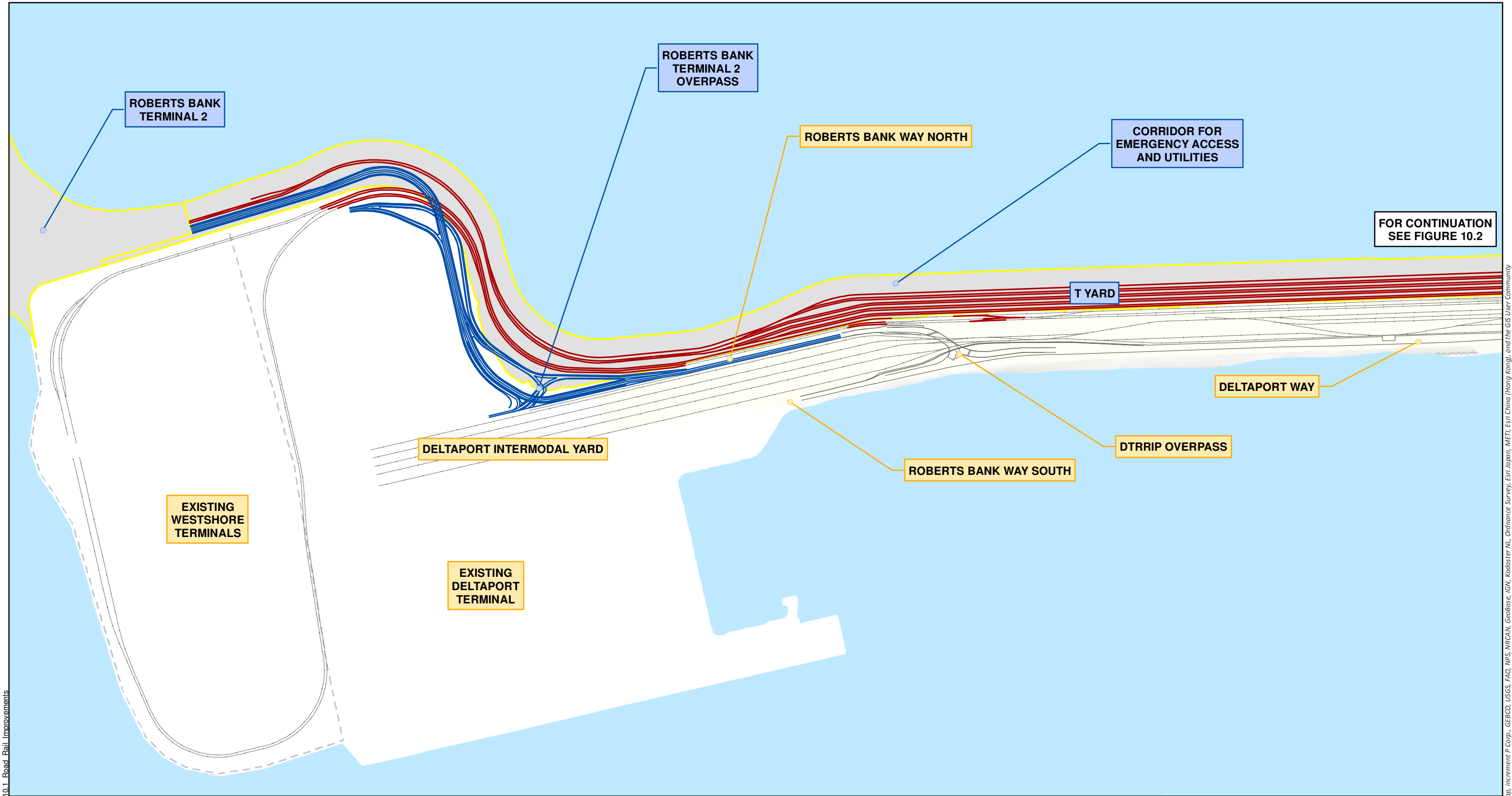
A gravel emergency access road will be located on the north side of the widened causeway to allow for uninterrupted access to the Roberts Bank terminals in the unlikely event that the main causeway road, Deltaport Way, is blocked. Located within a 10-m-wide right-of-way, the 8-m-wide emergency access road will allow for two-way traffic on a gravel surface. This road will also be used for maintenance purposes.

2.3.4.3 Vehicle Access and Control System

To provide security and prevent unregistered container trucks from gaining access to the Project, a vehicle access control system (VACS) will be incorporated along the causeway access road. The VACS will include two gates for westbound vehicles and one gate for eastbound trucks exiting the terminals. Vehicles denied access to the Project will be required to turn around.

2.3.4.4 Causeway Utility Corridor

A 12-m-wide utility corridor is located adjacent to the emergency access road to support the routing of utilities such as a new water-main, underground power distribution, and other Project and non-Project-related future components.



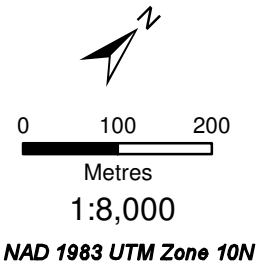
Document Name: 00719-00-GIS-6042_Figure10.1_Road_Rail Improvements

Legend

PROJECT COMPONENTS

LANDMARKS

- BOUNDARY OF PROJECT AREA
- EXISTING RAIL TRACK
- RAIL TRACK ADDITIONS AND MODIFICATIONS
- ROAD ADDITIONS AND MODIFICATIONS



ROBERTS BANK TERMINAL 2

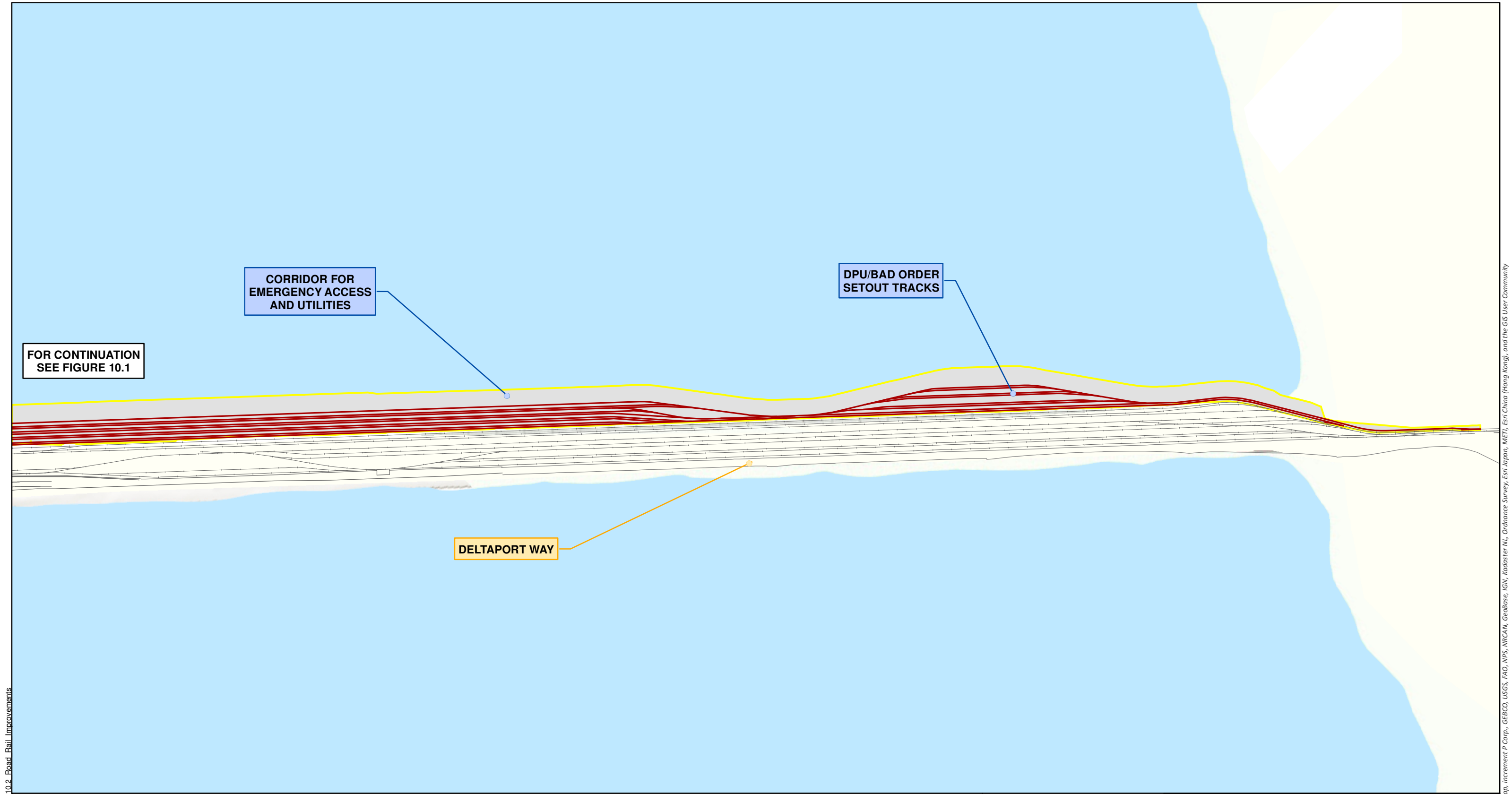
ROAD AND RAIL IMPROVEMENTS

DATE: SEPTEMBER 2013

FIG No. 10.1

Sources: Esri, Delorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

Document Name: 00719-00-GIS-6042_Figure10.2_Road_Rail Improvements



Legend

PROJECT COMPONENTS

LANDMARKS

- BOUNDARY OF PROJECT AREA
- EXISTING RAIL TRACK
- RAIL TRACK ADDITIONS AND MODIFICATIONS

0 100 200
Metres
1:8,000
NAD 1983 UTM Zone 10N



ROBERTS BANK TERMINAL 2	
ROAD AND RAIL IMPROVEMENTS	
DATE: SEPTEMBER 2013	FIG No. 10.2

Sources: Esri, Delorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

2.4 CONSTRUCTION AND OPERATION ACTIVITIES

Construction of Project components is planned to be built from the water in towards the shoreline. This will require construction phasing in the following order:

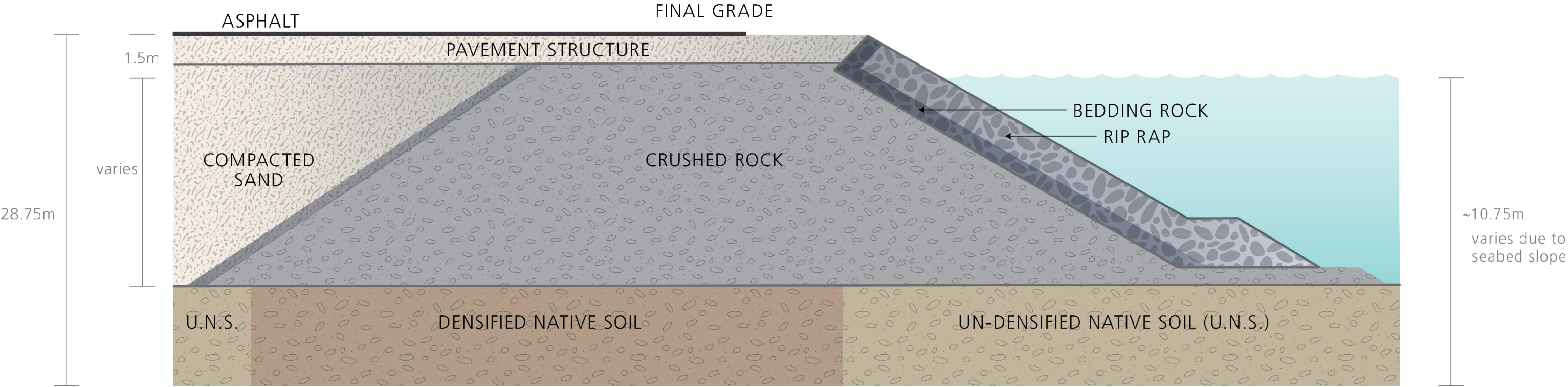
1. Creation of containment dykes;
2. Dredging;
3. Soil densification and improvement;
4. Land Development;
5. Building of Three Berth Wharf Structure;
6. Development of Terminal and Causeway Infrastructure; and
7. Expansion of the existing tug basin.

2.4.1.1 Creation of Containment Dykes

Containment dykes will be installed to isolate the new terminal land development and expanded causeway from the surrounding marine environment (see **Figure 11.0**). The containment dykes will remain a permanent part of the filled area. The construction of containment dykes and subsequent infilling will be completed in consecutive stages over an approximate period of four years. Perimeter and internal dykes will be constructed using approximately 3.7 million m³ of rock, gravel, and riprap, sourced from local quarries with the outer exposed slope protected from waves by riprap, and the inner slope faced with a filter layer of gravel to minimise any seepage of fines from the retained fills into the surrounding marine environment.



CREST OF EAST BASIN CONTAINMENT DYKE *
(See magnified cross-section below)



* Cross-section shown for east side is typical for the other sides with minor modifications.



ROBERTS BANK TERMINAL 2

**ROBERTS BANK TERMINAL 2
CONTAINMENT DYKES**

DATE:
SEPTEMBER 2013

FIG No.
11.0

2.4.1.2 Dredging

The dredge area footprint for the combined berth pocket and caisson trench, as described below, will be approximately 30 ha. Dredging will be performed using cutter suction dredge equipment. The estimated 4.2 million m³ of dredged material will be used as backfill within the terminal perimeter dykes. It is expected that the majority (approximately 85%) of this dredged material will be re-used as terminal fill (approximately 3.6 million m³ of useable fill). The balance, consisting of unusable, fine sediments remaining in suspension (approximately 15%), will require disposal at sea (DAS) via a submarine pipeline at an approved DAS location. DAS is the regulated process by which Environment Canada individually assesses and permits the disposal of low-risk materials often with conditions, under the *Canadian Environmental Protection Act*.

Berth Pocket

The berth pocket covers an area of 17.4 ha. It will be dredged to a depth of approximately 20 m below the existing seabed at the proposed berth face, densified and backfilled to a level 11.6 m below the current seabed (after densification) to provide adequate depths for safe navigation for container ships accessing the three berth wharf, with a depth of 18.4 m at LLW, and to meet the performance requirements for the adjacent new wharf foundation.

Caisson Trench

The caisson trench covers an area of 13.3 ha. It will be dredged, densified, and backfilled similar to the adjacent berth pocket. This dredging below the planned caisson wharf structure is required to remove *in situ* low permeability, and loose, sandy silts with poor seismic performance characteristics. The dredgeate will be transported hydraulically through a pipeline and placed within the containment dykes, similar to the berth pocket.

The tug basin expansion will require dredging of approximately 140,000 m³ of *in situ* soil via clamshell excavation to approximately 6 m below the existing seabed level to allow sufficient under keel clearance in the new moorage locations for the large tractor tugs, and expansion of the basin to approximately 130 m by 170 m in area. The dredged volume from the tug basin will be re-used as general fill within the terminal or the causeway with the surplus suspended sediments released to the same approved DAS site.

In addition to the re-use of dredgeate for fill material, an estimated 10.5 million m³ of sand sourced from maintenance dredging in the Fraser River will be used as terminal and causeway fill material. This represents four years of surplus dredged material that would normally be disposed at sea. A temporary storage location, or transfer pit, will be required to store the Fraser River sand during the initial construction of the containment dykes. The temporary transfer pit will also be required during construction of the terminal and widening of the causeway, to accommodate a staggered supply of sand to fill these

areas and to preload the newly created land. The supply of suitable dredged material will be staggered due to seasonal dredging restriction windows on the Fraser River. The temporary transfer pit used previously for Deltaport Third Berth Project construction, and located east of the Deltaport terminal, will have sufficient capacity for the purposes of this Project. Transfer of sand from the temporary transfer pit to the fill sites will occur *via* a separate dredge and temporary pipeline. Surplus suspended sediments will require DAS *via* a submarine pipeline to the disposal location.

PMV's experience with the existing Roberts Bank terminal since it was initially built is that maintenance dredging has not been required. Consequently, the Project is also expected to require limited or no maintenance dredging. The coastal geomorphic studies at the site will be ongoing and offer further confirmation to operational maintenance dredging requirements.

2.4.1.3 Soil Densification and Improvements

After dredging for the caisson trench, densification of *in situ* soil below the base of the trench will be carried out by barge-mounted vibro replacement equipment. A temporary 1.5-m-thick layer of crushed rock (approximately 192,000 m³ obtained from local quarries) will be placed at the bottom of the trench to act as a cap to filter the outflow of fines produced during the vibro-densification process. While some of the rock forming the temporary cap could be drawn down into the native soil as part of the vibro-replacement process, the remainder will be removed by clamshell excavation prior to placement of a crushed rock mattress layer. The salvaged rock will be used elsewhere as part of the general fill.

During land development for the Project terminal, ground improvement measures will be implemented, following the installation of the containment dykes and terminal fills, to achieve the desired performance levels. These include densification under terminal buildings and perimeter containment dykes using vibro-replacement methods. This will be phased during the construction process with densification occurring in three to eight month windows as required for a particular area.

2.4.1.4 Land Development

To create the land for the Project (including the new terminal and expanded causeway), approximately 17.9 million m³ of fill will be required. This fill will generally consist of up to 3.6 million m³ of useable material from the local berth pocket and caisson trench dredging, 10.5 million m³ of sand sourced from maintenance dredging in the Fraser River, a minor amount of dredged material from the tug basin expansion (approximately 140,000 m³), and approximately 3.7 million m³ of rock, gravel, and riprap required for the perimeter and internal dykes that will be sourced from local aggregate/quarry suppliers.

Following the infilling within the containment dykes, additional Fraser River sand will be placed on top of this area as preload to provide consolidation and geotechnical stability. After the required preload period, the remaining preload sand from this area will be rolled over to adjacent areas and supplemented as

required with additional sand until the entire terminal and causeway areas have been filled and preloaded. Any remaining sand at the completion of the process will be available for the local sand market. Following fill activities and preload removal, densification by dynamic compaction of the 6-m top layer of sand fill will be carried out.

2.4.1.5 Building of the Three Berth Wharf Structure

The wharf will be constructed using 30 open-top concrete caissons, each of which will be divided into rows of internal cells. Each caisson will have the approximate dimensions of 41.7 m long, 18 m wide, and 27.1 m high (shown in cross section in **Figure 8.0**). One additional caisson will be required at each of the east and west faces of the terminal adjacent to the wharf structure. These two additional caissons are anticipated to be smaller with approximate dimensions of 24.5 m long, 16 m wide, and 20.8 m high. The caissons will likely be fabricated off-site, transported to site, and floated into position for final placement within a dredged caisson trench. After allowing the caissons to sink into final position, internal cells within the caissons will be filled with approximately 384,000 m³ of rock ballast, obtained from local quarries, to provide mass to resist overturning and sliding forces.

A concrete cope wall, seen in **Figure 8.0**, with approximate dimensions of 3 m x 3 m x 1,300 m, will tie adjacent caissons together and provide support for the fender and mooring systems. The cope wall will also accommodate services such as shore power and a potable water supply for ships through an internal service tunnel and appropriate surface pits.

The remainder of the wharf structure behind the caissons is a combination of a rock berm and sand fill, which adjoin with the general terminal fills. Approximately 193,000 m³ of scour protection rock will be placed on the seabed in the adjacent berth pocket (at the toe of the caissons) as previously described in **Section 2.4.1.3** to prevent erosion due to scour from propeller wash.

2.4.1.6 Development of Terminal and Causeway Infrastructure

As the land is developed and the preloading is completed, the development of utilities, buildings, roads, rail, and terminal operating equipment foundations will proceed. The development of the infrastructure will last two years after the land development is completed section by section. Major equipment such as the ship-to-shore gantry cranes, the stacking cranes, and the RMGs are expected to arrive pre-assembled via special ocean-going vessels. Building materials such as steel, concrete, asphalt, rebar, piping, cable, etc. are expected to arrive via road transport. Rail materials such as ties, rail, switches, ballast, etc. will most likely be delivered by rail.

2.4.1.7 Expansion of the Existing Tug Basin

To allow for a second operator to service the proposed new terminal, the existing tug basin will require expansion and reorganizing of the existing facilities as outlined in **Section 2.3.3**.

Following dredging of the tug basin, described previously in **section 2.4.1.2**, the installation of riprap is required for slope and crest protection around the perimeter of the basin to prevent erosion caused by propeller wash and drainage from adjacent inter-tidal flats. The fill quantities are estimated to be:

- Slope protection riprap – 7,300 m³ (including 3,400 m³ reused from existing slope/crest protection);
- Crest protection riprap – 2,600 m³.

The expanded tug basin will also require the relocation of the existing Seaspan 912 mooring barge and the installation of six steel pipe piles as mooring piles for the current operator.

Installation of new mooring floats and mooring piles for a second operator is anticipated in the conceptual layout to include fourteen millimetre (mm) to 450 mm diameter steel pipe piles for locating the new mooring floats.

In addition three navigation piles; and eight piles for access trestle support, and the installation of pedestrian trestles and ramps will be required to service both operators. Pile types and sizes will be determined during detail design when specific geotechnical drilling and data gathering will occur.

2.4.1.8 Summary of Operations Activity

Terminal operations will involve the berthing and mooring of vessels at the three-berth wharf. On the terminal, ship-to-shore gantry cranes will transfer containers between ships and the wharf.

Containers will be moved from the wharf to either the Container Yard or the Intermodal Yard *via* mobile transfer equipment. Containers will be stacked in the Container Yard for storage using electrically powered stacking cranes (or similar equipment). The Container Yard will contain special access platforms for storage of refrigerated containers and their required electrical plug in.

From the Container Yard, the containers move to the rail Intermodal Yard *via* mobile transfer equipment. Rail tracks will accommodate several strings of rail cars. Electric rail-mounted gantry cranes (or similar equipment) will be used to transfer containers to and from railcars. Alternatively, containers will be loaded to/from truck chassis for road transport.

General railcar maintenance will be performed in the Intermodal Yard. Railcar storage for incoming and outgoing trains will be on the causeway. Light locomotive maintenance and refueling *via* tanker truck will all occur on the causeway in the Distributed Power Setout Yard.

Tugs will be moored in the Expanded Tug Basin with other support boats to serve all of the Roberts Bank terminals. Throughout operations, maintenance activities will be performed as required. Support facilities including administrative buildings and employee parking areas, will also operate on the terminal.

2.5 SUMMARY OF PROJECT COMPONENTS AND ACTIVITIES

Table 3 provides a summary of the Project components and sub-components, and includes a description of the key activities required during the construction and operations phases of the Project. **Table 4** summarises approximate Project land area requirements.

Table 3 Summary of Project Components and Activities

Project Components and Equipment	Construction Activities	Operations Activities
Berth Pocket	• Dredging of <i>in situ</i> soils for berth pocket, • Pumping of dredged material and discharge for use as terminal fill within the containment dykes, • DAS of suspended fines and excess water from dredgeate out of the containment area, • Densification of <i>in situ</i> soils below base of dredged berth pocket, • Installation of mattress rock to prevent scour from ship and tug propellers, and for stability of the toe of the adjacent caisson structure.	• Movement and berthing of ships, • Movement of line-handling vessels and berthing tugs during berthing and de-berthing of container ships, • Discharges from ships (de-ballasting), • Maintenance dredging (as required).
Marine Terminal		
	Land Development:	
	• Construction of perimeter and interior dykes (multiple cells) for the terminal area, • Temporary storage of Fraser River dredgeate at underwater transfer pit, • Dredging of underwater temporary transfer pit for terminal fill and preload, • DAS of suspended fines and excess water from dredgeate out of the containment area, • Densification of perimeter dyke areas and building locations, • Preload areas cell by cell from terminal towards shore, • Sell any remaining preload to local sand market.	• Maintenance as required

Project Components and Equipment	Construction Activities	Operations Activities
Three Berth Wharf	• Transportation of caissons to site, • Dredging of <i>in situ</i> soils for caisson trench, • Pumping of dredged material and discharge for use as terminal fill within the containment dykes, • DAS of suspended fines and excess water from dredgeate out of the containment area, • Densification of <i>in situ</i> soils below base of dredged caisson trench, • Caisson installation (sinking) and internal ballast filling, • Installation of concrete cope wall (cap beam) to tie caissons together and provide mooring facilities (bollards, fenders, shore power pits, service pits), • Installation of rock and sand fills between caisson structure and terminal containment dyke, • Installation of rip-rap on the seabed at toe of caissons, • Installation of six 914-mm-diameter steel pipe piles for the mooring dolphin, • Installation of approximately 10 linear metres (m) of sheet piling at each of the two wharf end returns, plus 10 m of sheet piling used as dead-man anchor wall at each of those two locations, • Marine transport and installation of ship to shore gantry cranes.	• Line handling for ship moorage, • Mooring of ships, • Ship-to-shore gantry crane movements along the wharf and movement of containers to/from the ships, • Transfer of containers to/from wharf area to/from container yard and rail intermodal yard, • Supplying shore power to moored ships, • Resupplying of ships (potable water and consumables), • Lighting for 24-hr. operations, • Maintenance as required.
Container Storage Yard	• Installation of infrastructure including underground systems for stormwater, water, sanitary, and fibre optic controls, • Installation of underground electrical distribution, • Construction of pavement structure (base course and asphalt), • Installation of container handling equipment (assumed to be electric stacking cranes and reefer platforms), • Installation of high mast lighting (may require piled foundations depending on final soil conditions).	• Container handling equipment traffic, • Terminal truck traffic, • Container storage, • Reefer storage and associated electrical connections, • Lighting for 24-hr. operations, • Maintenance as required.

Project Components and Equipment	Construction Activities	Operations Activities
Rail Intermodal Yard (IY)	• Installation of infrastructure including underground systems for stormwater, water, sanitary, and fibre optic controls, • Installation of underground electrical distribution, • Installation of rail tracks, • Construction of pavement structure between tracks and around IY perimeter (base course and asphalt), • Installation of intermodal yard (IY) container handling equipment (assumed to be electric rail-mounted gantry (RMG) cranes).	• Container train arrival, unloading and loading, and departure, • Rail car inspections and repairs, • Container coning and deconing, • Lighting for 24-hr. operations, • Maintenance as required.
Ancillary Systems and Support Facilities • Truck Gate Facility • Systems to Maintain Site Security • Civil Utility Systems • Support Facilities.	• Installation of infrastructure including underground systems for stormwater, water, sanitary, and fibre optic controls, • Installation of buildings for Administration, Security, Operations, Electrical, and Maintenance, • Installation of perimeter fencing and security systems, • Installation of underground electrical distribution and above-ground substations.	• Truck gate operations, • Lighting for 24-hr. operation, • Stormwater collection and discharge, • Sanitary sewer collection, treatment, and discharge, • Customs inspections of containers, • Security services, • Maintenance as required.
Tug Basin Expansion		
	• Dredging to expand and deepen existing Roberts Bank tug basin, • Deposit of dredged material into dyked containment areas, • DAS of suspended fines and excess water from dredgeate out of the containment area, • Installation of riprap for slope and crest protection around the perimeter of the tug basin, • Relocation of the existing mooring barge and installation of associated six new piles, • Installation of new mooring floats and associated 14 new piles for second operator, • Installation of eight new piles for pedestrian trestles and ramps, • Installation of three navigation piles, • Area lighting and utilities (potable and fire water, sanitary).	• Transiting of tugs between tug basin and Roberts Bank terminal berths, • Moorage of tugs and support boats, • Maintenance as required, • Maintenance dredging as required.

Project Components and Equipment	Construction Activities	Operations Activities
Causeway Expansion		
	Land Development:	
	• Perimeter and internal dykes established for expanded causeway, • Bring to subgrade level with Fraser River sand fills. • DAS of suspended fines and excess water from dredgeate out of the containment area.	• Maintenance as required.
Causeway rail improvements	• Construction of rail sub-ballast structure, • Add ties, rails, and ballast for new tracks and rail yards, • Add gravel access roads between pairs of tracks, • Tie in new lead tracks serving the yards and terminal into an existing mainline lead on the causeway and near the causeway entrance • Relocation of existing rail tracks to accommodate road/overpass construction • Lighting installation at rail switch points.	• Rail traffic, • Rail car storage and switching, • Rail car repair and locomotive refueling as per current Roberts Bank Terminals practice, • Maintenance vehicle traffic, • Operations vehicle traffic, • Maintenance as required.
Causeway road improvements	• Construction of pavement structure, • Add roadbed and asphalt, • New overpass construction for road access to the Project • Lighting installation at new overpass • Provision of gravel emergency access road at north side of widened causeway. • Installation of vehicle and access control system (VACS) gates and associated controls. • New water main installation.	• Road traffic, including truck staging, • Maintenance as required. • Vehicle traffic and associated line-ups for VACS clearance, • Maintenance as required.

Table 4 Approximate Project Land Areas Requirements

	Project Component	Area Footprint
1	Berth Pocket	17.4 ha
2	The Terminal including marine slope and three berth wharf	117 ha
3	Causeway widening including marine slope and rail tie-in area	43.1 ha
4	Tug basin improvements	2.5 ha
	Total Project Area	180 ha

2.6 PROJECT PHASES AND SCHEDULING

The schedule for the Project construction phase and start of operations will depend, in part, on the schedule of the EA and review process and subsequent environmental approvals, permits, and market conditions. The approximate duration of the Project phases is anticipated to be as follows:

- **Construction:** Approximately six years;
- **Operations:** Partial operations could start approximately four years after construction starts, with full operations starting six years after commencement of construction; and
- **Decommissioning and Abandonment:** There are no plans to decommission and abandon the Project. The land will remain in perpetuity and its future use will be subject to applicable permitting and regulatory requirements.

The schedule anticipated from receipt of approvals to the beginning of operations is shown in **Figure 12.0**. This figure shows the principal construction activities.

Figure 12.0 Anticipated Project Construction Schedule Including Key Activities

Activity	Years of Construction					
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Terminal Dyking	■	■	■	■	■	■
Fill Material Stockpiling	■	■	■	■	■	■
Dredging of Berth Pocket and Caisson Trench	■	■	■	■	■	■
Caisson Foundation & Wharf Construction	■	■	■	■	■	■
Terminal Fill and Preloading	■	■	■	■	■	■
Terminal Infrastructure	■	■	■	■	■	■
Causeway Dyking	■	■	■	■	■	■
Causeway Fill, Ground Improvement and Preloading	■	■	■	■	■	■
Causeway Infrastructure	■	■	■	■	■	■
Tug Basin Expansion	■	■	■	■	■	■

3.0 PORT LAND USE AND LAND OWNERSHIP

The following section describes the locations of Project components, land status, zoning, and legal descriptions.

Photos of existing work areas and operations at Roberts Bank, including images associated with field studies conducted in the Project Area, are provided in **Appendix C**.

Section 7.0 and **Figure 19.0** describe traditional land and water use in the Project Area by First Nations, including existing First Nations-licensed fisheries.

3.1 LAND USE PLAN

The current PMV Land Use Plan designates the existing facility at Roberts Bank as industrial, for Port and Marine Use. The Project is within an area designated in the Port Land Use Plan for Industrial Expansion. The Land Use Plan indicates that Roberts Bank will be a primary focus for PMV's container growth strategy, including the development of a new container terminal and associated transportation infrastructure.

Since 2012, PMV has been updating its Land Use Plan. This two-year process, beginning in 2012, involves comprehensive consultation with First Nations, stakeholders, and the community. PMV does not anticipate that the industrial designation for the Project Area will change in the updated Land Use Plan.

3.2 LAND OWNERSHIP – FEDERAL AND PROVINCIAL LANDS

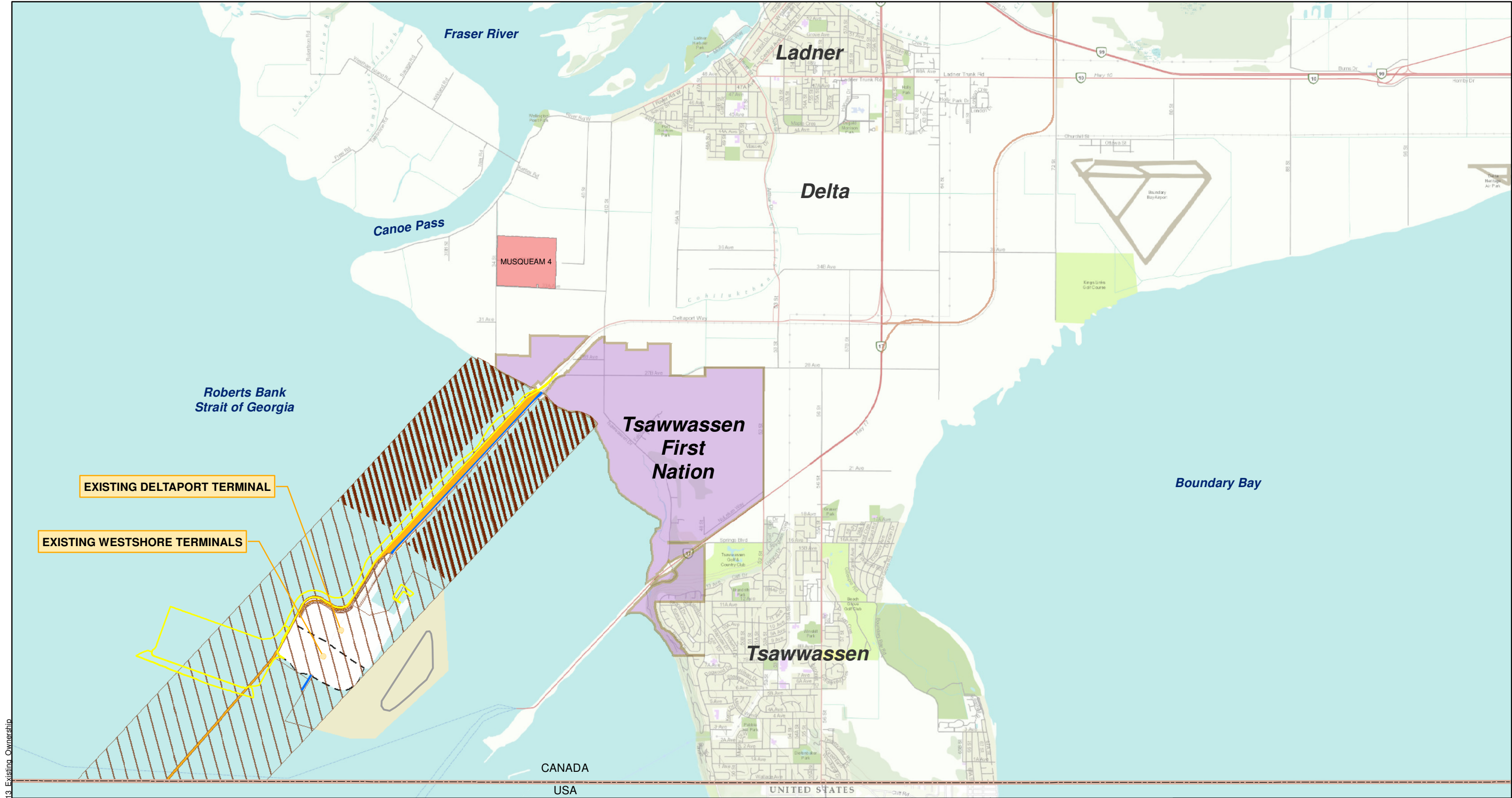
The current ownership of Project lands and legal land ownership descriptions are provided in **Figures 13.0** and **14.0**, respectively. Approximately, 117 ha of the Project will be constructed on federal lands managed by PMV. Approximately 52 ha of the Project will be constructed on submerged lands that are currently provincial Crown lands with no zoning designation. PMV has expressed an interest to the Province of BC to access these lands. It is not anticipated that a tenure agreement will be finalized until after completion of the EA process.

A portion of lands owned by BCR will be required for the causeway widening and construction of the overpass. PMV will negotiate an agreement with BCR for the transfer or use of these lands.

A legal description of lands required to support Project development is provided in **Appendix E**.

A regional overview of federal land in the Project region is provided in **Figure 15.0**.

Document Name: 00719-00-GIS-6054 Figure13 Existing Ownership



Legend

BOUNDARY OF PROJECT AREA

TRANSFER PIT

US-CANADA BORDER

FIRST NATIONS RESERVE

TFN LANDS

BC RAIL

CROWN FEDERAL

CROWN FEDERAL TO BE TRANSFERRED, ASSIGNED OR SUBLEASED TO TSAWWASSEN FIRST NATION

CROWN PROVINCIAL (SURVEYED)

CROWN PROVINCIAL (UNSURVEYED)

CROWN PROVINCIAL (MOTI)

N

0 500 1,000

Metres

1:50,000

NAD 1983 UTM Zone 10N

PORT METRO

vancouver

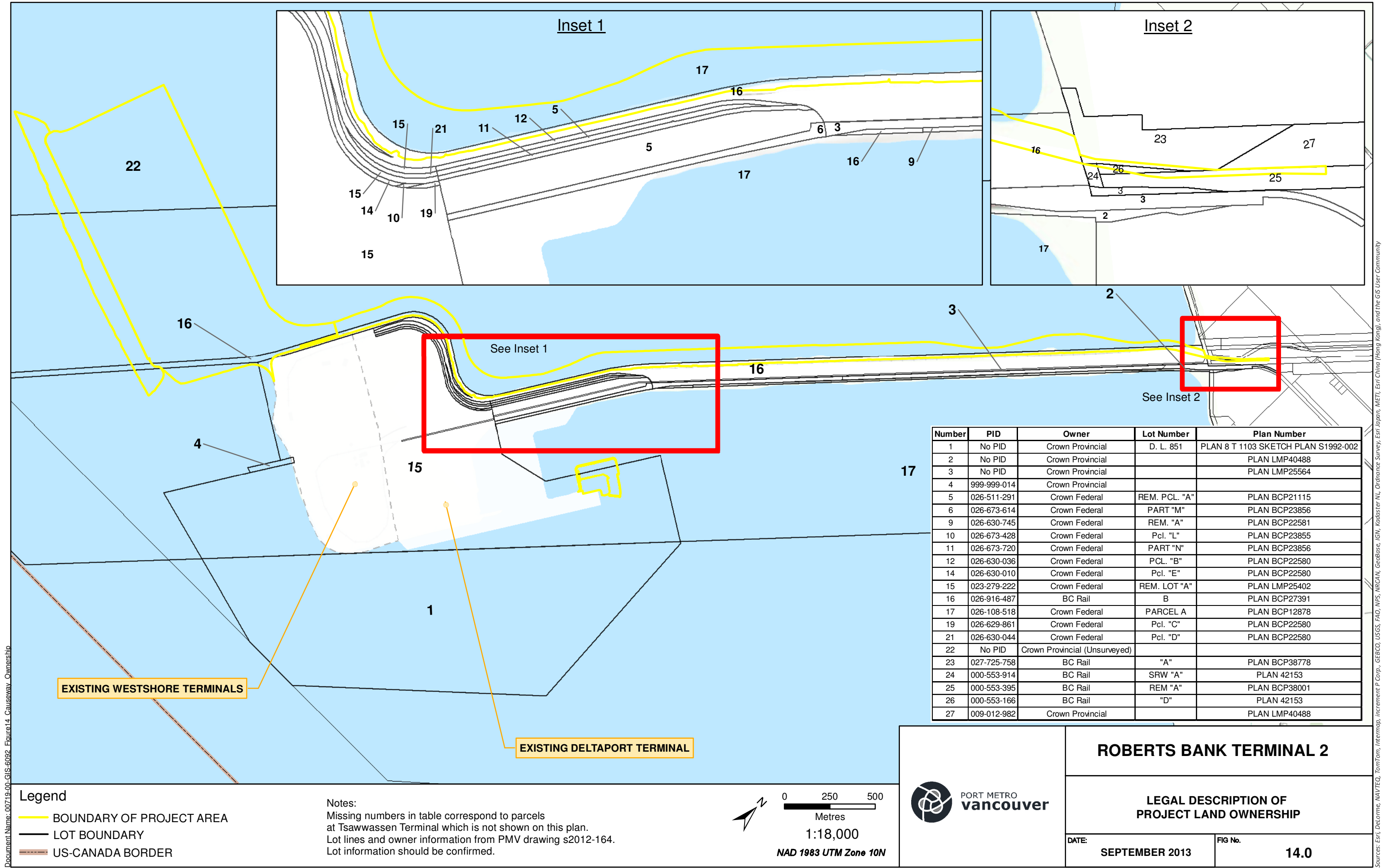
ROBERTS BANK TERMINAL 2

EXISTING OWNERSHIP

DATE: SEPTEMBER 2013

FIG No. 13.0

Sources: Esri, Delorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community



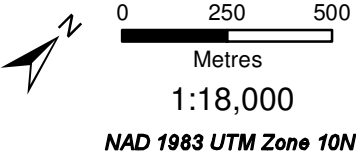
Document Name: 00719-00-GIS-6092-Figure14 Causeway Ownership

Sources: Esri, Delorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

Number	PID	Owner	Lot Number	Plan Number
1	No PID	Crown Provincial	D. L. 851	PLAN 8 T 1103 SKETCH PLAN S1992-002
2	No PID	Crown Provincial		PLAN LMP40488
3	No PID	Crown Provincial		PLAN LMP25564
4	999-999-014	Crown Provincial		
5	026-511-291	Crown Federal	REM. PCL. "A"	PLAN BCP21115
6	026-673-614	Crown Federal	PART "M"	PLAN BCP23856
9	026-630-745	Crown Federal	REM. "A"	PLAN BCP22581
10	026-673-428	Crown Federal	Pcl. "L"	PLAN BCP23855
11	026-673-720	Crown Federal	PART "N"	PLAN BCP23856
12	026-630-036	Crown Federal	PCL. "B"	PLAN BCP22580
14	026-630-010	Crown Federal	Pcl. "E"	PLAN BCP22580
15	023-279-222	Crown Federal	REM. LOT "A"	PLAN LMP25402
16	026-916-487	BC Rail	B	PLAN BCP27391
17	026-108-518	Crown Federal	PARCEL A	PLAN BCP12878
19	026-629-861	Crown Federal	Pcl. "C"	PLAN BCP22580
21	026-630-044	Crown Federal	Pcl. "D"	PLAN BCP22580
22	No PID	Crown Provincial (Unsurveyed)		
23	027-725-758	BC Rail	"A"	PLAN BCP38778
24	000-553-914	BC Rail	SRW "A"	PLAN 42153
25	000-553-395	BC Rail	REM "A"	PLAN BCP38001
26	000-553-166	BC Rail	"D"	PLAN 42153
27	009-012-982	Crown Provincial		PLAN LMP40488

- Legend**
- BOUNDARY OF PROJECT AREA
 - LOT BOUNDARY
 - US-CANADA BORDER

Notes:
Missing numbers in table correspond to parcels at Tsawwassen Terminal which is not shown on this plan.
Lot lines and owner information from PMV drawing s2012-164.
Lot information should be confirmed.

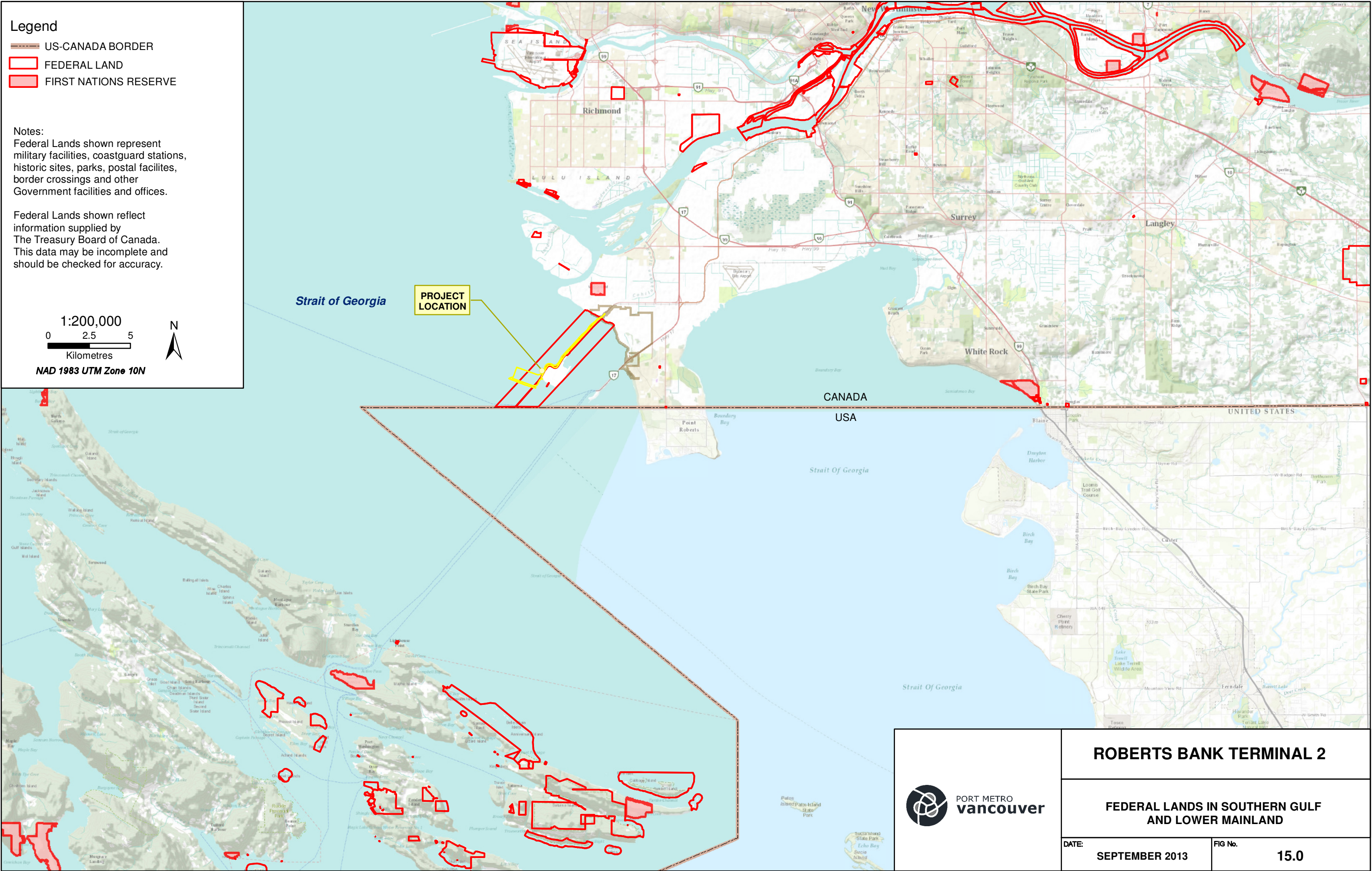


ROBERTS BANK TERMINAL 2

LEGAL DESCRIPTION OF PROJECT LAND OWNERSHIP

DATE: **SEPTEMBER 2013**

FIG No. **14.0**



4.0 FEDERAL INVOLVEMENT – FINANCIAL SUPPORT AND LEGISLATIVE REQUIREMENTS

The following sections describe the funding mechanisms and regulatory requirements that may apply to the Project.

4.1 FINANCIAL SUPPORT

The Project will be developed by PMV through private funding and commercial arrangements. The Project currently does not rely on federal or provincial government funding sources.

4.2 FEDERAL LANDS

A portion of the Project is to be constructed on federal Crown lands managed by PMV. **Appendix E** provides a list of these lands and their sizes. See **Sections 3.1.1, 3.1.2** and **Figure 14.0** for more detail. Furthermore, **Figure 15.0** shows all federal lands in the region of the Project.

4.3 ANTICIPATED PERMITS, APPROVALS, AND AUTHORISATIONS

In addition to the expected requirement for approval under *CEAA 2012* and *BCEAA*, (described in **Section 1.6**), the Project may require the environmental permits and approvals summarised in **Table 5**. PMV will apply for provincial permits which may be required concurrently with the *BCEAA* process.

Table 5 Potential Federal Permits, Approvals and Authorizations

Act	Permit/Approval	Permitted/Approved Activity	Roberts Bank RBT2 Effect
Federal			
<i>Fisheries Act</i> Subsection 35 (2)(b)	Harmful Alteration, Disruption, or Destruction (HADD) Authorisation	Alteration, destruction or disturbance of fish habitat in accordance with terms and conditions in the authorisation, issued by Fisheries and Oceans Canada (DFO).	Potential loss of fish and fish habitat – terminal/causeway footprint and indirect effects (coastal processes)
<i>Fisheries Act</i> Subsection 32	Authorisation	No person shall kill fish by any means other than fishing, in accordance with terms and conditions in the authorisation, issued by DFO.	Potential mortality of fish
<i>Canadian Environmental Protection Act, 1999</i> Part 7, Division 3	Disposal at Sea Permit	Loading of dredge material from site, and disposal of material at an approved site, in accordance with permit requirements and conditions.	DAS of dredged materials.
<i>Species at Risk Act (SARA)</i> , Section 73(1)	Permit	Authorises activities affecting listed wildlife species, or species' critical habitat or residences.	Construction and operation within southern resident killer whale (SRKW) critical habitat. A SARA permit may be required.
<i>Navigable Waters Protection Act</i> Section 5	Approval	Minister's prior approval for work built or placed in, on, over, under, through, or across any navigable water.	Construction of works within navigable waters.

5.0 ENVIRONMENTAL AND SOCIO-ECONOMIC SETTING

The following sections provide a general description of the existing physical, biological, and socio-economic setting for the Project Area.

The Project is expected to be subject to approvals pursuant to *CEAA 2012* and *BCEAA*. During the environmental assessment process, the environmental components discussed in this section, along with socio-economic, heritage, and health components discussed in later sections, will be advanced from baseline work to an assessment of the effects of the Project, including measures to avoid or mitigate potential effects. The review process required under each of the above-referenced acts will include opportunities for consultation and input by First Nations, the public, stakeholders, and communities, in addition to consultation carried out by PMV.

5.1 ENVIRONMENTAL SETTING

5.1.1 Land Use and Status

The Project Area is substantially west and seaward of the high-water mark on the Roberts Bank morphological unit within the Fraser River estuary and delta. Proximal to the Project Area are lands and waters that have status designated by provincial and federal statutes as described below.

5.1.2 Regional Parks and Ecological Conservancy Areas

Regional parks and ecological conservancy areas located in the vicinity of the Project are illustrated in **Figure 15.1**. Regional parks include:

- Boundary Bay Regional Park in Delta, located approximately 7 km east of the Project;
- Deas Island Regional Park in Delta, located approximately 10 km north east of the Project; and
- Burns Bog Ecological Conservancy Area in Delta, located approximately 14 km north east of the Project.

5.1.2.1 Wildlife Management Areas

The following provincial Wildlife Management Areas (WMAs), established under Section 4 of the *BC Wildlife Act* are located in the Fraser River estuary near the Project Area⁷. They include:

- Sturgeon Bank WMA, approximately 13 km north of the Project;
- Roberts Bank WMA, directly to the north of and adjacent to the Project;
- Boundary Bay WMA, located approximately 9 km east of the Project; and
- South Arm Marshes WMA, located approximately 9 km north of the Project.

⁷ The distances to nearby WMAs are calculated as a direct line from the centre of the terminal to the closest boundary of the WMA.

These WMAs were established to conserve critical, internationally significant habitat for year-round migrating and wintering waterfowl populations, along with important fish and marine mammal habitat, and critical habitat for shorebirds, raptors, songbirds, and small mammals. The Boundary Bay, Sturgeon Bank, Roberts Bank, and South Arm Marshes WMAs have been designated as Western Hemisphere Shorebird Reserve Network sites (Western Hemisphere Shorebird Reserve Network 2009). The last management plans for these sites available at the time of writing are dated BC Parks, 2011.

5.1.2.2 Federal Protected Areas

National Wildlife Areas

National Wildlife Areas (NWAs) were established through the *Wildlife Area Regulations* of the *Canada Wildlife Act* for the purposes of wildlife conservation, research, and interpretation. The Alaksen NWA, designated in 1972, is located approximately 9 km north of the Project Area in the Fraser River delta, between the Roberts Bank WMA and the South Arm Marshes WMA (**Figure 16.1**). The Alaksen NWA comprises cultivated farmland, remnant wetlands, estuarine habitats, riparian forests, grassland, and urbanised zones. Due to its global significance as a migration stop-over and wintering area for a large number of migratory birds along the Pacific coast, the Alaksen NWA has also been designated as an Important Bird Area⁸, a Ramsar Site⁹ (No. 243) (Environment Canada 2011), and located within the Fraser River Estuary Western Shorebird Reserve Network site. A section of Alaksen NWA overlaps with the George C. Reifel Migratory Bird Sanctuary (MBS), which is protected by regulations under the *Migratory Birds Convention Act, 1994*. This MBS is also part of the Fraser River Estuary Western Hemisphere Shorebird Reserve Network.

Southern Resident Killer Whale Critical Habitat

Southern Resident Killer Whale (SRKW) critical habitat (shown in **Figure 16.1**) was identified in the *Recovery Strategy for the Northern and Southern Resident Killer Whales (Orcinus orca) in Canada*, posted in March 2008 on the *Species at Risk Act (SARA)* Public Registry (DFO 2008). The southern Strait of Georgia was officially designated as SRKW critical habitat by regulation, effective February 2009.

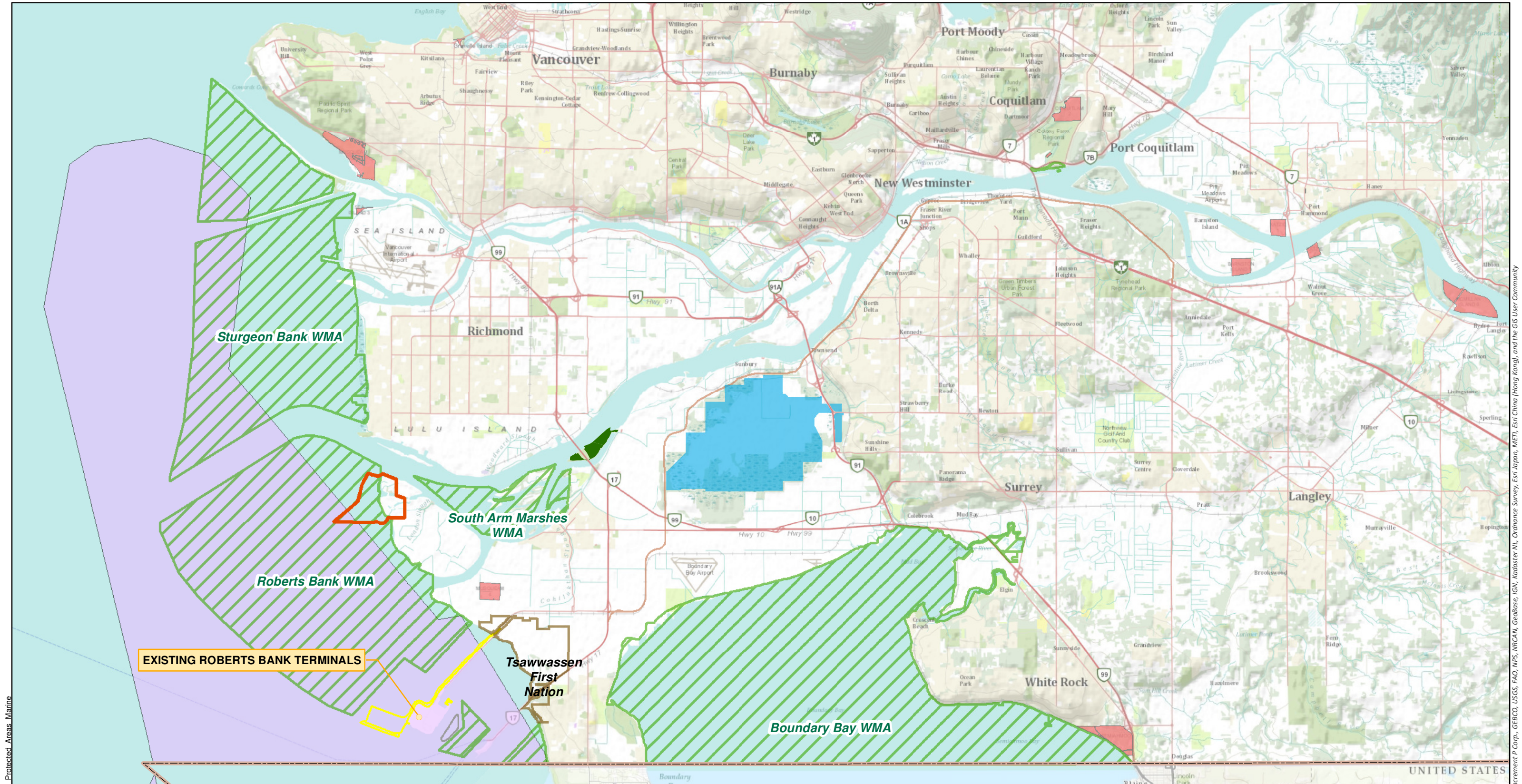
⁸ The Fraser River estuary is designated as an Important Bird Area by Birdlife International.

⁹ Ramsar sites are wetlands of international significance, designated under the Ramsar Convention

Historic Sites

Two National Historic Sites, shown in **Figure 16.2**, the Britannia Heritage Shipyard and the Gulf of Georgia Cannery are located at Steveston, approximately 10 km north of the Project Area. The Britannia Heritage Shipyard is a National Historic Site, which preserves the area where a thriving community of canneries, boat yards, residences, and stores once existed.

The Gulf of Georgia Cannery National Historic Site, located next to the Britannia Heritage Shipyard, is owned by Parks Canada, and is operated as a museum by the Gulf of Georgia Cannery Society, a local not-for-profit organization.



Legend

	BOUNDARY OF PROJECT AREA		GEORGE REIFEL BIRD SANCTUARY
	TRANSFER PIT		SOUTHERN RESIDENT KILLER WHALE CRITICAL HABITAT
	US-CANADA BORDER		DEAS ISLAND REGIONAL PARK
	FIRST NATIONS RESERVE		BURNS BOG ECOLOGICAL CONSERVANCY AREA
	WILDLIFE MANAGEMENT AREA (WMA)		

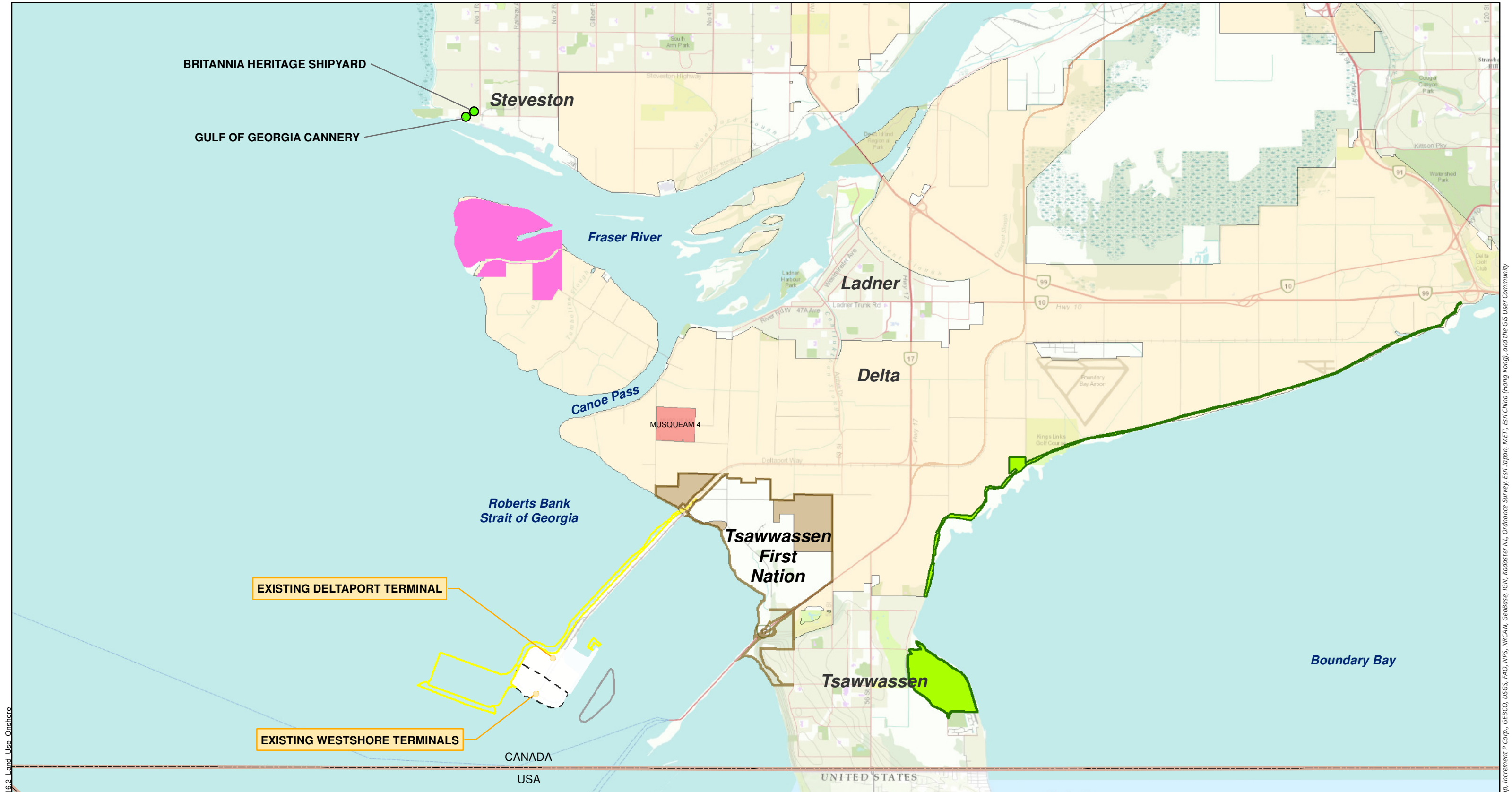
0 2 4
Kilometres
1:150,000
NAD 1983 UTM Zone 10N

PORT METRO
vancouver

ROBERTS BANK TERMINAL 2	
PROTECTED AREAS AT ROBERTS BANK	
DATE:	SEPTEMBER 2013
FIG No.	16.1

Document Name: 00719-00-GIS-6055_Figure16.1_Protected Areas_Marine

Sources: Esri, Delorme, NAVTEQ, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community



Legend

- BOUNDARY OF PROJECT AREA
- TRANSFER PIT
- US-CANADA BORDER
- FIRST NATIONS RESERVE
- AGRICULTURAL LAND RESERVE (ALR)
- ALR WITHIN TFN LANDS
- ALAKSEN NATIONAL WILDLIFE AREA
- BOUNDARY BAY REGIONAL PARK
- HISTORIC SITE

0 1,000 2,000
Metres
1:75,000
NAD 1983 UTM Zone 10N

ROBERTS BANK TERMINAL 2	
LAND USE AND HISTORIC SITES	
DATE:	SEPTEMBER 2013
FIG No.	16.2

Document Name: 00719-00-GIS-6055_Figure16.2_Land Use Onshore

Sources: Esri, Delorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

5.1.3 Physical Components

5.1.3.1 Marine Zones

The three main physical components of the outer Fraser River delta include the intertidal zone, the subtidal zone, and the delta foreslope. The intertidal zone is from the high-water mark to 0 m; the subtidal zone extends from 0 m to -3 m; the delta foreslope drops from the edge of the subtidal zone at 3 m CD to the ocean floor at -80m (**Figure 17.0**).

5.1.3.2 Tides and Waves

The physical marine environment is influenced by tides, wind, and waves. Tidal current velocities result in net sediment transport to the north within the Project Area. As tidal flow in the Strait of Georgia encounters the shallower portions of the Fraser River delta, flow direction changes and becomes perpendicular to the depth contours of the tidal flats.

Waves in the Project Area are primarily generated by wind. Storms with wind speeds above 30 km per hour (km/hr.) are common throughout the year, but are more frequent during the fall and winter months. The effect of waves on the Project Area is highly dependent on tide level.

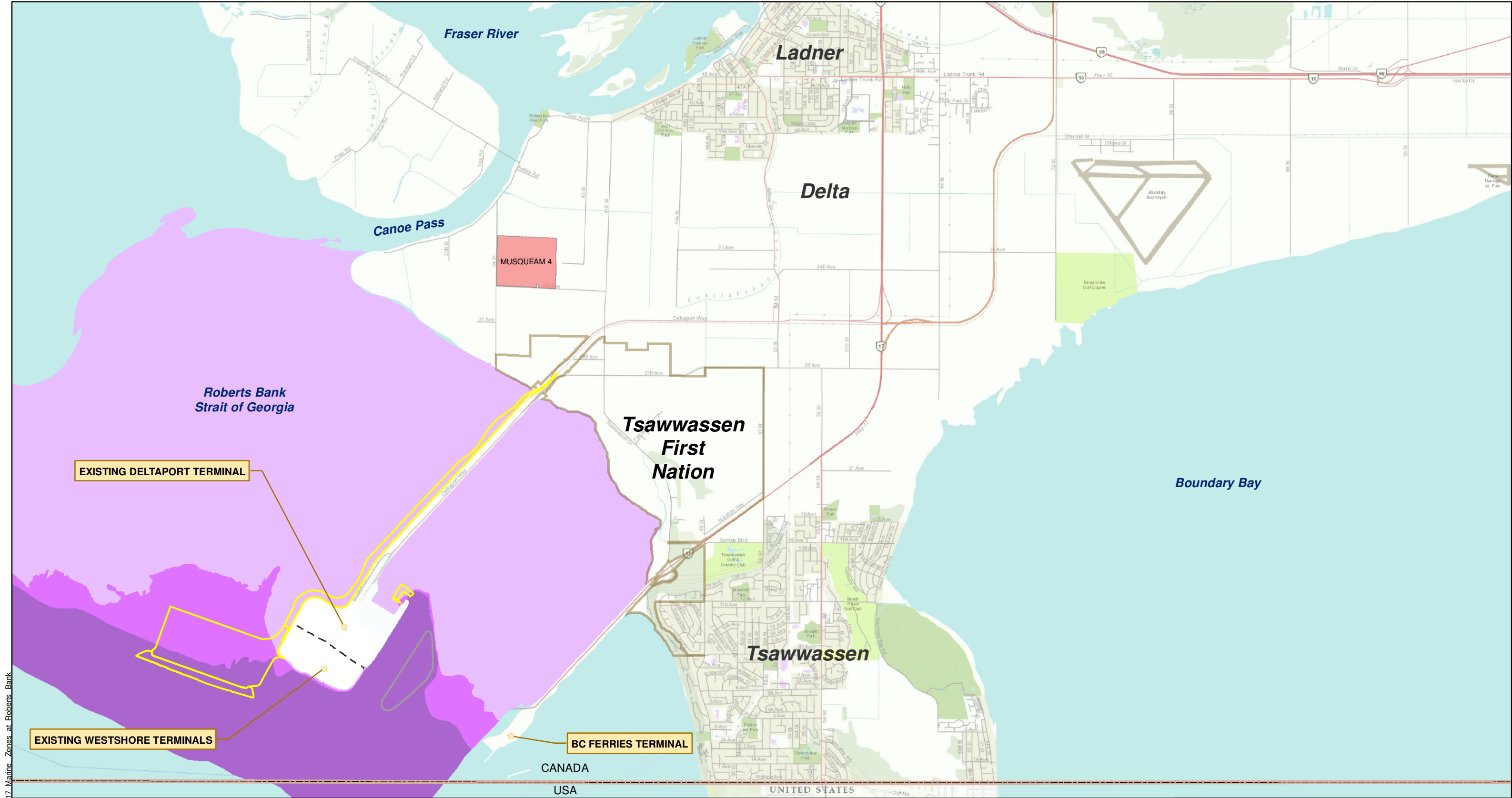
5.1.3.3 Sediment and Water Quality

The Fraser River is the predominant source of fine sediment and fresh water to the Project Area. Although the main arm carries the majority of flow and sediment, Canoe Passage, the southernmost channel draining to the delta of the river, is closer to the Project Area.

Both water and sediment inputs are highest during the freshet season between late May and early July, and taper off into late summer as the snowpack in the interior of the province melts. The spatial extent of the Fraser River plume is influenced by the river flow and tide stage. The plume is diverted towards the north during rising tides, and is drawn towards the south during falling tides.

5.1.3.4 Underwater Noise

The Project Area is currently subject to underwater noise from a variety of anthropogenic sources, including tourism and recreational watercraft; propeller and thruster noise from container and bulk cargo ships transiting and berthing at Deltaport and Westshore Terminals and BC Ferries at Roberts Bank; cargo and passenger ships moving along the main shipping lanes in the Strait of Georgia; and other commercial and recreational marine traffic.



Legend

BOUNDARY OF PROJECT AREA

TRANSFER PIT

US-CANADA BORDER

FIRST NATIONS RESERVE

INTERTIDAL ZONE: HIGH WATER MARK to 0m

SUBTIDAL ZONE: 0m to -3m

DELTA FORESLOPE: -3m to -80m

Notes:

Location of 0m based on Lidar and CHS Chart 3492

Delta Foreslope shown to approx -80m

Locations approx.

N

05001,000

Metres

1:50,000

NAD 1983 UTM Zone 10N

PORT METRO

vancouver

ROBERTS BANK TERMINAL 2

PHYSICAL MARINE ENVIRONMENT

DATE:SEPTEMBER 2013

FIG No.17.0

Sources: Esri, Delorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

5.1.4 Biological Components

Roberts Bank has a diverse ecosystem that supports biofilm, eelgrass beds, and intertidal marshes in areas shown in **Figure 18.0**. These estuarine habitats support infaunal invertebrate species, which in turn sustain numerous species of shellfish, crustaceans, fish, and birds throughout their life- cycles. The Fraser River Estuary (encompassing Roberts Bank, Sturgeon Bank, and Boundary Bay) supports large numbers of resident, migrating, and/or wintering birds. The Strait of Georgia (also known as the Salish Sea) supports several marine mammal species, including seals and sea lions (*pinnipeds*), toothed whales, dolphins and porpoises (*odontocetes*), and baleen whales (*mysticetes*).

Biological estuarine components are further described below. Species and communities with provincial and/or federal conservation concern, referred to as Species At Risk, are listed for each component; additional information on Species At Risk designations is provided in **Appendix G**.

5.1.4.1 Marine Vegetation

Several marine vegetation ecological communities that are considered at-risk by the BC Ministry of Environment's Conservation Centre have been identified within the Project Area, as summarised in **Table 6**. Lyngbye's sedge herbaceous vegetation occurs most frequently in locations such as tidal flats and channel margins where there is brackish water and active sedimentation. Seashore saltgrass herbaceous vegetation occurs at the lower limit of estuary vegetation on fine-textured, poorly drained sediments that are flooded for prolonged periods by weakly to strongly brackish water. Low species diversity is typical in both of these ecological communities. Tufted hairgrass – Douglas' aster occurs in the high marsh zone characterised by irregular tidal inundation, while American glasswort – sea milkwort occurs in the low intertidal area.

Table 6 At-Risk Marine Vegetation Ecological Communities Potentially Within the Project Area

Common Name	Scientific Name	BC CDC ¹	SARA ²
Lyngbye's sedge herbaceous vegetation	<i>Carex lyngbei's</i> sedge herbaceous vegetation	Red	NS
Lyngbye's sedge – Douglas' water-hemlock	<i>Carex lyngbyei</i> - <i>Cicuta douglasii</i>	Blue	NS
Seashore saltgrass herbaceous vegetation	<i>Distichlis spicata</i> var. <i>spicata</i> herbaceous vegetation	Red	NS
American glasswort – Sea-milkwort	<i>Sarcocornia pacifica</i> – <i>Glaux maritima</i>	Red	NS
Tufted hairgrass – Douglas' aster	<i>Deschampsia cespitosa</i> ssp. <i>beringensis</i> – <i>Symphyotrichum subspicatum</i>	Red	NS

Notes: ¹ BC CDC - BC Conservation Data Centre conservation status: Red = Red-listed; Blue = Blue-listed.
² SARA - *Species at Risk Act* Schedule 1 conservation status: E = Endangered, T = Threatened, SC = Special Concern, NS = No Status

5.1.4.2 Marine Invertebrates

The intertidal sand and mudflats at Roberts Bank support a diverse benthic invertebrate community, dominated by marine worms such as segmented polychaetes and round nematodes and small crustaceans such as amphipods and copepods. These invertebrates play a key ecological role within the estuary, primarily as prey species for other invertebrates, fish, and coastal bird species.

Dungeness crab (*Metacarcinus magister*) sustain commercial, Aboriginal and recreational fisheries at Roberts Bank and hold considerable cultural value for First Nations in the area. Dungeness crabs live out their entire life histories at Roberts Bank; larvae and juveniles prefer complex, vegetated habitats in the low-to mid-intertidal zone while adults typically inhabit soft-bottom substrates in deeper waters, and are often associated with eelgrass beds.

Bivalve shellfish such as heart cockle (*Clinocardium nuttallii*), have traditionally been an important food source for local First Nations communities. These bivalves prefer soft substrates, such as sand and mud, and are especially abundant in low intertidal and shallow sub-tidal areas.

At Roberts Bank, aggregations of orange sea pens (*Ptilosarcus gurneyi*), a type of soft coral, occupy sub-tidal sandy bottom habitats along the deltaic foreslope (see **Figure 18.0**). Sea pens are suspension feeders that eat small organic particulate material, larvae, and other zooplankton; in turn, they are consumed by several benthic predators including nudibranchs and sea stars. Their presence increases habitat complexity, providing structural relief to fish and macro-invertebrate species.

There are no known marine invertebrate species of conservation concern within the Project Area.

5.1.4.3 Marine Fish

As defined in the federal *Fisheries Act*, 'fish' includes: a) parts of fish; b) shellfish, crustaceans, marine animals, and any parts of shellfish, crustaceans, or marine animals; and c) the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans, and marine animals. A brief description of shellfish and crustaceans is provided in **Section 5.2.2**; marine animals are described in **Section 5.2.4**.

Numerous marine and anadromous fish (i.e. fish that inhabit salt water and spawn in freshwater), collectively referred to as 'marine fish', use the Roberts Bank area for all or part of their life-cycle. Marine fish serve complex ecological functions in the marine environment, both contributing to and influencing biodiversity through predator-prey and competitive interactions. The most common fish species found in subtidal and intertidal waters around Roberts Bank are Pacific staghorn sculpin (*Leptocottus armatus*), starry flounder (*Platichthys stellatus*), three-spined stickleback (*Gasterosteus aculeatus*), chum salmon (*Oncorhynchus keta*), and shiner perch (*Cymatogaster aggregata*).

The Fraser River is one of the most productive Pacific salmon rivers in the world. Juvenile salmon (primarily chum and pink (*Oncorhynchus gorbuscha*) utilise the shoreline along the Roberts Bank causeway in the vicinity of the Project, relying on nursery habitats (e.g., eelgrass) for foraging and protection from predators. Pacific salmon, as well as, forage fish, flat fish, and reef fish, are important to the commercial, recreational, and Aboriginal fisheries in the Roberts Bank area. PMV's understanding of areas designated as Aboriginal fishing and commercial and recreational fishing areas are presented in **Figures 19.0** and **20.0**, respectively. Notable as well, Chinook salmon are an important prey species for SRKW.

Several foraging species (including surf smelt (*Hypomesus pretiosus*), Pacific herring (*Clupea pallasii*), Pacific sand lance (*Ammodytes hexapterus*), and shiner perch) are found within and near Roberts Bank. Two cohorts of surf smelt exist in the Roberts Bank area. Reef fish species, including lingcod (*Ophiodon elongatus*) and rockfish (*Sebastes* spp.), have also been observed in the Project Area.

The status of federal and/or provincial anadromous fish species of conservation concern that may exist in the Project Area, based on their habitat preferences during marine phases of their life-cycles, are summarised in **Table 7**. Large densities of eulachon (*Thaleichthys pacificus*) have not been reported in the marine component of the Project Area, although they have been observed within the Fraser River estuary. Eulachon are a culturally valued, staple food source for many coastal First Nations people, and are provincially Blue-listed. White sturgeon (*Acipenser transmontanus*) spawn in freshwater but spend the majority of their lifecycle in the marine environment, whereas green sturgeon (*A. medirostris*) found in the Fraser River estuary are presumed to be transient.

Table 7 At-Risk Anadromous Fish Species that Potentially Occur within the Project Area

Common Name	Scientific Name	BC CDC List ¹	SARA ²
Eulachon	<i>Thaleichthys pacificus</i>	Blue	NS
White sturgeon	<i>Acipenser transmontanus</i> pop. 4	Red	NS
Green sturgeon	<i>Acipenser medirostris</i>	Red	SC
Cutthroat trout, <i>clarkii</i> ssp.	<i>Oncorhynchus clarkii clarkii</i>	Blue	NS

Notes: ¹ BC CDC - BC Conservation Data Centre conservation status: Red = Red-listed; Blue = Blue-listed.

² SARA - *Species at Risk Act* Schedule 1 conservation status: E = Endangered, T = Threatened, SC = Special Concern, NS = No Status

5.1.4.4 Marine Mammals

Marine mammals are apex predators in the Strait of Georgia marine ecosystem. Several marine mammal species use the area during all or part of the year, with peak abundance in the Fraser River Estuary typically coinciding with seasonal physical and biological factors, such as the availability of prey species. Several marine mammals are provincially and/or federally designated as species at risk (**Table 8**). Brief summaries of the key mammals utilising the Fraser River Estuary are provided below.

Three main species of pinnipeds (seals and sea lions) are found in the area. Harbour seals (*Phoca vitulina*) are the most abundant and are found year-round in the Strait of Georgia. In contrast, Steller and California sea lions (*Eumetopias jubatus* and *Zalophus californianus*, respectively) arrive in the fall and depart in spring. Several species of cetaceans (whales, dolphins, and porpoises) are also common in the area. Harbour porpoises (*Phocoena phocoena*), the most abundant cetacean in the area, are provincially Blue-listed, and are classified as a Species of Special Concern under SARA Schedule 1 (**Table 8**). Pacific white-sided dolphins (*Lagenorhynchus obliquiden*) and Dalls porpoises (*Phocoenoides dalli*) may also be sighted in the southern Strait of Georgia.

Populations of both resident and transient killer whales (*Orcinus orca*) occur in the Strait of Georgia. The SRKW population, frequently observed and well studied in the southern Strait of Georgia, hold notable cultural (public and First Nations) and economic (tourism) value. SRKWs are provincially Red-listed and are listed as Endangered under SARA Schedule 1. At Roberts Bank, SRKW habitat use appears to be seasonal, peaking in late summer to coincide with the Fraser River salmon runs. SRKW critical habitat, the defined area identified as essential for SRKW recovery, was identified in the *Final Recovery Strategy* posted in March 2008 on the SARA Public Registry (DFO 2008). Critical habitat was officially designated in 2009 and includes waters in southern Strait of Georgia. Ecosystem features, such as the availability of prey for foraging and the quality of the environment, are considered attributes of critical habitat and are important to the survival and recovery of SRKWs. Transient killer whales are provincially Red-listed and listed as Threatened under SARA Schedule 1. Though they can occur in the area, they are not typically found at Roberts Bank.

The three species of baleen whales most likely to be observed near the Project Area are grey whales (*Eschrichtius robustus*), humpback whales (*Megaptera novaeangliae*), and minke whales (*Balaenoptera acutorostrata*). Grey whales migrate along the BC coast each year between their summer feeding areas in Alaska and the Bering Sea, and their winter breeding lagoons in Mexico. They have been sighted in inside waterways, primarily in Boundary Bay, as well as occasionally in Haro Strait and the Strait of Georgia. Grey whales are provincially Blue-listed and are classified as a species of Special Concern under SARA Schedule 1 (**Table 8**). Humpback whales also migrate seasonally along the BC coast, and the number of sightings in inside waters and the Strait of Georgia has increased in recent years. They are provincially Blue-listed and currently listed as Threatened under SARA Schedule 1.

There are a number of other species of conservation concern with ranges within southern BC waters (e.g., blue whales (*Balaenoptera musculus*), sei whales (*Balaenoptera borealis*), and fin whales (*Balaenoptera physalus*). These species are very rare in inside waters, such as the Strait of Georgia, however, are not anticipated in or near the Project Area.

Table 8 At-Risk Marine Mammal Species that Potentially Occur in the Project Area

Common Name	Scientific Name	BC CDC ¹	SARA ²
Killer whale (Northeast Pacific southern resident population)	<i>Orcinus orca</i>	Red	E
Killer whale (Northeast Pacific transient population)	<i>Orcinus orca</i>	Red	T
Grey whale	<i>Eschrichtius robustus</i>	Blue	SC
Humpback whale	<i>Megaptera novaeangliae</i>	Blue	T
Steller sea lion	<i>Eumetopias jubatus</i>	Blue	SC
Harbour porpoise	<i>Phocoena phocoena</i>	Blue	SC

Notes: ¹ BC CDC – BC Conservation Data Centre conservation status: Red = Red-listed; Blue = Blue-listed.
² SARA – *Species at Risk Act* Schedule 1 conservation status: E = Endangered, T = Threatened, SC = Special Concern, NS = No Status

5.1.4.5 Coastal and Migratory Birds and Waterfowl

The Roberts Bank area provides eelgrass, biofilm, mudflat, and intertidal marsh habitat for coastal birds to forage, rest, roost, and breed. Coastal birds include shorebirds, waterbirds, herons, diving birds, and gulls and terns.

The Fraser River estuary and adjacent lands are a major stopover area on the migratory shorebird route known as the Pacific Flyway, which extends from Alaska to Patagonia, and is used by up to five million migratory birds. Western sandpipers (*Calidris mauri*) are the most abundant migratory shorebird in the area; the entire world population of 3.6 million Western sandpipers migrate along the BC coast and hundreds of thousands briefly stop in the Strait of Georgia basin (one-day estimates have totalled at least 500,000 individuals (WHSRN 2012)). The Fraser River estuary is also valuable migratory habitat for Pacific dunlin (*Calidris alpina pacifica*), supporting between 10 percent (%) to 30% (approximately 250,000 birds) of the entire Pacific dunlin population each winter.

Table 9 summarises the provincial and federal conservation status designations for listed coastal birds likely to occur within the Project Area.

Table 9 At-Risk Coastal Birds Species that Potentially Occur within the Project Area

Common Name	Scientific Name	BC CDC ¹	SARA ²
Great blue heron, <i>fannini</i> ssp.	<i>Ardea herodias fannini</i>	Blue	SC
Brant goose	<i>Branta bernicla</i>	Blue	NS
Caspian tern	<i>Hydroprogne caspia</i>	Blue	NS
Double-crested cormorant	<i>Phalacrocorax auritus</i>	Blue	NS
Pelagic cormorant	<i>Phalacrocorax pelagicus pelagicus</i>	Red	NS

Notes: ¹ BC CDC - BC Conservation Data Centre conservation status: Red = Red-listed; Blue = Blue-listed.
² SARA - *Species at Risk Act* Schedule 1 conservation status: E = Endangered, T = Threatened, SC = Special Concern, NS = No Status

5.1.5 Terrestrial Environment

The Project includes a rail tie-in of a lead track to the BCR rail network, equating to an area of approximately 1 ha within the BC Rail right-of-way above the highwater mark. The region surrounding the rail tie-in incorporates numerous transportation corridors, including Highway 17 (SFPR)¹⁰, Highway 17A¹¹, Highway 91, Highway 99 and Deltaport Way, the Roberts Bank Rail Corridor and numerous rural roads and two active commercial and recreational airports. Land use in the region is primarily agricultural or urban/residential, and consequently little native vegetation remains. The dominant vegetation consists of agricultural crops, roadside grass swales, occasional hedgerows, and small stands of trees. Habitat for wildlife in the region includes farm fields, old-fields, shrubland, hedgerows, and ditch-like watercourses.

Because of the prevalence of agricultural land use within this region, freshwater features tend to be limited to channelised ditches and remnant slough features.

5.1.5.1 Water Resources – Surface Water and Groundwater

Surface Water

The Fraser River watershed has been altered by a wide range of anthropogenic influences. Watercourses in the region are typical of other ditches in Delta that receive runoff from nearby agricultural lands and transportation corridors. They are characterised by low dissolved oxygen concentrations and elevated levels of turbidity, temperatures, and dissolved solids.

Groundwater

The South Fraser River Delta Aquifer is a shallow aquifer located beneath the area (Hemmera 2006). The aquifer is unconfined, and is composed of sand and gravel deposits of the Fraser River Delta (Madrone Environmental Services Ltd. 2009).

There are no registered water wells in the rail tie-in area; however, a group of five wells is located over one km to the southeast (see **Figure 21.0**). Estimates from these well logs, and field observations from the 41B Street Project (Madrone Environmental Services Ltd. 2009), suggest the aquifer is generally between 0 m and 2 m below ground surface. The shallow depth and unconfined nature of the aquifer classify it as vulnerable to contamination; iMap BC (2012) shows this aquifer to be a low-demand, high-vulnerability aquifer with moderate productivity.

All properties in the area (residential, commercial, agricultural, industrial) are serviced by the municipal water system for domestic and agricultural use (Hemmera 2006). Water withdrawn from the aquifer is not used for drinking and the demand for water from the aquifer is low (Madrone Environmental Services Ltd. 2009).

¹⁰ SFPR was renamed Highway 17 December 1, 2012.

¹¹ Hwy 17A is the former Hwy 17 prior to the development of the South Fraser Perimeter Road

5.1.5.2 Terrestrial Wildlife

Terrestrial fauna species in the region are typical of those found in agricultural or developed areas of the Lower Mainland. The key habitats include agricultural fields for wintering waterfowl, shorebirds, and raptors; grasslands for barn owl (*Tyto alba*); and agricultural ditches for fish.

Table 10 lists provincial and federal wildlife species of conservation concern potentially occurring within the region, based on their historic geographic distributions and habitat preferences, and on observations of their presence in the region.

Table 10 Terrestrial Wildlife Species at Risk that Potentially Occur in the Region

English Name	Scientific Name	BC CDC List ¹	SARA ²
Barn owl	<i>Tyto alba</i>	Blue	SC
Barn swallow	<i>Hirundo rustica</i>	Blue	NS
Short-eared owl	<i>Asio flammeus</i>	Blue	SC
Great blue heron, <i>fannini</i> ssp.	<i>Ardea herodias fannini</i>	Blue	SC
Southern red-backed vole, <i>occidentalis</i> ssp.	<i>Myodes gapperi occidentalis</i>	Red	NS
Snowshoe hare, <i>washingtonii</i> ssp.	<i>Lepus americanus washingtonii</i>	Red	NS
Pacific water shrew	<i>Sorex bendirii</i>	Red	E
Olympic shrew	<i>Sorex rohweri</i>	Red	NS
Trowbridge's shrew	<i>Sorex trowbridgii</i>	Blue	NS
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	Blue	NS
Beaverpond baskettail	<i>Epitheca canis</i>	Blue	NS
Autumn meadowhawk	<i>Sympetrum vicinum</i>	Blue	NS
Audouin's night-stalking tiger beetle	<i>Omus audouini</i>	Red	NS
Western pine elfin, <i>sheltonensis</i> ssp.	<i>Callophrys eryphon sheltonensis</i>	Blue	NS
Monarch	<i>Danaus plexippus</i>	Blue	SC
Zerene fritillary, <i>bremnerii</i> ssp.	<i>Speyeria zerene bremnerii</i>	Red	NS
Western thorn	<i>Carychium occidentale</i>	Blue	NS
Threaded vertigo	<i>Nearctula</i> sp. 1	Red	SC
Pacific vertigo	<i>Vertigo andrusiana</i>	Red	NS
Scarletback tailedropper	<i>Prophysaon vanatta</i>	Blue	NS
Broadwhorl Tightcoil	<i>Pristiloma johnsoni</i>	Blue	NS
Black Gloss	<i>Zonitoides nitidus</i>	Blue	NS
Evening fieldslug	<i>Deroceras hesperium</i>	Red	NS
Pacific sideband	<i>Monadenia fidelis</i>	Blue	NS

Notes: ¹ BC CDC - BC Conservation Data Centre conservation status: Red = Red-listed; Blue = Blue-listed.

² SARA - *Species at Risk Act* Schedule 1 conservation status: E = Endangered, T = Threatened, SC = Special Concern, NS = No Status

5.1.5.3 Terrestrial Vegetation

The terrestrial portion of the Project is situated within the Coastal Douglas-fir Moist Maritime (CDFmm) biogeoclimatic zone. The CDFmm zone is restricted to low elevations along the Strait of Georgia, including areas of Richmond, Delta, and Langley. This zone has warm, dry summers and mild, wet winters. Growing seasons are very long and feature pronounced seasonal water deficits on drier sites.

At-risk plant species that have the potential to occur within the region have demonstrated an affinity for low elevation and/or disturbed habitats. **Table 11** summarises vegetation species potentially occurring proximal to the rail tie-in.

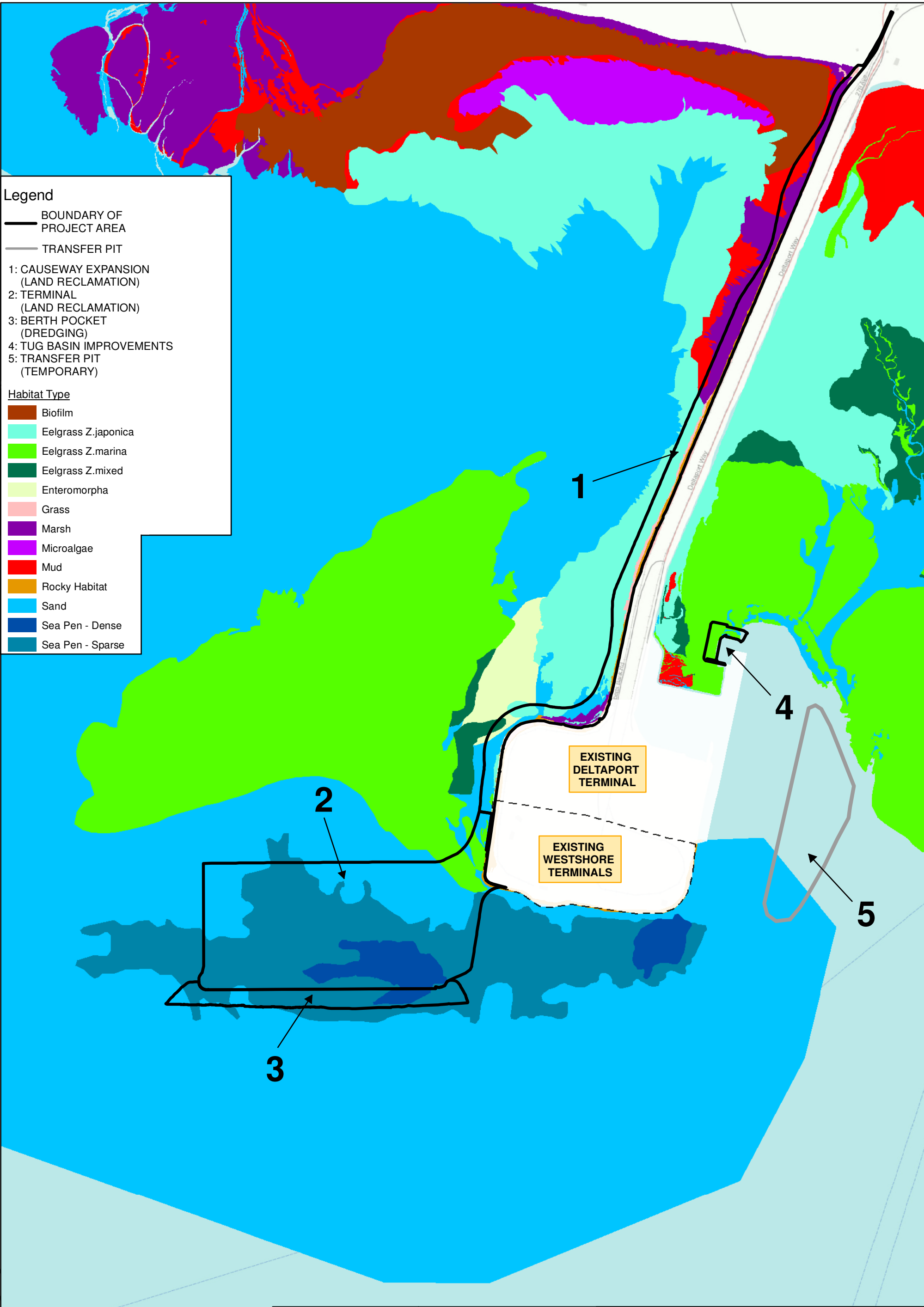
Table 11 Terrestrial Vegetation Species at Risk that Potentially Occur Proximal to the Rail Tie-in

English Name	Scientific Name	BC CDC	SARA
Phantom orchid	<i>Cephalanthera austiniiae</i>	Red	T
Vancouver Island beggarticks	<i>Bidens amplissima</i>	Blue	SC
Pacific waterleaf	<i>Hydrophyllum tenuipes</i>	Red	NS
Streambank lupine	<i>Lupinus rivularis</i>	Red	E

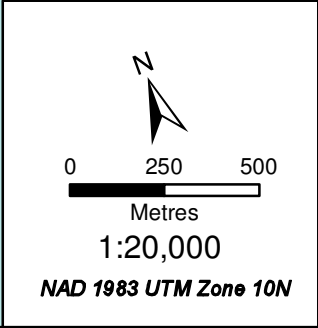
Notes: ¹ BC CDC - BC Conservation Data Centre conservation status: Red = Red-listed; Blue = Blue-listed.
² SARA - *Species at Risk Act* Schedule 1 conservation status: E = Endangered, T = Threatened, SC = Special Concern, NS = No Status

5.1.5.4 Freshwater Fish

Because of the prevalence of agricultural land use within the region, freshwater features are limited to channelized ditches. Located behind dykes and flood control infrastructure (e.g., pump stations, flapgates, etc.), access for migratory fish (i.e., trout and salmon) is very limited. The rail tie-in is also located adjacent to the ditch network within the Delta lowlands, which means that there is a considerable distance from waters frequented by salmonids (e.g., Fraser River to the west, or Big Slough to the east). As a result of these factors, resident, non-salmonid fish species are predominant in the region, such as threespine stickleback (*Gasterosteus aculeatus*), peamouth chub (*Mylcheilus caurinus*), and pumpkinseed sunfish (*Lepomis gibbosus*).

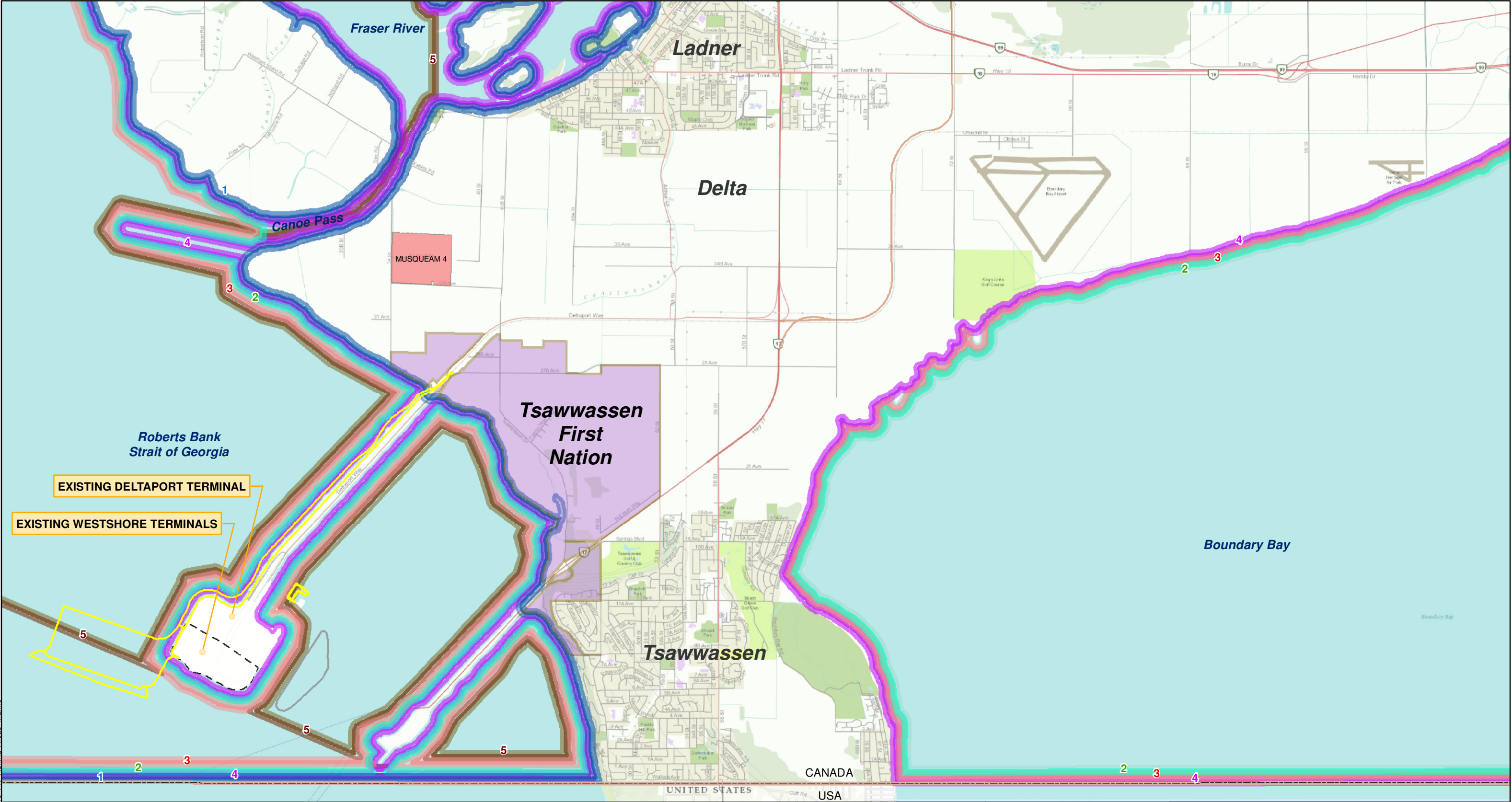


Document Name: 00719-00-GIS-6052_Figure18_Marine Habitat



ROBERTS BANK TERMINAL 2	
EXISTING KNOWLEDGE OF MARINE HABITAT ZONES SURROUNDING THE PROJECT	
DATE: SEPTEMBER 2013	FIG No. 18.0

Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community



- Legend**
- BOUNDARY OF PROJECT AREA
 - TRANSFER PIT
 - US-CANADA BORDER
 - FIRST NATIONS RESERVE

- FIRST NATIONS FISHING AREAS**
- 1 Musqueam (Salmon)
 - 2 Musqueam (Crab)
 - 3 Tsleil-Waututh (Crab)
 - 4 Tsawwassen (Crab & Salmon)
 - 5 Cowichan (Salmon)

Notes:
These areas reflect Department of Fisheries and Oceans Aboriginal Fisheries Strategy Licenses and reflect legal descriptions provided to Port Metro Vancouver by DFO.
PMV anticipates obtaining further information on aboriginal fishing areas and interests within the Project footprint during Project consultation.

N
0 500 1,000
Metres
1:50,000
NAD 1983 UTM Zone 10N

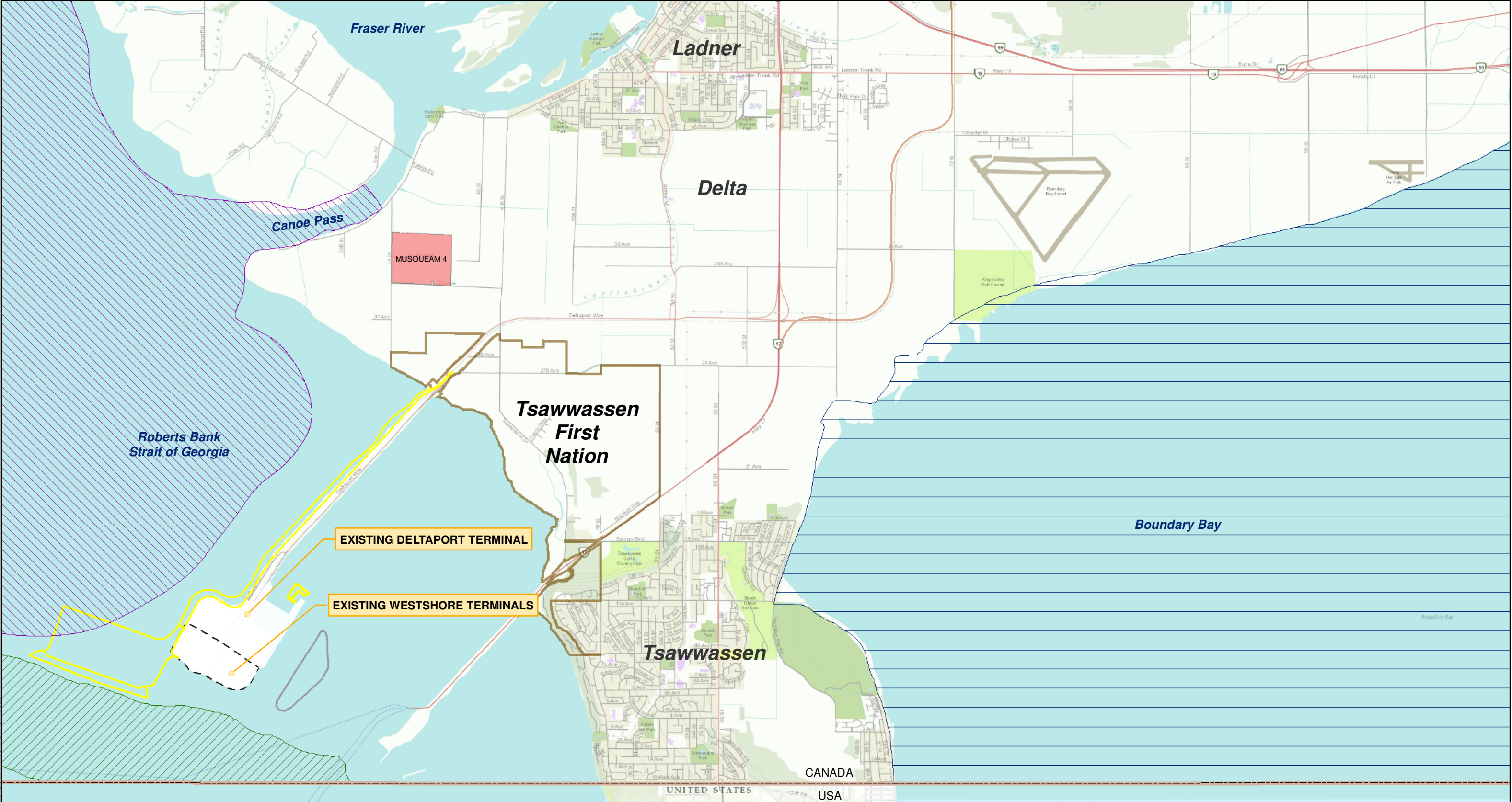


ROBERTS BANK TERMINAL 2

**CURRENT FIRST NATIONS LICENCED FISHERIES
APRIL - NOVEMBER 2013**

DATE:
SEPTEMBER 2013

FIG No.
19.0



Legend

- BOUNDARY OF PROJECT AREA
- TRANSFER PIT
- US-CANADA BORDER
- FIRST NATIONS RESERVE

COMMERCIAL FISHERIES

- SALMON TROLLING
- SALMON NET
- CRAB

Notes:
The entire area shown falls within Management Area 29 - Pacific Region as defined by DFO for Fisheries Waters.

Scale:
0 500 1,000 Metres
1:50,000
NAD 1983 UTM Zone 10N

PORT METRO vancouver

ROBERTS BANK TERMINAL 2

COMMERCIAL & RECREATIONAL FISHING AREAS

DATE: SEPTEMBER 2013 FIG No. 20.0

5.2 SOCIO-ECONOMIC AND SOCIO-COMMUNITY SETTING

This section provides a brief overview of the socio-economic and socio-community setting in the vicinity of the Project. It describes available information related to local communities; jobs and employment; population and demographics; community services and infrastructure; and transportation and traffic. An overview of local infrastructure is presented in **Figure 21.0** below. This information is based on recent available data that will be updated during the EA.

5.2.1 Local Communities

The closest residential communities to the Project area are, Tsawwassen First Nations (TFN), the Corporation of Delta, the City of Richmond, the City of Surrey, and the City of Langley. **Table 12**, outlines these communities and their proximity to the project.

Table 12 Proximity of Local Communities to the Project

	Community	Population (residents ¹)	Distance from Project (km)
<i>First Nation</i>	Tsawwassen First Nation Treaty Lands	168	Adjacent to Project Area
<i>Corporation of Delta²</i>	Tsawwassen	21,000	6.2 E
	Ladner	22,000	11 NE
	North Delta	51,000	18 NE
<i>Other Nearby Communities³</i>	Richmond	190,000	16 N
	Surrey	468,000	27 NE
	Langley	25,000	39 E
	Township of Langley	104,100	40 E

Note: ¹ Tsawwassen First Nation, 2013; Statistics Canada 2006; City of Richmond, 2007; City of Surrey 2012; City of Langley 2013;

² Distances to residential areas within the Corporation of Delta are calculated as a direct line (as the crow flies) from the centre of the terminal to the closest residentially zoned (RS1) property.

³ Distances to cities outside of the Corporation of Delta are calculated as a direct line (as the crow flies) from the centre of the proposed terminal to each community City Hall.

The closest permanent residences to the Project are the Tsawwassen First Nation (TFN), whose treaty lands are adjacent to the Project Area. The TFN community is located on approximately 290 ha of land along the shore of Roberts Bank, between the BC Ferries Tsawwassen Terminal and the Roberts Bank terminals complex.

Within the Corporation of Delta the Roberts Bank Rail Corridor and Highway 17 are key transportation routes for goods moving to and from port facilities in Delta. Direct employment from port-related industry accounts for 3,300 jobs in Delta, and more than \$690 million in economic output (InterVISTAS 2012). Richmond's economy supports more than 135,000 jobs in a variety of sectors, 5,200 direct jobs from port-related activities. Facilities within Richmond's logistics hub and other types of port-related industries along

the Fraser River contribute \$870 million in economic output (InterVISTAS 2012). The City of Surrey supports port-related industries contributing approximately 1, 800 jobs and over \$500 million in economic output to Surrey, which is home to many port-related facilities along the Fraser River (InterVISTAS 2012). The City of Langley and the Township of Langley are eastern neighbors to the City of Surrey.

The Project also falls within, or is in close proximity to, asserted traditional territories of several First Nations, seen in **Figure 22.0**. Information on aboriginal groups and their asserted traditional territories or treaty settlement lands can be found in **Section 7.0**.

5.2.2 Jobs and Employment

Within the Corporation of Delta, sales and services jobs represent the greatest share of occupations at almost 25 % of the labour force (Statistics Canada 2007). Between 2001 and 2006, the size of the total experienced labour force declined in Delta by 0.01 %, compared to growth of 0.1 % in Metro Vancouver. The number of people employed in the trades, transport, and equipment operator sector increased in Delta over the same time period. Delta has also maintained a higher percentage of workers in the management and trades occupations than what is generally observed in Metro Vancouver. These occupations typically experience higher incomes than other occupations and have historically captured higher percentage wage increases during economic expansion.

5.2.3 Community Services and Infrastructure

Delta Hospital is located approximately 5 km from Deltaport Way, and provides 24-hour emergency services. Currently, Roberts Bank terminal operators utilise the emergency ward of Delta Hospital approximately 15 to 20 times per year. Major trauma cases are transferred to Royal Columbian Hospital (New Westminster), Vancouver General Hospital (Vancouver), or Lions Gate Hospital (North Vancouver).

The Delta Police Department serves the communities of Ladner, Tsawwassen, and North Delta. Delta Police respond to routine police calls at Roberts Bank terminals. TSI, the operator of the Deltaport Container Terminal, retains independent security companies to provide day-to-day security services. The Royal Canadian Mounted Police (RCMP) are responsible for responding to issues posing national threat.

Delta Fire and Emergency Services provide emergency responses and community support to Delta. Roberts Bank terminals are served by Fire Hall No. 1, the largest and best equipped of all fire halls in Delta with a minimum of eight staff on duty at all times. Ambulance services are provided by the BC Ambulance Services. The Ladner ambulance station has four ambulances; back-up is available from Richmond, Delta, or White Rock.

5.2.4 Recreation

There is recreational use of land and waters around Roberts Bank, including (but not limited to) recreational fish and shellfish harvesting, jogging, hiking, and bird watching. The public has access to lands and waters adjacent to the Project Area and shoreline.

5.2.5 Transportation

Roberts Bank is an established trade gateway for the transfer of cargo from and to ships, trains, and trucks, and is well positioned to accommodate future growth in trade activity. It has several competitive advantages, including proximity to major transportation corridors such as Highways 17, 91, and 99, and Nordel Way. Traffic congestion is known to occur on these roads, in particular on Highway 99 through the George Massey Tunnel, River Road, and Highway 17A between Ladner and the Highway 99 Junction.

Operating at 2.4 million TEUs, the Project would result in approximately 3,700 total daily truck trips (1,850 trips in and 1,850 trips out) to and from the terminal. Rail projections show that the Project would generate an average of eight trains per day and upwards of ten container trains per day during peak operations (four to five trains in and four to five trains out).

Container trucks can encounter congestion as they access the Deltaport terminal along Deltaport Way from Highway 17A. Employee traffic also contributes to traffic volumes on the local and regional roads, as does non-employee traffic associated with service vehicles and visitors.

Several initiatives are currently underway to reduce traffic congestion in the area. When the \$1.26 billion SFPR (Highway 17) is completed at the end of 2013, container trucks departing from Deltaport will reduce congestion by rerouting from Highway 17A and from Highway 10 west of Highway 91 onto the new highway. The \$360 million Roberts Bank Rail Corridor Program (which includes one road network improvement project and eight overpasses in Delta, Surrey, the City of Langley, and the Township of Langley) will separate road and rail traffic, improving safety, easing community connections, and reducing train whistling. On September 28, 2012, the Premier of BC also announced plans to engage local governments in initial discussions on a replacement for the George Massey tunnel.

The average container ship capacity at Deltaport in 2010 was 6,250 TEUs, and involved approximately 245 vessel calls to deliver 1.54 million (M) TEUs (WorleyParsons Canada 2011). The projected average ship capacity for 2030 is approximately 9,500 TEUs. The trend towards increasing container ship size in Port Metro Vancouver has been evident for at least the last 12 years, and is consistent with changes in the world fleet. Given the increases in ship capacity, it is projected that the number of vessel calls in 2030 to the Project would be approximately 260, or five per week, in addition to the vessel calls to Deltaport and Westshore Terminals (WorleyParsons Canada 2011).

The Vancouver International Airport (YVR) is located approximately 20 km north¹² of the Roberts Bank terminals. YVR is a large air transportation and cargo terminal serviced by major international carriers. Boundary Bay Airport (CZBB) is located approximately 13 km northeast of the Roberts Bank terminals, and serves light aircraft. Delta Heritage Airpark, an uncontrolled aerodrome and public park, is located 18 km east of the Roberts Bank terminals.

5.2.6 Air Quality, Noise, and Visual Conditions

5.2.6.1 Air Quality

Metro Vancouver and the Fraser Valley Regional District operate a network of 26 air quality monitoring stations in the Lower Fraser Valley (LFV). The stations monitor a variety of gaseous emissions including greenhouse gases (GHGs), nitrogen oxides (NO and NO₂), sulphur dioxide (SO₂), carbon monoxide (CO), ozone (O₃), speciated volatile organic compounds (VOCs) in some locations, as well as particulate matter (PM₁₀ and PM_{2.5}).

PMV, in partnership with Metro Vancouver, has installed an air quality monitoring station in Tsawwassen, as shown in **Figure 21.0**. PMV will use the Tsawwassen station baseline ambient air quality data available through Metro Vancouver to define potential air quality effects from other sources in the area.

5.2.6.2 Noise

Various noise studies have been conducted in and around the Project Area during the past few decades. These noise studies indicated that the Project Area and adjacent areas are currently subject to noise emissions from existing port operations, road traffic, rail traffic from the BCR line, and from the BC Ferries causeway and terminal. The primary source of noise from Roberts Bank derives from trains (locomotives, wheel/rail noise, coupling), ship operations, and Port and terminal operations, such as container gantry crane movement, and vehicles entering and exiting the Port.

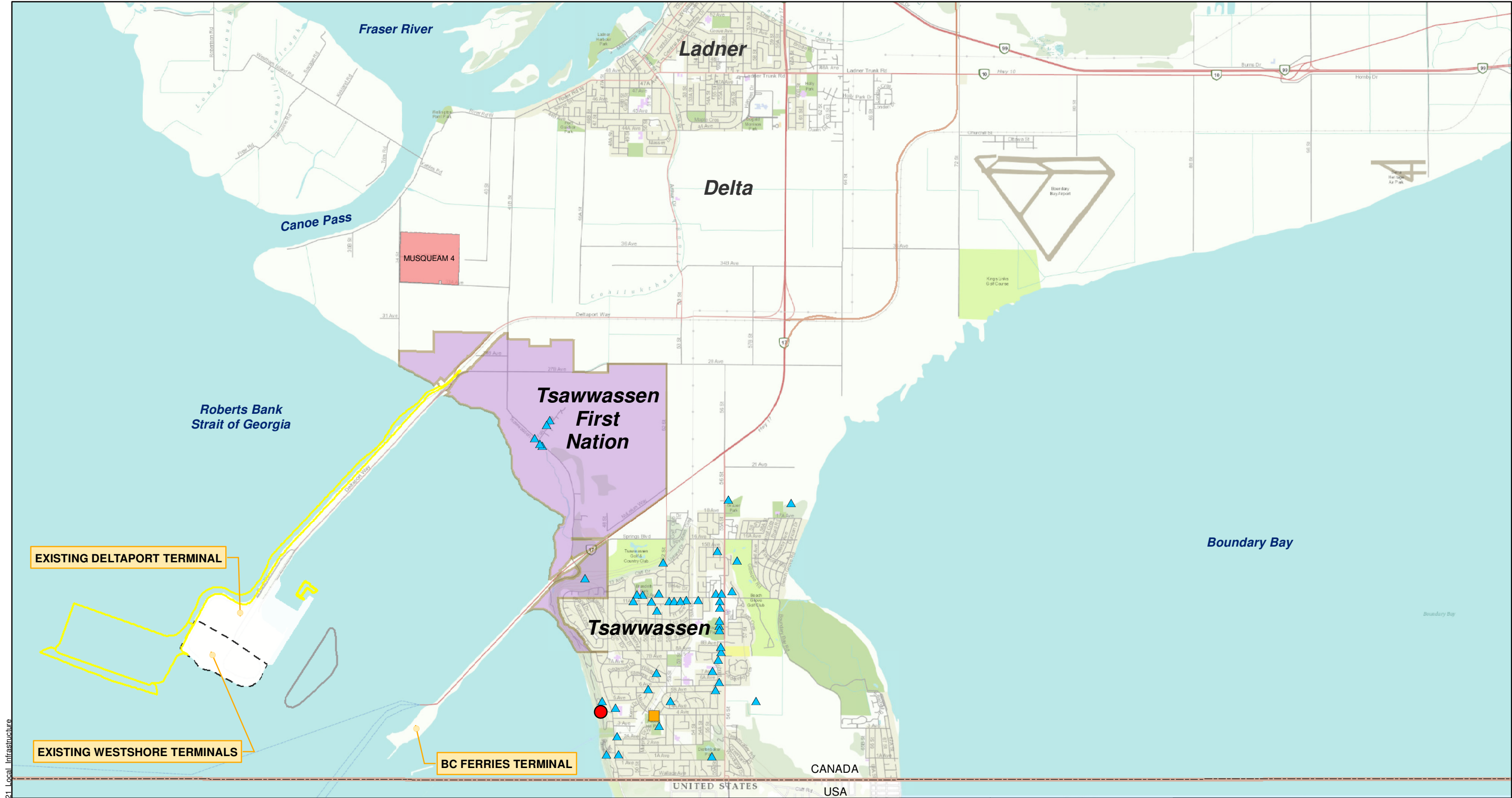
¹² Distances to nearby airports are calculated as a direct line (as the crow flies) from the centre of the proposed terminal to the airport runway.

5.2.6.3 Visual

The Roberts Bank port complex is a large industrial facility that is a dominant visual feature from a number of locations, both on land and from the water. The most prominent visible features of the Roberts Bank terminal complex are:

- The 10 gantry cranes at the Deltaport terminal;
- The multi-coloured shipping containers stacked in the Deltaport container yard; and
- The large container and coal ships that occupy the berths at the Deltaport and Westshore terminals, respectively;
- The coal piles, shiploaders, and stackers/reclaimers at the Westshore coal handling facility; and
- Lighting from both Deltaport and Westshore terminals.

The existing terminals at Roberts Bank are currently illuminated to meet Human Resources and Skills Development Canada (HRSDC) requirements for safe working conditions.



- Legend**
- BOUNDARY OF PROJECT AREA
 - TRANSFER PIT
 - US-CANADA BORDER
 - FIRST NATIONS RESERVE
 - GROUND WATER WELL
 - SURFACE WATER POINT OF DIVERSION
 - AIR QUALITY MONITORING STATION

N
0 500 1,000
Metres
1:50,000
NAD 1983 UTM Zone 10N



ROBERTS BANK TERMINAL 2

GROUND WATER WELLS AND ACTIVE AIR QUALITY MONITORING STATIONS

DATE:
SEPTEMBER 2013

FIG No.
21.0

6.0 POTENTIAL ENVIRONMENTAL EFFECTS

The following section provides a preliminary summary of potential Project-related environmental effects. It is anticipated that potential biophysical effects resulting from the Project will be limited primarily to federal and provincial Crown lands in the vicinity of Roberts Bank, with some effects potentially detectable in United States (US) marine waters and at Point Roberts in Washington State.

During the EA process, environmental, socio-economic, heritage, and health studies will be advanced from baseline work to effects assessment, and measures to avoid or mitigate potential effects will be identified. There will be additional opportunities for consultation and input by First Nations, the public, and stakeholders.

The proposed Project footprint and its zone of influence, as well as the local area boundaries, will be defined during the EA process.

6.1 POTENTIAL MARINE ENVIRONMENT EFFECTS

6.1.1 Marine Environment

The majority of the bio-physical effects potentially resulting from the Project will occur in the marine environment. The area of Project development within the marine environment is approximately 180 ha, of which approximately 160 ha would be new land development.

Project construction will result in the direct loss of marine habitat due to three Project components: the terminal, the expanded causeway, and the improved tug basin. Effects due to the Project footprint and activities that affect coastal processes are expected, the total scale of which will be investigated as part of the EA process. Dredging, construction of dykes, the placement of fill and caissons, and DAS activities will re-suspend sediments, potentially releasing persistent contaminants and altering water and sediment quality. Subsequent changes in habitat quality may occur, influencing the abundance and distribution of marine vegetation, invertebrates, and contributing to higher trophic levels (e.g. fish and birds).

Operations activities will result in additional marine vessel berthing activity (increased underwater noise, ship wakes, and propeller/thruster currents), additional surface infrastructure (overhead structures and lighting) and vehicles, treated sewage and storm water effluent discharges, increases in noise and air contaminants, and possibly accidental spills and leaks from ships.

Potential effects of the Project on physical and biological components, as well as potential transboundary effects, are summarised below. Additional information pertaining to wastes is provided in **Section 6.2**.

6.1.2 Coastal Geomorphology and Water and Sediment Quality

Dredging, construction of containment dykes, placement of fill and caissons, ship wakes, and propeller/thruster currents may physically alter the tidal flats and delta foreslope in the immediate area of the Project. Indirect effects beyond the Project Area may be associated with changes to the characteristics of existing processes and physical environment which could include changes in tidal flows and patterns, formation or modification of tidal channels, changes in sediment deposition and erosion, scour induced by modified waves and tidal currents near the Project, and the formation of a wave shadow over the part of the tidal flats.

Additional research and field studies are being completed to better understand the relationships between Project-related activities and potential changes to geomorphic processes and sediment characteristics, water column characteristics, and associated effects on the marine environment.

6.1.3 Underwater Noise

Underwater noise from the Project has the potential to elevate ambient sound levels currently produced in the area due to construction activities (densification) and ship berthing and transiting activities during operations. Potential effects from underwater noise include temporary displacement (e.g., avoidance) and auditory interference of fish and marine mammals primarily.

PMV plans to conduct acoustic studies in the Project Area to inform the assessment of potential changes in underwater noise resulting from the Project.

6.1.4 Marine Vegetation

Project-related effects from construction activities may include direct and indirect mortality of vegetation species (e.g. salt marsh, eelgrass and sea lettuce), and alterations in species distribution and composition. Operations activities are unlikely to have direct effects (eg. direct mortality or change in spatial extent) on marine vegetation, but changes in water and sediment (movement and/or quality) may result in indirect effects (eg. changes in conditions for growth of marine vegetation). It should be noted that the presence of infrastructure in the marine environment is not necessarily detrimental to marine vegetation communities and, in some cases, may improve habitat quality and/or availability.

6.1.5 Marine Invertebrates

Project interactions with marine invertebrates (e.g. marine worms, bivalve shellfish, and small crustaceans) may cause potential environmental effects such as:

- Direct mortality and physical damage to eggs, larvae, juveniles and adults;
- Direct loss of habitat including decreased spawning and rearing habitat;
- Increased contaminant uptake and bioaccumulation;
- Modification of natural movements; and
- Alterations in species distribution and composition.

6.1.6 Marine Fish

Construction and operations activities may permanently or temporarily alter or fragment fish habitat, leading to direct or indirect fish mortality, disturbance, and/or displacement. Project-related effects could potentially reduce the ongoing productivity for individual fish species. There is also the potential for predator-prey interactions to be affected by construction and operations activities.

Studies will be carried out to assess the potential effects on marine fish and fish habitat.

6.1.7 Marine Mammals

Potential effects of Project construction and operations activities on marine mammals are anticipated to be:

- Direct loss of marine habitat within the Project footprint;
- Disruption of natural behavior of SRKWs, baleen whales or pinnipeds, or their main prey (salmon) from increased underwater noise, reducing their ability to locate prey;
- Increased strikes from marine vessels; and
- Increased contaminant uptake and bioaccumulation in marine mammals resulting from sediment re-suspension.

Extensive studies will support the assessment of these effects on marine mammals.

6.1.8 Coastal and Migratory Birds and Waterfowl

Key interactions associated with construction and operations activities are related to effects arising from changes in coastal geomorphology and habitat, collision risk associated with increased traffic, and in-air acoustic emissions from construction and operations activities. Given public concern with existing powerlines, the effects on birds from existing powerlines will be studied but notable effects to populations of birds using Roberts Bank are not anticipated (primarily because available mitigation measures on the lines are known to be effective).

Direct and indirect Project-related effects on coastal birds may include:

- Direct loss of intertidal foraging habitats;
- Indirect effects to intertidal food sources;
- Increased mortality from collisions;
- Increased predation risk and associated mortalities from raptors;
- Habitat loss or alteration surrounding the Project footprint; and
- Sensory disturbance.

Extensive studies will support the assessment of these effects on coastal birds and waterfowl.

6.1.9 Transboundary Effects

Some Project-related effects may be potentially detectable in US marine waters and at Point Roberts in Washington State. They include:

- Air quality at Point Roberts – primarily during operations;
- Airborne noise at Point Roberts – during construction and operations;
- Underwater noise from soil densification and pile driving during construction;
- Underwater noise from ship berthing - during operations;
- Possible changes to the visual landscape including lighting at the facility for residents on the west side of Point Roberts close to the shoreline;
- Accidental spills and leaks, in the marine environment, from construction and operations equipment and activities;
- Marine sediment dispersion – during construction dredging activity;
- Possible indirect effects on fish and migratory birds could relate to changes in water and sediment quality from RBT2 which could in turn affect marine vegetation and environmental conditions required for survival; and
- Possible direct and indirect effects on marine mammals (e.g. collisions with project related vessels and effects on prey, respectively).

The potential for these effects to be detected on US territory will be included in the EA.

6.2 POTENTIAL DISCHARGES AND WASTES

During construction, sediment-laden water from dredging and densification works will be the primary discharge to the marine environment. Accidental spills and leaks from construction and operations equipment and activities are also possible. During terminal operations, treated sewage and storm water effluent from the new terminal will be discharged to the marine environment. Releases have the potential to affect water quality and marine habitat.

Wastes produced during the construction and operations phases of the Project may include the following:

- Surplus dredged material;
- Non-hazardous solid waste;
- Batteries;
- Ozone depleting substances including freon and halon;
- Used oil filters, used absorbent materials, and antifreeze; and
- Waste oil, petroleum products, and solvents.

Waste produced during construction and operations will either be disposed of in accordance with applicable regulations, or will be reused and recycled where feasible.

6.3 TERRESTRIAL EFFECTS

The Project is not expected to affect terrestrial wildlife and vegetation nor freshwater fish and their habitat. Coastal birds and water fowl will be assessed as noted above.

6.4 POTENTIAL SOCIO-ECONOMIC AND SOCIO-COMMUNITY EFFECTS

Potential Economic and Community Effects

Potential socio-economic and community effects during the construction and operations phases of the Project are summarised below.

Construction

- Creation of approximately 4,500 total direct, indirect, and induced jobs during the six-year construction period, worth a total of approximately \$1.14 billion in wages and \$1.63 billion in GDP for the Canadian economy (WorleyParsons Canada 2012).
- Changes in local population and demographics by way of employment opportunities associated with construction activities attracting people to live and work in Delta and nearby communities.
- Increased demand on community services and infrastructure.
- Short-term increases in construction traffic associated with workers travelling to the site, including the delivery of equipment and construction materials.
- Potential changes in access to recreational activities in the area including recreational fishing, bird watching and hiking/jogging.

Operations

- Creation of 18,200 total direct, indirect and induced jobs worth approximately \$620 million in wages and 1.66 billion in GDP annually (WorleyParsons Canada 2012), once the Project is operating at capacity.
- Total economic output increase in the Canadian economy of approximately \$3.1 billion annually (WorleyParsons Canada 2012).
- Increase in population in Delta and surrounding areas due to the addition of long-term job opportunities arising from increased capacity at Roberts Bank during Project operations.
- Increased demand on community services and infrastructure.
- Increased truck, rail, and marine traffic entering and leaving the Project Area, and effects on traffic congestion in Delta and TFN lands.
- Potential effects on visual and biotic resources that could effect existing recreational use of the area.

6.4.1 Potential Heritage and Archaeological Effects

Numerous archaeological investigations have taken place in the Project Area in response to infrastructure development during the past 50 years. These investigations suggest that the potential for effects of the Project on archaeological resources is low. PMV recognises that some archaeological resources may be discovered during construction. As the Project will largely be built on land reclaimed from land under water, additional investigations on affected submerged lands may be required.

First Nations have indicated a strong interest in ensuring that any traditional use sites within the Project Area are protected, and PMV will continue to collaborate with potentially affected First Nations in this regard.

Mitigation measures and standard practices to reduce potential effects on heritage and archaeological resources will be developed and described during the EA process for the Project.

6.4.2 Potential Health Effects

Potential health effects associated with the Project relate to potential accidents and malfunctions; potential changes to air quality and noise levels (areas described in **Section 6.2**); and potential uptake of contaminants into edible shellfish.

Potential accidents and malfunctions during construction and operations that could affect human health include those related to worker travel and equipment mobilisation (traffic accidents, transportation of dangerous goods); ship operations (collisions); equipment failure; spills and leaks (fueling); and overall health and safety (major accident or death).

6.4.3 Air Quality

The focus for air emissions studies associated with Project-related construction and operations activities (e.g., Marine vessels, cargo handling equipment, locomotives, on-road vehicles) include:

- 1) Common air contaminants such as nitrogen dioxide (NO₂), carbon monoxide (CO), sulphur dioxide (SO₂), hydrocarbons (HC), total suspended particulate matter (PM), inhalable particulate matter (PM₁₀), and respirable particulate matter (PM_{2.5});
- 2) Selected mobile source air toxins which have been determined to be of significance to human health such as acetaldehyde, acrolein, benzene, 1,3-butadiene, diesel particulate matter, formaldehyde and naphthalene; and
- 3) Compounds related to climate change issues including greenhouse gases such as carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and black carbon.

6.4.4 Noise

Noise generated during the construction and operations phases of the Project may result in increases to ambient noise, low-frequency noise, and vibration levels within approximately 5 km to 6 km of the Project, which may affect some adjacent communities and wildlife. Construction-related activities that may result in a temporary increase in ambient noise include the use of heavy equipment and vehicles. Operations-phase activities that may result in increased ambient noise include operation of trains in the intermodal yard and on the causeway (e.g. running locomotives, wheel/rail noise, coupling); ship operations; and port and terminal operations, such as container gantry crane movement, as well as container trucks and employee vehicles entering and exiting the causeway and terminal.

6.4.5 Visual and Lighting

The Project will result in changes to the visual landscape from some viewpoints due to construction and operations activities, and the installation of temporary and permanent lighting at various locations in the Project Area. Visual (non-lighting related) changes during operations will be primarily associated with the new terminal. Additional vehicles, trucks, and trains travelling to and from the terminal will also contribute to the visual change.

Lighting changes during operations will be associated with the installation of new lighting on the terminal to support a safe working environment. Lighting is also required for security of both the public and property. Key changes to be assessed will include the visual effects on local residents and recreational uses in and around Roberts Bank.

6.5 POTENTIAL EFFECTS OF THE PROJECT ON FEDERAL LANDS

The bio-physical effects described above will occur on federally and provincially owned lands. If PMV is successful in acquiring provincially owned lands north of the federally owned lands, much of the effects described will be situated on federally owned lands.

Effects attributable to air quality, noise, lighting, and birds may also be detectable on non-federal and private lands east of the causeway.

6.6 POTENTIAL EFFECTS OF THE PROJECT FOR FIRST NATIONS

The potential effects of the Project on First Nations interests are discussed in **Section 7.0**.

7.0 ABORIGINAL ENGAGEMENT AND CONSULTATION

This section of the Project Description identifies the First Nations that may have an interest in the Project. Also described in this section are the consultation and engagement activities, and results of these activities, which PMV has undertaken to date.

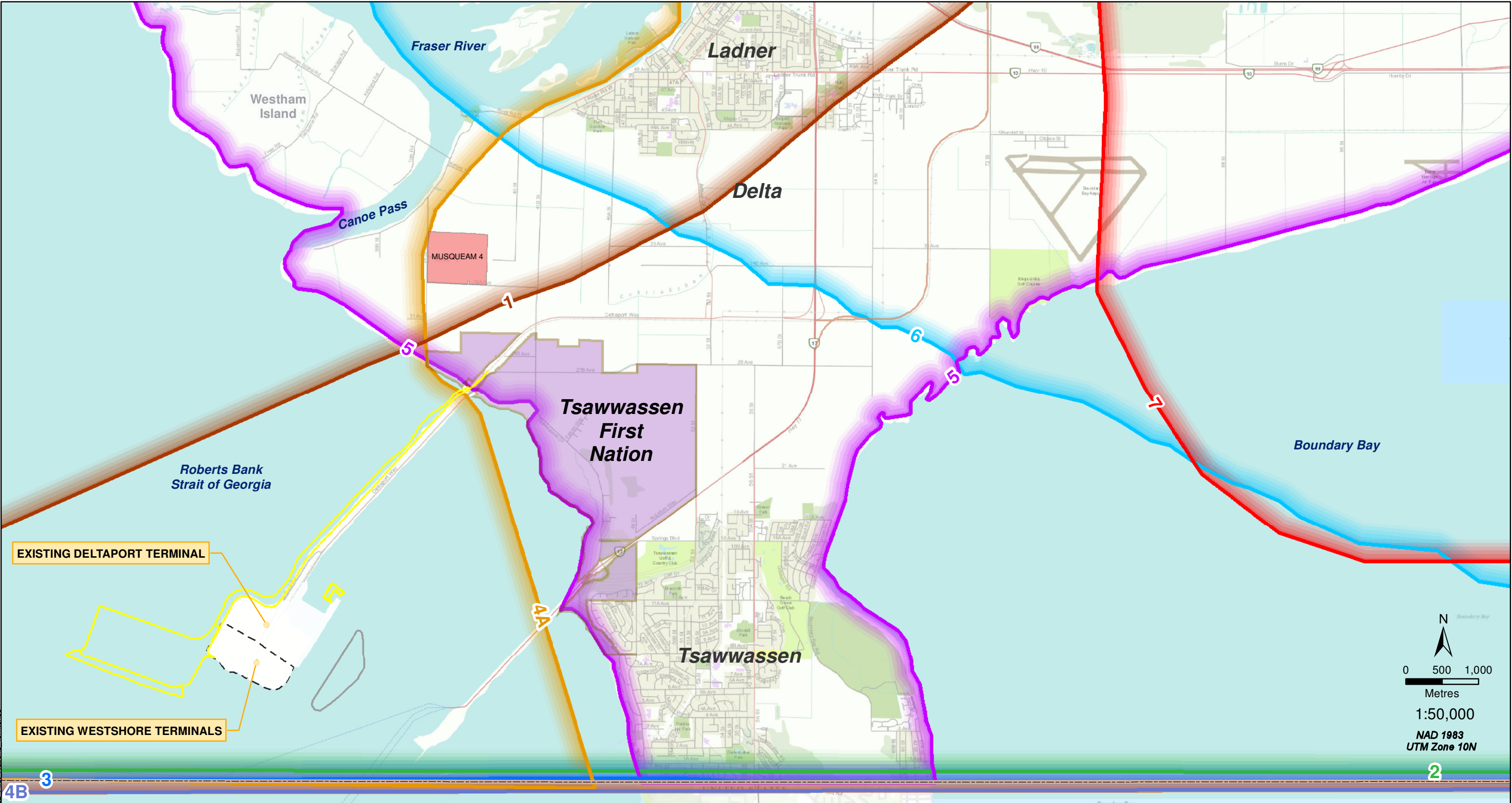
7.1 FIRST NATIONS THAT MAY HAVE AN INTEREST IN THE PROJECT

The First Nations groups listed below are those that are thought to have an interest in the Project based on asserted territories or treaty settlement lands, or those that may be affected by the Project based on its proposed design. The scope and extent of consultation with each of these First Nation communities will vary with the scope of Aboriginal interests identified by them and the degree to which their respective interests may be potentially affected by the Project. It is anticipated that the CEA Agency and/or BC EAO will provide additional input and guidance as to which groups will be consulted during the EA phase, as well as the level of consultation required.

The identified First Nations with whom PMV has initiated consultation and engagement activities are as follows:

- Tsawwassen First Nation;
- Musqueam Indian Band;
- Semiahmoo First Nation;
- Tseil-Waututh Nation;
- Hul'qumi'num Treaty Group;
- Sto:lo Nation;
- Sto:lo Tribal Council;
- Kwantlen First Nation;
- Katzie First Nation; and
- Squamish First Nation.

A summary of the Aboriginal traditional territories and settlement lands is presented in **Figure 22.0**, and existing First Nations-licensed fisheries are presented in **Figure 19.0**. Contact information for the First Nations identified above is included in **Appendix C**.



- Legend**
- BOUNDARY OF PROJECT AREA
 - TRANSFER PIT
 - US-CANADA BORDER
 - FIRST NATIONS RESERVE

- FIRST NATIONS TRADITIONAL TERRITORIES AND TFN LANDS**
- Tsawwassen First Nation Lands
 - Musqueam Indian Band
 - Semiahmoo First Nation
 - Tsleil-Waututh First Nation (Consultation Area)
 - Hul'qumi'num Treaty Group (Core Area)
 - Hul'qumi'num Treaty Group (Marine Area)
 - Stó:lo Nation (Shared Area)
 - Katzie First Nation
 - Kwantlen First Nation

Notes:
Traditional Territories came from various sources, including Aboriginal Affairs & Northern Development Canada and the BC Treaty Commission.

Traditional Territories of other identified First Nations thought to have an interest in the Project are not shown due to scale.

TFN final agreement includes harvesting rights not shown on this map.

This map should not be considered an authoritative source.



ROBERTS BANK TERMINAL 2

FIRST NATIONS BOUNDARIES IN PROXIMITY OF THE PROJECT AREA

DATE: SEPTEMBER 2013

FIG No. 22.0

7.2 COMPLETED CONSULTATION AND ENGAGEMENT WITH IDENTIFIED FIRST NATIONS

Planning for First Nations engagement and consultation on the Project began in January 2011. Prior to submitting the Project Description to federal and provincial regulators to initiate the EA process (the Pre-submission phase), two separate rounds of consultation and engagement activities were held with identified First Nations. The purpose of the pre-consultation and Project Definition rounds of consultation and engagement activities was to share initial information related to the Project and to solicit feedback from First Nations on potential First Nations issues and concerns.

7.2.1 Pre-consultation Activities

During the pre-consultation period in the spring of 2011, PMV held introductory meetings with a number of First Nations to introduce the Project and to solicit feedback in relation to the specific topics on which they want to be consulted and how they want to see the related consultation and engagement process delivered. At these meetings, First Nations attendees were provided with copies of PMV's Pre-Consultation Discussion Guide and Feedback Form (PMV 2011) and were given an opportunity to provide feedback with respect to content, raise questions, or further identify specific areas of interest or concern. In addition to in-person meetings and/or discussions with First Nation community representatives, communication methods with First Nation representatives included e-mail and follow-up phone calls and provision of a variety of Project-related information (hardcopy and digital format). Specific pre-consultation meetings took place with the TFN and the Musqueam Indian Band to facilitate a detailed review of the Pre-Consultation Discussion Guide and Feedback Form and seek further input with respect to potential perceived effects to First Nations related to the Project, as defined at that stage. Follow-up pre-consultation summary meetings also took place with these two communities.

7.2.2 Project Definition Consultation and Engagement Activities

PMV initiated Project Definition consultation and engagement activities with identified First Nations in October 2012. The consultation program is ongoing, and consists of components that are summarised in **Table 13**.

Table 13 Project Definition Consultation and Engagement Activities to Date

Consultation and Engagement	Activities
Notifications to Initiate Project Definition Consultation and Engagement	In early October 2012, Port Metro Vancouver (PMV) contacted identified First Nations previously engaged in pre-consultation discussions to provide notification of the commencement of the Project Definition Consultation and Engagement Phase. Follow-up communication took place <i>via</i> email and the Project Overview document was provided to identified First Nations.
Introductory Letters to First Nations	Introductory letters were sent to identified First Nations (listed in Section 7.1) in October 2012. Letters provided an overview of the Project and of the associated consultation process, and a link to the Project website. PMV also provided First Nations with an offer to meet or address any questions or concerns related to the Project.
Follow-up to Introductory Letters	PMV followed up with all identified First Nations to confirm receipt of the Introductory Letter, to respond to any initial questions and/or concerns, and to offer to meet regarding the Project. Follow-up communication consisted of emails, telephone calls, and in-person discussions. Electronic copies of the Introductory Letters were emailed to all identified First Nations.
Provision of the Roberts Bank Terminal 2 Discussion Guide (PMV 2012)	Copies of PMV's Project Definition Consultation Discussion Guide were provided to all identified First Nations either in person, <i>via</i> courier/mail or electronically. The Discussion Guide was reviewed at Project Definition consultation meetings with First Nations (see Introductory and Follow-up Meeting below).
First Nations Input into the Technical Advisory Groups (TAGs)	Recognizing the value of First Nations input (traditional and technical knowledge), PMV notified First Nations of the TAG process (see Section 9.0). PMV subsequently explored opportunities for First Nations involvement and the establishment of a variety of processes for facilitating First Nations in the review of information generated from the TAG sessions and to provide related input. In July 2013, PMV met with First Nations and discussed a process for sharing the information generated from the TAG sessions.
Traditional Knowledge/Use Workshops	PMV conducted a series of workshops with Tsawwassen First Nation (TFN) elders and separate workshops with TFN crabbers and fishers. As a result of the workshops, field study designs were influenced to include consideration for the concerns and the knowledge shared during these workshops. While crabs and finfish were the focus of the workshops, other shellfish and traditional plants were also discussed. A subsequent meeting was held in July 2013 with TFN, during which the topic of traditional knowledge and use data collection was discussed. To identify the possibility of avoiding or mitigating potential effects to First Nations interests, PMV also conducted a similar information gathering meeting with the Musqueam Indian Band (January 2013).
First Nations Involvement in the Field Studies Program	In an effort to incorporate First Nations knowledge and experience into the Project's Field Studies Program, PMV hired local First Nations field technicians for a range of bio-physical study programs associated with the EA component of the Project.
Introductory and Follow-up Meetings	Introductory Project Definition consultation and engagement meetings were held with the TFN (November, 2012), Musqueam Indian Band (November, 2012), Tsleil-Waututh First Nation (December, 2012), Semiahmoo First Nation (December, 2012), Katzie First Nation (January, 2013) Kwantlen First Nation (January, 2013), and the Cowichan Nation Alliance (March, 2013), which consists of members of the Hul'qumi'num Treaty Group (HTG) and the Hwlitsum First Nation. Consultation materials provided and discussed at the introductory meetings included: the Discussion Guide (PMV, 2012), RBT2 Project Overview (released October 2012), and hard copies of the Roberts Bank Terminal 2 Project Definition presentation given by PMV. This presentation included information on the key components of the Project such as scope, anticipated schedule and related timelines, field studies, Environmental Assessment (EA) process, and consultation. Follow-up meetings took place with the TFN (January, 2013), and Musqueam Indian Band (January 2013) .

Consultation and Engagement	Activities
Project Update Meetings	Project update meetings were held with the TFN (July 12, 2013), Tsleil-Waututh First Nation (July 15, 2013), Musqueam Indian Band (July 16, 2013), and Semiahmoo First Nation (July 19, 2013). PMV also offered to meet with the members of the HTG prior to the submission of the Project Description. Topics discussed at the meetings included status of the Project, TAG process, fieldwork, traditional use data collection, and funding for participation in the Project consultation activities and EA review. PMV also sought input from First Nations on the information related to their community that is presented in this document. Letters providing an update on the status of the Project were sent to Katzie First Nation, Kwantlen First Nation, Sto:lo First Nation, Sto:lo Tribal Council, and Squamish Nation (July 2013).
Invitation to Attend Public Consultation – Open Houses	While PMV has a separate First Nations consultation process that runs parallel to public and stakeholder consultations, First Nations were also provided with the opportunity to attend public consultation activities.
TFN Community Information Session	PMV conducted a Project information session for TFN in early 2012. The intent of this session was to provide an overview of the Project to TFN community members and respond to any initial concerns or questions.
General Communications	PMV also undertook a range of communication efforts with identified First Nations such as emails, phone calls, and in-person discussions. These communications have included responses to requests for information and Project-related questions, confirmation of receipt of information, and coordination of meetings/consultation activities.

7.2.3 PMV's Commitment to Continued and Active Engagement with First Nations

PMV recognises and respects that local First Nation communities and their leadership want meaningful and ongoing input into the planning, development, and operation of port facilities and related transportation infrastructure. Accordingly, PMV is committed to continued and active engagement with First Nations with interests that may potentially be affected by the Project.

7.2.4 Results of Consultation and Engagement Activities to Date

The primary objective of PMV's First Nations consultation and engagement program for the Project is to ensure that all applicable legal and regulatory requirements are effectively addressed in a timely manner. Within this broader context, the goal of the program is to identify the potential for Project-related effects, and to design and implement appropriate mitigation measures in collaboration with participating First Nations and applicable regulatory agencies. PMV aims to approach consultation in a manner that supports positive, productive, and lasting relationships between PMV and identified First Nations.

7.2.5 Key Comments Expressed during Pre-Consultation

While no Project-specific concerns were received from any First Nations during the pre-consultation period, several relevant issues and themes, including the following, were identified by participating First Nations as being particularly important:

- Ensuring adequate and meaningful consultation in relation to the Project;
- Ensuring meaningful participation by First Nations in the EA review phase;

- Providing capacity funding to First Nations to facilitate meaningful participation in consultation and EA review processes;
- Respecting the terms of formal Agreements between PMV and TFN, and the existing relationship between the two parties;
- Identification of potential Project-related economic development opportunities for First Nations; and
- Ensuring the appropriate inclusion of TFN in mapping that identifies local governments.

7.2.6 Key Comments Expressed During Project Definition Consultation

To date, comments raised by First Nations during Project Definition consultations include issues related to the following:

- Procurement and employment opportunities for First Nations;
- Reduction in crab harvesting area;
- Effects on crab health and population;
- Effects to community health and wellness associated with effects on crabs;
- Effects related to treaty and aboriginal rights;
- Air quality and human health effects;
- Vessel and rail emissions;
- Increase in vessel, train, and vehicle numbers;
- Loss of marine habitat and fisheries effects;
- Effects on wildlife;
- Terminal design;
- Potential for accidents and spills to affect the marine environment/spill response;
- Cumulative effects from port development at Roberts Bank; and
- Provision of funding for meaningful participation in Project consultation activities and EA review.

As part of Project Definition consultation, PMV received a notice of deferral from Sto:lo Research and Resource Management Centre, People of the River Referrals Office representing Sto:lo Nation, and Sto:lo Tribal Council (received November 2012), advising no review is required at this time. Squamish First Nation declined to participate at this time, requesting that PMV continue dialogue with TFN (received December 2012). PMV will continue to keep these communities informed as the Project proceeds.

7.3 FIRST NATIONS LAND AND RESOURCE USE

Some of the information below has been provided to PMV directly from the First Nations as related to their respective communities.

The Project is located adjacent to TFN treaty territory and within the asserted traditional territories of various First Nations. Current use of lands and resources by First Nations for traditional purposes occurs throughout these territories. This use is secured by either specific treaty rights (as with the TFN), or under s.35 of the *Constitution Act, 1982*.

As of spring 2013, traditional Aboriginal fisheries for crab and salmon have been active within and around the Project Area. Further consultation with First Nations identified in **Section 7.1**, as well as with Fisheries and Oceans Canada (DFO), is required to expand on this understanding and assess potential Project-related effects on First Nations fisheries.

PMV's current understanding of the First Nations' land and resources used for traditional purposes will be considered, to understand potential effects that may occur within treaty or asserted traditional territories as a result of the PMV development at Roberts Bank. Ongoing consultation for the Project with First Nations will seek to confirm and expand upon the existing understanding of the traditional uses in areas that surround the Project.

Tsawwassen First Nation

The Tsawwassen First Nation exercises treaty rights in Tsawwassen Lands, the Tsawwassen Fishing Area, the Tsawwassen Intertidal Bivalve Fishing Area, the Tsawwassen Migratory Bird Harvest Area, and the Tsawwassen Wildlife Harvest Area as set out in the Tsawwassen First Nation Final Agreement (2007). The Project area either overlaps one or more of these Tsawwassen use areas or a Project activity has the potential to interact with a Tsawwassen First Nation activity within one or more of these Tsawwassen use areas. Tsawwassen First Nation activities protected under the Tsawwassen First Nation Final Agreement include the harvest of fish, crab, wildlife and migratory birds, traditional plants, and access to forestry resources. Through discussions with the Tsawwassen First Nation, PMV understands that the Tsawwassen First Nation harvests Fish and Aquatic Plants in the area of PMV developments and activities at or near Roberts Bank. The potential impact on these fisheries has been raised as a concern during consultations to-date. Workshops held to-date have focused on obtaining information from Tsawwassen First Nation elders, and fishers related to the currently active fisheries and traditional practices, as well as potential Project-related impacts to Fish and Aquatic Plants as defined in the Tsawwassen First Nation Final Agreement.

Musqueam Indian Band

The Musqueam Indian Band has communities based in South Vancouver and Delta. Portions of the Musqueam's asserted traditional territory encompass the mouth of the south Fraser River and Roberts Bank area, portions of which are included within designated Musqueam fishing areas for crab, prawn, and salmon regulated by DFO.

Through consultation and engagement activities, PMV understands that Musqueam members currently use the lands and resources in the Project Area for crabbing, fishing, and hunting. The Musqueam Indian Band has expressed concerns with respect to the potential effects of port development at Roberts Bank on fish, fish habitat, and health of crab populations, as well as Musqueam access to and use of marine resources.

Semiahmoo First Nation

The Semiahmoo First Nation is based in the area of White Rock, and asserts a traditional territory that extends into the eastern portion of Roberts Bank. This asserted territory represents areas important for the collection of traditional subsistence resources for the Semiahmoo, including fish and crab species.

Through consultation with PMV, the Semiahmoo First Nation has expressed concerns with respect to the potential effects of Project development on the health and numbers of crab populations, as well as access to and use of marine resources.

Tsleil-Waututh Nation

The Tsleil-Waututh Nation is based in the area of Burrard Inlet and Indian Arm and has an asserted traditional territory that includes the lower Fraser River and the Strait of Georgia, where the Roberts Bank Terminal is now located. Tsleil-Waututh has traditional and contemporary fish and fish habitat interests in this area. The Tsleil-Waututh Nation maintains confidential records of traditional activities within their territory that relates to cultural heritage and the seasonality and procurement of culturally important marine species. The use of this area includes, but is not limited to, active commercial fishing licenses for Area E, which includes Area 29. Potential effects to marine species due to Project-related activities will be considered as they relate to Tsleil-Waututh access to and use of marine resources, and protection of marine habitat.

Hul'qumi'num Treaty Group

The Hul'qumi'num Treaty Group (HTG) represents six First Nations based in southeastern Vancouver Island (Stz'uminus First Nation, Cowichan Tribes, Halalt First Nation, Lake Cowichan First Nation, Lyackson First Nation, and Penelakut Tribe).

The traditional territories of the HTG include the Strait of Georgia, the south arm of the Fraser River, and Juan de Fuca Strait, including the Roberts Bank area. These areas contain traditional marine resource harvesting areas important to the Hul'qumi'num First Nations.

With the exception of the Lake Cowichan and the Lyackson First Nation, HTG members have met with PMV as the Cowichan Nation Alliance. This working group also includes the Hwlitsum First Nation.

Sto:lo Nation

The Sto:lo Nation includes 11 First Nations in the Lower Mainland, with a collective traditional territory that encompasses the cities of Surrey, Richmond, and Delta in the vicinity of the Project. Specific information regarding traditional harvesting practices within this asserted territory are held confidentially by the Sto:lo Nation.

Sto:lo Tribal Council

The Sto:lo Tribal Council represents eight member First Nations within a traditional territory that encompasses large portions of the Fraser River, with the Project located in the southwestern corner of this territory. Resources relating to traditional harvesting practices within this asserted territory are held confidentially by the Sto:lo Tribal Council.

Kwantlen First Nation

The Kwantlen First Nation has an asserted traditional territory that encompasses areas between Mission and Tsawwassen near the Project. The traditional use of this territory by the Kwantlen has been documented in studies relating to infrastructure developments in the Lower Mainland. More specific information regarding traditional harvesting practices and the use of spiritual sites within Kwantlen asserted traditional territory may be held confidentially by Kwantlen First Nation.

Katzie First Nation

The Katzie First Nation asserted traditional territory encompasses large portions of the Fraser River, Richmond, and Delta near the Project Area. Information relating to the use of traditional resources and culturally sensitive areas within Katzie territory has been documented in studies related to major development projects in Metro Vancouver.

The culturally sensitive information included in these studies is held confidentially by the Katzie First Nation, and includes information regarding Katzie use of marine resources that may interact with Project development.

Squamish Nation

Squamish Nation traditional territory is located in the Lower Mainland region of British Columbia. Prior to, and following the arrival of Europeans in the late 1700s, the lands and waters used and occupied either exclusively, or jointly with First Nation neighbours, were as follows: from Point Grey on the south to Roberts Creek on the west; then north along the height of land to the Elaho River headwaters including all of the islands in Howe Sound and the entire Squamish valley and Howe Sound drainages; then southeast to the confluence of the Soo and Green Rivers north from Whistler; then south along the height of land to the Port Moody area including the entire Mamquam River and Indian Arm drainages; then west along the height of land to Point Grey. Traditional uses of this territory by the Squamish people include habitation, travel, and the harvest of resources, which has been documented in studies related to recent infrastructure development projects within their territory.

7.4 POTENTIAL EFFECTS ON FIRST NATIONS

PMV will continue consultations with identified First Nations to seek additional information on potential Project effects on First Nations interests and potential and established Aboriginal and Treaty rights. PMV understands that First Nations have a strong interest in ensuring that any traditional use sites within the Project Area are protected. PMV will continue to collaborate with potentially affected First Nations in this regard.

As of spring 2013, traditional Aboriginal fisheries for crab and salmon have been active within and around the Project Area. Further consultation with First Nations and DFO is required to expand on this understanding and assess potential Project-related effects on First Nations fisheries. Concerns regarding potential impacts to current use of lands and resources for traditional purposes within the Project Area raised during consultations with First Nations to-date include:

- TFN harvesting areas for Fish and Aquatic Plants;
- Musqueam Indian Band access to and use of marine resources such as fish and crab, as well as fish habitat;
- Semiahmoo First Nation access to and use of marine resources, and health and number of crab populations;
- Tsleil-Waututh Nation access to and use of marine resources and protection of marine habitat; and
- Traditional marine resource harvesting areas important to the Hul'qumi'num First Nations.

In terms of socio-economic effects, PMV also understands that some First Nations members may rely on commercial fishing and crabbing for their livelihood. PMV will also consider the potential effects on these communities should the resources be affected. The potential for health effects for First Nations from the Project and from Project-related effects to traditional activities such as crabbing or fishing will be further understood and assessed through the EA.

PMV does not anticipate any effects on First Nations resulting from Project-related changes to physical or cultural heritage, or to any structure, site, or thing that is of historical, archaeological, paleontological, or architectural significance. Further consultation will, however, seek to confirm this understanding and gather additional information regarding potential Project effects related to changes in the environment.

8.0 CONSULTATION WITH THE PUBLIC AND STAKEHOLDERS

This section of the Project Description describes the current consultation activities with interested public, stakeholder groups, and local governments. It also describes key comments and concerns expressed to date. A description of consultation activities focused specifically on First Nations is described in **Section 7.0**, and regulatory agency consultation is described in **Section 9.0**.

8.1 STAKEHOLDERS THAT MAY HAVE AN INTEREST IN THE PROJECT

PMV is engaging communities, stakeholders, and the public regarding the Project. The stakeholder categories and groups that may have an interest in the Project are presented below. At a high level, the list includes:

- Local communities and residents;
- Local and regional governments;
- Tenants and terminal operators;
- Railway companies;
- Community organisations;
- Industry groups;
- Agricultural groups;
- Business organisations; and
- Environmental non-governmental organisations.

8.2 PUBLIC AND STAKEHOLDER CONSULTATION PROCESS TO DATE

PMV is undertaking a comprehensive multi-round community, stakeholder, and public consultation process associated with the Project, which launched in January 2011. Consultation is occurring in several phases, and began with pre-consultation in June 2011. In addition to formal consultation periods, PMV is committed to ongoing engagement with communities, local and regional government, and interested stakeholders throughout the development and review of the Project. **Figure 23.0** illustrates the PMV-led consultation rounds that will continue throughout Project development.

Figure 23.0 Port Metro Vancouver-Led Consultation

PORT METRO VANCOUVER-LED CONSULTATION¹



Notes: 1. Port Metro Vancouver-led consultation with communities, stakeholders and the public, and Port Metro Vancouver-led consultation with First Nations will continue throughout project development. Other communications and community engagement activities will be undertaken throughout project review.

8.3 HOW INPUT WILL BE USED

Communication and consultation materials clearly state that public and stakeholder consultation input from each round of consultation will be used to shape the scope and content of subsequent rounds of consultation, and considered, along with technical and economic input, as PMV refines the scope and features of the Project.

A discussion guide is developed for each round of consultation, including a feedback form, which is also available online. Input is accepted via the feedback form or written submission. At the conclusion of each round of consultation, a Consultation Summary Report is developed to highlight the key themes for consideration by PMV.

A Consideration Memo will then be prepared, documenting how community, stakeholder, and public input was considered in refining the Project's scope, design, EA studies, and potential community benefits. These materials are posted to the Project's website.

8.4 ENVIRONMENTAL ASSESSMENT PUBLIC COMMENT PERIODS

In addition to PMV-led consultation, and as directed by federal and/or provincial regulators, PMV will meet or exceed environmental requirements for public participation during the EA process, as defined by provincial and federal legislation, and regulations. It is anticipated that the EA and review process will involve several rounds of consultation on issues such as the environmental review, the scope and nature of the assessment, the effects assessment report, and regulatory procedures and reports. Feedback is expected to be gathered online, through written submissions, during open houses, and via any other means as determined by PMV and the government.

8.5 ONGOING COMMUNITY ENGAGEMENT

8.5.1 Port Community Liaison Committee

In addition to comprehensive, multi-round consultation described above, PMV has created a Port Community Liaison Committee (PCLC) to serve as a mechanism for dialogue and communications about port-related issues in Delta. Working in the spirit of collaboration, PCLC is an information-sharing forum that brings together municipal, First Nations, industry, PMV, and community interests to discuss developments, identify concerns and opportunities for timely community input, as well as facilitate two-way communication among respective constituencies about port operations and development.

PCLC consists of up to 15 individuals, including representatives from the Corporation of Delta, TFN, community organisations, port industry, and PMV, which are appointed by their respective governing bodies. Community representatives provide geographic representation from the entire community (Tsawwassen, Ladner, and North Delta), as well as the diverse mix of interests within the municipality of Delta. PCLC is a key stakeholder group that will be asked to provide input into PMV consultation and other topics throughout development of the Project.

8.5.2 Local Government Liaison Program

PMV has established staff-level technical committees in key municipalities with an interest in port development and the Project to provide an opportunity for regular contact between PMV's Project team and staff from each local government. This forum offers an opportunity to exchange technical information as Project planning proceeds, and to ensure local government interests relating to technical information are raised and discussed in a timely manner.

Five staff-level Technical Liaison Committees have been established in the following municipalities:

- Corporation of Delta;
- City of Langley;
- Township of Langley;
- City of Surrey; and
- City of Richmond.

In addition to the five staff-level committees, a Local Government Elected Roundtable has been created as an information-sharing committee that provides a forum for PMV and elected officials to share information and discuss community interests, issues, and benefits related to the Project. While discussions will inform the EA for the Project, it is not meant to replace municipal participation in EA working groups.

8.5.3 Ongoing Community Relations

PMV is also undertaking other community engagement and communications initiatives to complement the consultation program. With the goal of providing timely information and an opportunity for stakeholders and the public to ask questions and/or provide comments outside of formal consultation periods, the community relations program includes the following:

- Project website: <http://www.robertsbankterminal2.com/>;
- Inquiry/response program (container.improvement@portmetrovanancouver.com; 604.665.9337);
- Field study communications;
- Presentations and meetings with stakeholders and community groups;
- Online engagement through Port Talk: <http://porttalk.ca/>; and
- Business liaison.

8.6 COMPLETED PUBLIC AND STAKEHOLDER CONSULTATIONS

The following table summarises consultation completed to date. Additional information on the completed stages of consultation is available at <http://www.robertsbankterminal2.com/>.

Table 14 Completed Public and Stakeholder Consultations – Notification and Participation

Consultation Round	Activities	Dates	Participation
Pre-consultation	• Notification included more than 800 emails to stakeholders and more than 500 follow-up phone calls • Notification also included a guest editorial by Port Metro Vancouver (PMV) Chief Executive Officer (CEO) Robin Silvester in print and online editions of the <i>Delta Optimist</i> • Seven multi-stakeholder meetings were held in Delta, Richmond, Surrey, Langley, and Vancouver • Four meetings took place with local government • Discussion guide and feedback form became available in print and online (PMV 2011)	June 6, 2011 – June 30, 2011	• 73 attendees at multi-stakeholder meetings • 55 feedback forms received • one written submission
Project Definition Consultation	• Notification included: ▫ More than 2,000 emails to stakeholders and more than 1,400 follow-up phone calls, ▫ 27 advertisements across the following newspapers: <i>Delta Optimist</i>, <i>Langley Advance</i>, <i>Langley Times</i>, <i>Richmond News</i>, <i>South Delta Leader</i>, <i>Surrey Leader</i>, <i>Surrey Now</i> • Notification also included a guest editorial by PMV CEO Robin Silvester in print and online editions of the <i>Delta Optimist</i> • Seven multi-stakeholder meetings in Delta, Richmond, Surrey, Langley, and Vancouver • Five open houses in Delta, Richmond, Surrey, and Langley • Four meetings with local government • Two community information booths at the Ladner Leisure Centre and the South Delta Recreation Centre • Discussion guide and feedback form in print and online	October 22, 2012 – November 30, 2012	• 175 people attended consultation events • 86 attendees at multi-stakeholder meetings • 72 attendees at open houses • 47 feedback forms received • 27 written submissions received

8.6.1 Key Comments Expressed during Pre-Consultation

The Project's pre-consultation phase included a very early round of consultation that asked stakeholders for input on what they would like to be consulted about and how they want to be consulted in future rounds of consultation.

The following issues ranked as being the most important topics for participants during future rounds of consultation:

- Socio-economic elements of the Project, such as road and rail traffic, economic benefits, and jobs;
- Local and regional area elements, including issues such as air quality, land use, noise, and light; and
- Wildlife and habitat, water quality and marine species, and local benefits and opportunities.

In terms of consultation methods, the most preferred forms were:

- Attending a small group meeting;
- Attending a community open house; and
- Completing an online feedback form (75% preferred) or providing a written submission.

Of 39 respondents who volunteered additional topics for consultation, the most frequently mentioned topics included a desire for more input during the process; concerns about the effects of the Project on the communities of the Corporation of Delta, Township of Langley, and City of Langley; concern about the effects of the Project on the health and quality of life for residents; the need to justify the Project through economic forecasting; and the need to consider protection of the environment throughout Project development.

During multi-stakeholder meetings, participants also discussed the relationship between ports in BC, such as Prince Rupert, an interest in regional transportation planning as well community and environmental benefits that could be provided through development of the Project. Participants also requested PMV to ensure that consultation participants also have access to technical information, such as reports and study outlines, and study results. PMV has responded to a number of these issues through Project Definition consultation, including the creation of an online document library regarding studies at Roberts Bank (<http://www.robertsbankterminal2.com/information-centre/>).

As part of Pre-consultation activities, PMV held meetings with municipal governments, including the Corporation of Delta, the City of Langley, the Township of Langley, the City of Surrey, and the City of Richmond. In addition to the topics listed above, local governments also expressed an interest in PMV's long-term growth strategy, and wanted to ensure that they were involved in the discussions.

8.6.2 Key Comments Expressed during Project Definition Consultation

From October 22, 2012 to November 30, 2012, PMV conducted Project Definition Consultation, which provided an opportunity for community members, stakeholders, and the public to receive information and provide feedback about features of the Project and discuss topics important to the EA.

The following represents a summary of the key themes identified during Project Definition Consultation, including stakeholder meetings, feedback forms, and other written submissions:

- Participants expressed concern about the effects of existing port facilities at Roberts Bank to current and future air quality, noise and light pollution, as well as potential effects to birds, fish, and agricultural land. Participants asked that PMV responsibly balance environmental, social, and economic needs during planning for the Project.
- Participants questioned PMV's demand forecasts and justification for additional container capacity on the West Coast of Canada. Some participants expressed interest in seeing additional capacity built in Prince Rupert or the use of short-sea shipping as an alternative to building a new terminal.
- Participants expressed interest in having more technical information about the Project, including having access to various Project documents and studies and additional details about the EA process and the baseline field studies currently underway.
- Participants expressed concern about the potential increase in road and rail traffic as a result of the Project and asked that PMV review options for improving the efficiency of container trucks to reduce the number of empty truck trips and eliminate unnecessary trips throughout the Lower Mainland.

A Consultation Summary Report detailing the activities described above is available on PMV's website (<http://www.robertsbankterminal2.com/>), including a Consideration Memo showing how PMV has responded to the feedback received during the consultation period.

9.0 FEDERAL AND PROVINCIAL GOVERNMENT CONSULTATION

This section of the report provides a brief overview of engagement activities that have been conducted with federal and provincial regulatory agencies to date. A description of consultation activities focused specifically on First Nations is described in **Section 7.0**, and consultation with the public and other stakeholders (including municipal governments) is described in **Section 8.0**.

Meetings between PMV and both provincial and federal regulators in regard to the Project have been ongoing since 2011. The purpose of these meetings has been to introduce the Project, review regulatory procedures and processes, discuss potential issues that might arise during the planning, construction, and operations of the Project, and receive feedback on technical workplans related to various field studies.

Provincial and federal departments that have been consulted in Vancouver, Victoria, and Ottawa include the following;

- CEA Agency;
- BC EAO;
- Environment Canada – Canadian Wildlife Service;
- Environment Canada – Marine Programs;
- Environment Canada – Environmental Protection Branch - Disposal at Sea;
- DFO – Major Projects Unit, Habitats Division, Fisheries Protection, Species At Risk;
- Transport Canada – Environmental Programs; and
- BC MOTI.

PMV is continuing to engage with provincial, federal, and local governments to identify issues and, on a discipline-specific basis, review baseline studies in light of EA regulatory process requirements.

9.1 TECHNICAL ADVISORY GROUPS

In October 2012, PMV initiated the formation of four Technical Advisory Groups (TAGs). Members of the TAG included representatives from Environment Canada, DFO, academia, non-governmental organisations (NGOs), and relevant technical consulting firms, including both Canadian and international experts. Meetings were initiated in October 2012 and are expected to continue until the formal initiation of the EA process for the Project. Meetings were facilitated by an independent and neutral facilitator (an outside contractor retained by PMV) and focussed on key environmental components that may be affected by the Project. The four identified topics were:

1. SRKWs;
2. Biofilm and shorebirds;

3. Coastal geomorphology; and
4. Productive capacity.

The goals of the TAGs were to:

- Establish a common understanding of best science;
- Identify new studies to fill existing data gaps;
- Identify collaborative partnerships on issues of common interest; and
- Explore technical issues at the pre-regulatory phase.

Over the course of three to four meetings, each TAG reviewed existing information and field study work plans, identified priority information needs and appropriate methods of effects assessment, and made recommendations to PMV to help support a high-quality EA for the Project.

10.0 REFERENCES

- BC Environmental Assessment Office (BC EAO). 2008. *Guidelines for Preparing a Project Description for an Environmental Assessment in British Columbia*. Created 11 June 2007; updated August 2013. Available at http://www.eao.gov.bc.ca/pdf/EAO_Guidelines_Preparing_Project_Description.pdf.
- Bornhold, Brian D. 2009. *Projected sea level changes for British Columbia in the 21st century*. Created December 2008. ISBN 978-0-7726-6069-5. Available at <http://www.env.gov.bc.ca/cas/pdfs/sea-level-changes-08.pdf>. Accessed July 2013.
- Canadian Environmental Assessment Agency (CEA Agency). 2004. Canada-British Columbia Agreement on Environmental Assessment Cooperation. Available at <http://www.ceaa-acee.gc.ca/default.asp?lang=En&n=04A20DBC-1>. Accessed July 2013.
- CEA Agency. 2012. *Guide to Preparing a Description of a Designated Project under the Canadian Environmental Assessment Act, 2012*. Available at https://www.ceaa-acee.gc.ca/63D3D025-2236-49C9-A169DD89A36DA0E6/Guide_to_Preparing_a_Description_of_a_Designated_Project_under_CEAA_2012.pdf. Accessed July 2013.
- City of Langley. 2013. Living in Langley. *City of Langley*. Available at <http://www.city.langley.bc.ca/index.php/discover-langley/living-in-langley>. Accessed July 2013.
- City of Richmond. 2007. Population and Demographics. *City of Richmond*. Available at <http://www.richmond.ca/discover/about/demographics/Census2006.htm>. Accessed July 2013.
- City of Surrey. 2012. Surrey Facts. *City of Surrey*. Available at <http://www.surrey.ca/6554.aspx>. Accessed July 2013.
- Environment Canada. 2011. Network of Protected Areas. Available at <http://www.ec.gc.ca/ap-pa/default.asp?lang=En&n=0D0A02C4-1>. Accessed July 2013.
- Fisheries and Oceans Canada (DFO). 2008. *Recovery Strategy for the Northern and Southern Resident Killer Whales (Orcinus orca) in Canada. Species at Risk Act Recovery Strategy Series*. March 2008. Available at http://publications.gc.ca/collections/collection_2008/ec/En3-4-46-2007E.pdf.
- Government of BC. 2012a. BC Stats: Provincial Population Projections. Available at <http://www.bcstats.gov.bc.ca/StatisticsBySubject/Demography/PopulationProjections.aspx>. Accessed July 2013.

Government of BC. 2012b. iMapBC. 2012. Available at <http://maps.gov.bc.ca/ess/sv/imapbc/> Accessed July 2013
Government of Canada. 2013. Asia-Pacific Gateway and Corridor Initiative. Available at www.asiapacificgateway.gc.ca. Accessed July 2013.

Hemmera. 2006. *South Fraser Perimeter Road Environmental Screening Report*. Prepared for the BC MOTI.

InterVISTAS Consulting. 2012. 2012 Port Metro Vancouver Economic Impact Study – FINAL REPORT. Available at <http://www.portmetrovancover.com/docs/default-source/about-facts-stats/2012-port-metro-vancouver-economic-impact-study.pdf?sfvrsn=0>. Accessed July 2013.

Madrone Environmental Services Ltd. 2009. *Land Capability Assessment Deltaport Way Overpass Area 41B Street at Deltaport Way*. Prepared for PMV by Sonia Meili.

Metro Vancouver. 2011 Census Bulletin. Available at http://www.metrovancouver.org/about/publications/Publications/2011_CensusBulletin1-Pop_and_Dwell.pdf. Accessed July 2013.

Ocean Shipping Consultants Ltd. 2001. *Port of Vancouver: Container Market Study*.

Ocean Shipping Consultants. 2012. *Port Metro Vancouver Container Forecasts*. #P120330-10: FINAL REPORT. Available at <http://www.robertsbankterminal2.com/wp-content/uploads/Port-Metro-Vancouver-Container-Forecasts-Ocean-Shipping-Consultants-2012.pdf>. Accessed July 2013.

Ocean Shipping Consultants. 2013. *PMV – Port Metro Vancouver Container Forecasts*. #P120330-10 <http://www.robertsbankterminal2.com/wp-content/uploads/Port-Metro-Vancouver-Container-Traffic-Forecast-Ocean-Shipping-Consultants-July-2013.pdf>. Accessed July 2013

Port Metro Vancouver (PMV). 2008. Port Metro Vancouver Land Use Plan Update. Available at <http://www.portmetrovancover.com/en/projects/LandUsePlan.aspx>. Accessed July 2013.
PMV. 2011. Discussion Guide. Roberts Bank Terminal 2 Pre-Consultation Discussion Guide and Feedback Form. June 2011. Available at <http://www.robertsbankterminal2.com/information-centre/project-documents/> Accessed July 2013

PMV. 2012. Discussion Guide. Roberts Bank Terminal 2 Project Discussion Guide and Feedback Form, Project Definition Consultation October 22 – November 30, 2012. Available at <http://www.robertsbankterminal2.com/consultation/public-stakeholder/>. Accessed July 2013.

PMV. 2013. Deltaport Terminal Road and Rail Improvement Project. Available at <http://www.portmetrovancover.com/en/projects/ongoingprojects/dtrip.aspx>. Accessed July 2013.

Statistics Canada 2006. 2006 Census Information. *Corporation of Delta*. Available at <http://www.delta.ca/assets/CPD/PDF/2006CensusSummary.pdf>. Accessed July 2013.

Statistics Canada. 2007. Delta, British Columbia (Code5915011) (table). 2006 Community Profiles. 2006 Census. Statistics Canada Catalogue no. 92-591-XWE. Ottawa. Released March 13, 2007. <http://www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-591/index.cfm?Lang=E> (accessed September 9, 2013).

Tsawwassen First Nation (TFN). 2007. Tsawwassen Final Agreement. Available at <http://www.tsawwassenfirstnation.com/treaty/April%2009%20-%20Tsawwassen%20First%20Nation%20Final%20Agreement%20English.pdf>. Accessed July 2013.

TFN, 2013. Taking Back Our Rightful Place. Tsawwassen First Nation: Land Facing the Sea. Available at <http://www.tsawwassenfirstnation.com/whoweare.php>. Accessed July 2013

Western Hemisphere Shorebird Reserve Network (WHSRN). 2009. Fraser River Estuary. Available at <http://www.whsrn.org/site-profile/fraser-river-estuary>. Accessed July 2013.

WorleyParsons Canada. 2011. Projection of Vessel Calls and Movements at Deltaport and Westshore Terminals. Deltaport Terminal Road and Rail Improvement Project. Available at <http://www.robertsbankterminal2.com/wp-content/uploads/Projections-of-Vessel-Calls-and-Movements-at-Deltaport-and-Westshore-Terminals.pdf> Accessed July 2013

WorleyParsons Canada. 2012. Terminal 2 (T2) Economic Assessment, Container Capacity Improvement Program (CCIP). Prepared for PMV by WorleyParsons Canada, March 6, 2012.

WorleyParsons Canada and Seaport Consultants Canada Inc. 2011a. Projections of Vessel Calls and Movements at the Roberts Bank Marine Terminals (Terminal 2). Prepared for PMV by WorleyParsons Canada and Seaport Group.

WorleyParsons Canada and Seaport Consultants Canada Inc. 2011b. Preliminary Container Traffic Projections for Port Metro Vancouver: 2011 to 2030. Container Capacity Improvement Program (CCIP) Project Definition Report (PDR) Phase – Executive Summary. Available at: http://www.robertsbankterminal2.com/wp-content/uploads/Executive-Summary-09409-01-GE-REP-90006-500_Rev0_110527.pdf

11.0 ACTS AND REGULATIONS

Canada Marine Act, SC 1998, c. 10

Canada Wildlife Act, RSC 1985, c. W-9

Wildlife Area Regulations, CRC, c. 1609

Canadian Environmental Assessment Act, 2012, SC 2012, c. 19, s. 52

Regulations Designating Physical Activities, SOR/2012-147

Environmental Assessment Act, SBC 2002, c. 43

Reviewable Projects Regulation, BC Reg 370/2002

Fisheries Act, RSC 1985, c. F-14

Migratory Birds Convention Act, 1994, SC 1994, c. 22

Navigable Waters Protection Act, RSC 1985, c. N-22

Species at Risk Act, SC 2002, c. 29

Wildlife Act, RSBC 1996, c. 488

APPENDIX A

Table of Concordance:

***CEAA 2012* Project Description Information Requirements**

Content required by the Guide to Preparing a Description of a Designated Project under the <i>Canadian Environmental Assessment Act, 2012</i>	Corresponding Section in the Document
1. General Information	1.0
1.1. Nature of the designated project, and location	1.2, Figure 1.0
1.2. Proponent contact information	1.4
1.2.1. Name of the designated project	Title page
1.2.2. Name of the proponent	1.3
1.2.3. Address of the proponent	1.4
1.2.4. Chief Executive Officer	1.4
1.2.5. Principle contact person	1.4
1.3. List of any jurisdiction and other parties that were consulted	1.5
1.4. Other relevant information	1.6 – 1.7
1.4.1. Regulatory requirements	1.6
1.4.2. Regional environmental studies	1.7
2. Project information	2.0
2.1. Description of the project, context and objectives	2.1 – 2.2
2.2. <i>Regulation Designating Physical Activities</i> setting	1.6
2.3. Project components and activities	2.3
2.3.1. Physical works associated with the designated project	2.3
2.3.2. Anticipated size and production capacity of the designated project	2.3
2.3.3. Percent increase in size or capacity	2.3
2.3.4. Description of all activities to be performed	2.3
2.4. Emissions, discharges and waste	6.1.1, 6.1.7, 6.1.9, 6.2
2.4.1. Sources of atmospheric emissions	6.1.9, 6.2
2.4.2. Sources and location of liquid discharges	6.1.9, 6.2
2.4.3. Types of wastes and plans for their disposal	6.2
2.5. Phases and scheduling	2.6
2.5.1. Anticipated scheduling, duration and staging of key project phases	2.5, 2.6, Figure 12.0
2.5.2. Main activities in each phase of the designated project	2.5, 2.6
3. Project Location	2.2
3.1. Description of the designated project's location	2.2
3.1.1. Coordinates	2.2
3.1.2. Site map/plan(s) depicting location of the designated project components and activities	Figure 1.0, 5.0 6.0, 7.0

Content required by the Guide to Preparing a Description of a Designated Project under the <i>Canadian Environmental Assessment Act, 2012</i>	Corresponding Section in the Document
3.1.3. Map(s) at an appropriate scale showing the location of the designated project components and activities, including;	
a) Watercourses and waterbodies with names where they are known	Figure 1.0, 13.0, 17.0, 18.0
b) linear and other transportation components (e.g., airports, ports, railways, roads, electrical power transmission lines and pipelines);	Figures 1.0, 10.1, 10.2
c) other features of existing or past land use (e.g., archaeological sites, commercial development, houses, industrial facilities, residential areas and any waterborne structures);	Figures 1.0, 16.2, 19.0, 20.0, 21.0,
d) location of Aboriginal groups, settlement land (under a land claim agreement) and, if available, traditional territory;	Figure 1.0, 19.0, 22.0
e) federal lands including, but not limited to National parks, National historic sites, and reserve lands;	Figures ;13.0, 14.0 15.0, 16.1, 17.0
f) nearby communities;	Figure 1.0, 13.0, 21.0
g) permanent, seasonal or temporary residences	Figure 13.0
h) fisheries and fishing areas (i.e., Aboriginal, commercial and recreational);	Figures 19.0, 20.0
i) environmentally sensitive areas (e.g., wetlands, and protected areas, including migratory bird sanctuary reserves, marine protected areas, and National Wildlife areas); and	Figure 16.1, 16.2 , 17.0, 18.0
j) provincial and international boundaries	Figures 1.0, 12.0, 13.0 15.0, 16.1, 16.2,
3.1.4. Photographs of work locations	Appendix C
3.1.5. Legal description of land	3.1, 3.2, Figures 13.0, 14.0, Appendix E
3.1.6. Proximity of the designated project to: -Residences -Traditional territories -Federal lands	3.1, 5.2.1, 7.1 Table 12, Figures 13.0, 14.0, 15.0, 22.0
3.2. Land and Water Use	3.0
3.2.1. Zoning designations	3.1
3.2.2. Current land ownership, including sub-surface rights	3.2, Figure 13.0
3.2.3. Land use, water use, management or conservation plans near the Project Area	3.1, 5.1.1, 5.1.2, Figure 14.0
3.2.4. Historical use of lands as a marine terminal	1.2, 3.1
3.2.5. Land use and zoning under Port Land Use Plan	3.1, Figure 14
3.2.6. Lands and resources currently used for traditional purposes by Aboriginal peoples	7.1, Figures 16.2, 19.0
4. Federal Involvement	
4.1. or anticipated federal financial support	4.1
4.2. Federal lands that may be used	3.24.2, Figure 14.0, 15.0
4.3. Legislative or regulatory requirements	4.3

Content required by the Guide to Preparing a Description of a Designated Project under the <i>Canadian Environmental Assessment Act, 2012</i>	Corresponding Section in the Document
5. Environmental Effects	
5.1. Description of the physical and biological setting	5.0, 5.1, Figures 17.0, 18.0
5.2. Description of any changes that may be caused to	
5.2.1. Fish and fish habitat	6.1.1, 6.1.2, 6.1.6
5.2.2. Aquatic species	6.1 – 6.1.7
5.2.3. Migratory birds	6.1.8
5.3. Description of any change to the environment on federal lands, in a province other or outside of Canada	6.0, 6.1.9
5.4. Description of the effects on Aboriginal peoples	7.3
6. Proponent Engagement and Consultation with Aboriginal Groups	
6.1. List of Aboriginal groups that may be interested in the designated project, including contact information	7.1, Appendix D
6.2. Description of the engagement or consultation activities carried out to date	7.2, Table 1, 13, 14
6.3. Overview of key comments and concerns	7.2.4 – 7.2.6
6.4. Overview of information on current use of lands and resources for traditional purposes	7.3, Figure 19.0
6.5. Consultation and information-gathering plan	7.2.3 Table 10.0
7. Consultation with the Public and Other Parties	8.0
7.1. List of stakeholders that may be interested and consultation activities carried out to date	8.1, Table 13,14
7.2. Overview of key comments and concerns	8.6.1, 8.6.2
7.3. Overview of any consultation activities	8.2 – 8.6 Figure 23.0
7.4. Description of any consultations that have occurred with jurisdictions that have environmental assessment decisions to make	9.0
8. Executive Summary	xlvi

APPENDIX B
Table of Concordance:
BC *EAA* Project Description Information Guidelines

Content required under the BC EAO's "Guidelines for Preparing a Project Description for an Environmental Assessment in British Columbia"	Corresponding Section in the Document
9. Proponent Information	
9.1. The proponent's name and the representative managing the project.	1.3, 1.4
9.2. Contact information, including a mailing address, phone and fax numbers, and email addresses.	1.4
9.3. Corporate information, including website address, particulars of company incorporation, and partners' names (if applicable).	1.3, 1.4, 8.5.3
10. General Background Information	
10.1. The type and size of the project, with specific reference to the thresholds set out in the <i>Reviewable Projects Regulation</i> .	1.2, 1.6
10.2. Project purpose and rationale.	2.1
10.3. Estimated capital cost.	2.1.3
10.4. Number of construction jobs (in person years) and operating jobs (actual number).	2.1.3
10.5. Location (latitude and longitude).	2.2
11. Project Overview	
11.1. A brief description of the major on-site and off-site project components, including options if the final site selections are not yet available.	2.3-2.5
11.2. 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 will be helpful to understanding the nature and location of the project).	Figures 1.0, 5.0 – 7.0, Appendix C
11.3. The project's duration, including decommissioning if appropriate.	2.6, Figure 12.0
11.4. The project's potential environmental, economic, social, heritage, and health effects (in general terms).	6.0
12. Land Use Setting	
12.1. A general description of existing land use in the vicinity of the project site.	5.1-5.2
12.2. Whether the project and its components are situated on private or Crown land.	3.2
12.3. Information about First Nations interests where asserted claims to rights or title are known.	7.1, 7.2.4 – 7.2.6, 7.3
13. Consultation Activities	
13.1. A summary of consultation activities that have been carried out with First Nations, the public and local governments.	7.2, 8.2, 8.6, 9.0
14. Development Schedule	
14.1. A tentative schedule for submitting an application for an environmental assessment certificate and developing the project (should a certificate be issued).	2.6
15. Required Permits	
15.1. A list of required permits, if known.	4.3

APPENDIX C

Photos of Work Areas



Photo 1: Existing Deltaport Terminal, adjacent to Westshore Terminals (coal), looking north.



Photo 2: Existing Deltaport Terminal, adjacent to Westshore Terminals (coal), looking southeast.



Photo 3: Existing Roberts Bank Causeway looking south, including Deltaport Way, South Yard (containers trains) and North Yard (Westshore coal trains).



Photo 4: Existing Roberts Bank Intermodal Yard at Deltaport, with causeway in the distance.

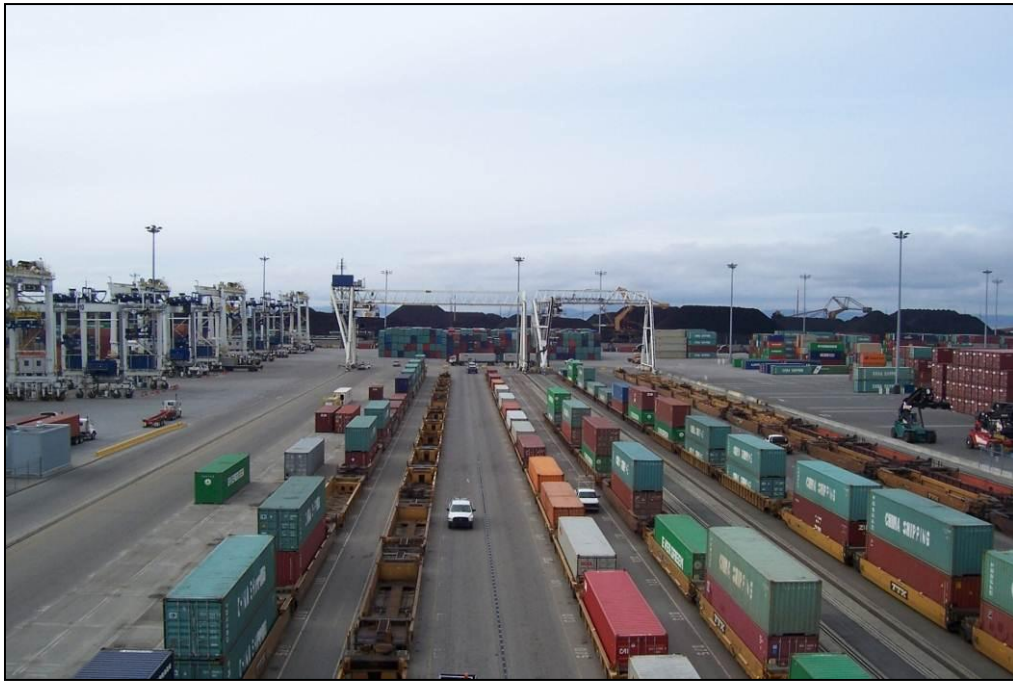


Photo 5: Existing Deltaport Intermodal Yard, looking west, with Westshore coal terminal in the distance.

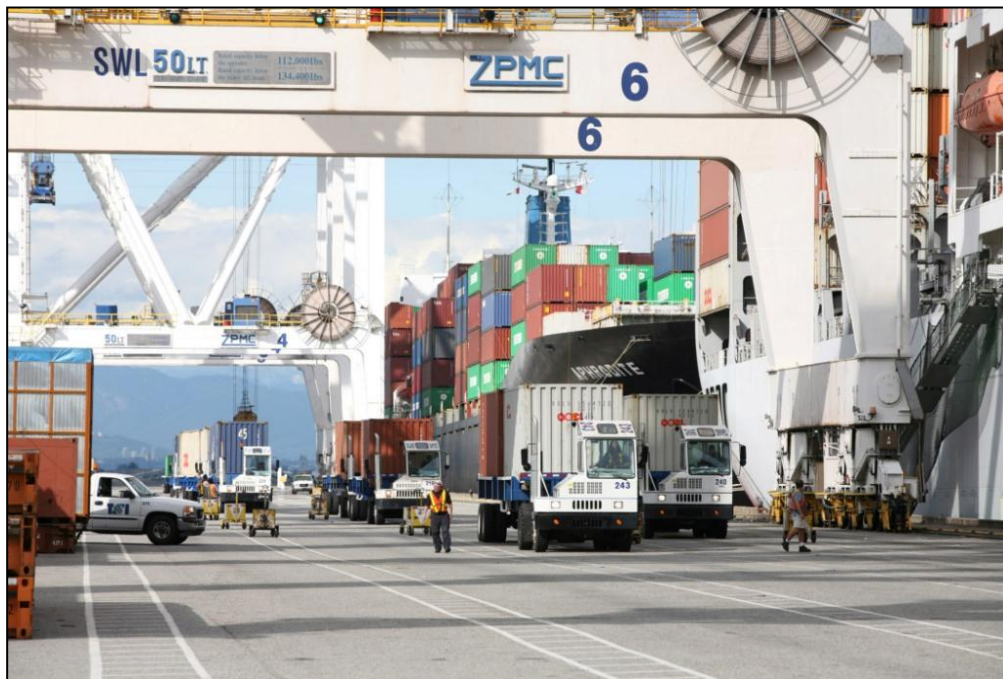


Photo 6: Container transfer from ships at Deltaport with ship-to-shore cranes.



Photo 7: Tug support of container ship at Deltaport.

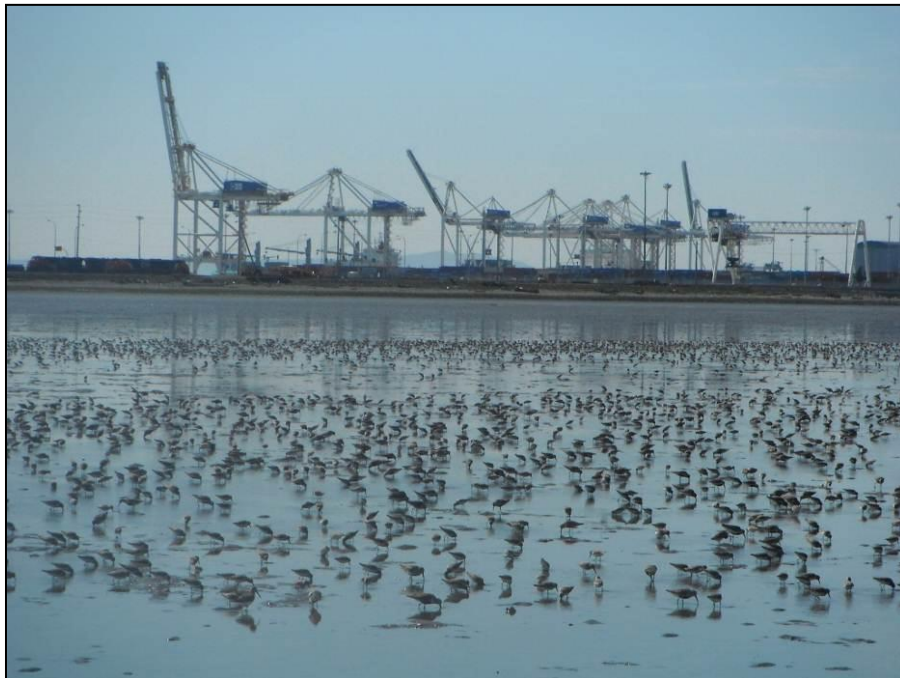


Photo 8: Shorebirds in the Roberts Bank inter-causeway area, view looking north.



Photo 9: Taking soil cores to sample benthic invertebrate population which are food for shorebirds.



Photo 10: Mist netting for shorebirds.



Photo 11: Intertidal marsh habitat sampling for benthic invertebrates and biofilm.



Photo 12: Biologist conducting a salt marsh survey at Roberts Bank.

APPENDIX D
First Nations Contact Information
for the Roberts Bank Terminal 2 Project

FIRST NATIONS CONTACT INFORMATION FOR THE ROBERTS BANK TERMINAL 2 PROJECT

(Additional contact information available upon request.)

First Nation	Contact Information
Tsawwassen First Nation (TFN)	Chief Bryce Williams 1926 Tsawwassen Drive Delta, BC V4M 4G2 Phone: 604.943.2112 Fax: 604.943.9226 Email: reception@tsawwassenfirstnation.com Tom McCarthy, Public Services Director, tmccarthy@tsawwassenfirstnation.com Ed Chanter, Director of Lands: echanter@tsawwassenfirstnation.com
Musqueam Indian Band (MIB)	Chief Ernest Campbell 6735 Salish Drive Vancouver, BC V6N 4C4 Phone: 604.263.3261 Fax: 604.263.4212 / 604.269.3369 Email: Leona Sparrow (Dir. Treaty, Lands and Resources): lsparrow@musqueam.bc.ca Dianne Sparrow (Associate Director, treaty, Lands and Resources): dbsparrow@musqueam.bc.ca
Hul'qumi'num Treaty Group (HTG)	12611-B Trans Canada Highway Ladysmith, BC V9G 1M5 Phone: 250.245.4660 Fax: 250.245.4668 Email: info@hulquminum.bc.ca
Semiahmoo First Nation	Chief Willard Cook 16049 Beach Road Surrey, BC V3S 9R6 (Terms Expire: December 27, 2012) Phone: 604.536.3101 Fax: 604.536.6116 Email: Joanne Charles, Councillor: semiahmoojoanne@gmail.com

First Nation	Contact Information
Tsleil-Waututh First Nation	Chief Justin George 3075 Takaya Drive North Vancouver, BC V7H 3A8 (Terms expire: March 31, 2013) Phone: 604 929 3454 Fax: 604 929 4714 Email: Erin Hanson, Stewardship Coordinator: ehanson@twnation.ca
Katzie First Nation	Chief Ed Pierre 10946 Katzie Road Pitt Meadows, BC V3Y 2G6 Phone: 604.465.8961 Fax: 604.465.5949 Email: Debbie Miller, Chief Negotiator: katzie.treaty@shawcable.com
Kwantlen First Nation	Chief Marilyn Gabriel 23690 Gabriel Lane P.O. Box 108 Fort Langley, BC V1M 2R4 Phone: 604.888.2488 Fax: 604.888.2442 Email: Tumia Knott, Councillor : Tumia@kwantlenfn.ca
Sto:lo Nation	Willy Hall Executive Director 7-7201 Vedder Road Chilliwack, BC V2R 4G5 Phone: 604.858.3366 Fax: 604.824.5129 Email: Jessica Morrison, Jessica.morrison@stolonation.bc.ca

First Nation	Contact Information
Sto:lo Tribal Council	Grand Chief Doug Kelly 2855 Chowat Road P.O. Box 440 Agassiz, BC V0M 1A0 Phone: 604.796.0627 Fax: 604.796.0643 Email: General: info@stolotribalcouncil.ca President: doug.kelly@stolotribalcouncil.ca Vice President: tye@stolotribalcouncil.ca Secretary/Treasurer: Vivian.ferguson@stolotribalcouncil.ca

APPENDIX E

Legal Descriptions of Lands and Ownership

Element	PID	Plan No	Fig14 Poly	Owner	Area
Causeway	026-916-487	PLAN BCP27391	16	BC Rail	9.85
Causeway	026-108-518	PLAN BCP12878	17	Crown Federal	32.50
Dredge Basin	026-916-487	PLAN BCP27391	16	BC Rail	0.38
Dredge Basin	026-108-518	PLAN BCP12878	17	Crown Federal	11.13
Dredge Basin	NA	NA	22	Crown Provincial (T2 Waterlot)	5.83
Terminal	023-279-222	PLAN LMP25402	15	Crown Federal	0.40
Terminal	026-916-487	PLAN BCP27391	16	BC Rail	2.8
Terminal	026-108-518	PLAN BCP12878	17	Crown Federal	70.79
Terminal	NA	NA	22	Crown Provincial (T2 Waterlot)	42.8
Tug Basin Improvements	023-279-222	PLAN LMP25402	15	Crown Federal	1.59
Tug Basin Improvements	026-108-518	PLAN BCP12878	17	Crown Federal	0.87
Track M5 Addition	026-916-487	PLAN BCP27391	16	BC Rail	0.45
Track M5 Addition	027-725-758	PLAN BCP38778	23	BC Rail	0.02
Track M5 Addition	000-553-914	PLAN 42153	24	BC Rail	0.005
Track M5 Addition	000-553-395	PLAN BCP38001	26	BC Rail	0.23
Track M5 Addition	000-553-166	PLAN 42153	27	BC Rail	0.08
Track M5 Addition	009-012-982	PLAN BCP28898	28	Crown Provincial	0.08
Total New Area					179.81
<i>Tug Basin Existing</i>	<i>023-279-222</i>	<i>PLAN LMP25402</i>	<i>15</i>	<i>Crown Federal</i>	<i>1.43</i>
Total All Areas					181.24

APPENDIX F

Glossary of Terms

GLOSSARY

Automatic Guided Vehicles (AGVs): Horizontal transport equipment to move containers on the terminal between the wharf area and the container yard or between the wharf area and the intermodal yard. Unlike shuttle carriers, AGVs need to be loaded and unloaded by a crane.

Bad Order Car: A rail car that requires more than routine service due to a mechanical or operational problem that prevents it from being used in a train for revenue service. These cars need to be isolated from train service into a storage yard where they can be repaired, or gathered for dedicated transport to a repair facility.

Berm: A raised barrier used to control erosion and sedimentation by reducing the rate of surface run-off.

Ballast water: Water in the ballast tank of a ship used to provide adequate weight to lower the ship's centre of gravity for stability. Ballast water is expelled from the ship during loading and drawn in to the ship during unloading.

Berth: A designated location in a terminal used for mooring vessels.

Blue list: The BC Conservation Data Centre (BC CDC) designation for species of special concern that are sensitive to human activities or natural events, but not endangered or threatened.

Bollard: The structure on the dock or wharf to which mooring lines are attached.

Caisson: A prefabricated hollow concrete box that is sunk into place and then filled with ballast rock, thus forming a foundation.

Chart Datum: The level of water from which charted depths displayed on a nautical chart are measured. A chart datum is generally a tidal datum; that is, a datum derived from some phase of the tide. Common chart datums are lowest astronomical tide and mean lower low water.

Coning: The physical work of installing locking cones in the top corners of containers to allow container stacking. Coning is completed when the cones are twisted *via* levers to lock the containers together.

Cope wall: A cap beam that ties adjacent caissons together and contains internal tunnels and surface pits for shore to ship services.

Critical Habitat: The habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species. SARA S.C. 2002, c. 29

Deadweight tonnage (DWT): A measure of how much weight a ship is carrying or can safely carry. It is the sum of the weights of cargo, fuel, fresh water, ballast water, provisions, and passengers.

Deconing: The opposite of coning. In this case the process of unlocking stacked containers from each other.

Dredging: An excavation activity that is at least partially underwater with the purpose of gathering bottom sediments and disposing of them at a different location.

Element: A term used by the BC CDC to describe a wildlife species or subspecies at risk.

Endangered: Species that face imminent extirpation or extinction.

Environmental Assessment (EA): The process of identifying, predicting, evaluating, and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made.

Environmental Impact statement (EIS): The term used by the federal government for the EA report submitted by a proponent for review. The EIS contains an assessment of all potential effects of a project, including cumulative effects, and mitigation measures to address these effects. The Ministers' decision whether to approve the Project is based on the content of this document.

Extirpated: Species that no longer exist in the wild in BC, but occur elsewhere.

In situ: Refers to something "in position", or that has not been removed from its original place.

Intermodal yard (IY): Facility capable of handling and transferring cargo between terminal and rail transportation.

Lead track: Track that leads from a mainline track to a yard track. From the lead track, railcars proceed through a series of switches into the yard.

Lower Mainland: A name commonly applied to the region surrounding and including Vancouver, British Columbia, Canada. It includes two Regional Districts: the Greater Vancouver Regional District and the Fraser Valley Regional District.

Marine Slope: The slope of land extending below the water surface from the developed land to the seabed at a defined angle for stability.

Metro Vancouver: A political body and corporate entity operating under provincial legislation as a 'regional district' and 'greater boards' that deliver regional services, policy and political leadership on behalf of 24 local authorities.

Mooring: The thing or act of attaching or securing a vessel to a permanent structure, such as a wharf or berth. Also refers to the ropes used to secure the vessel.

Mooring Dolphin: A mooring dolphin is an isolated marine structure consisting of a cluster of piles, platform and bollards to secure vessel mooring lines to, and is commonly reached from the wharf by a catwalk. They are used near wharf structures to control the transverse movement of berthing vessels, and greatly reduce the size of wharf structures.

Mitigation Measures: The purposeful implementation of decisions or activities that are designed to reduce the undesirable impacts of a proposed action on the affected environment.

No status: Species that are not considered sensitive to human activities or natural events, and are not threatened.

Preloading: The placement of material within the footprint of a construction area to allow for subsurface compaction and settlement. The preloading material is removed from the site when the underlying ground has been compacted.

Productive capacity: The maximum natural capability of habitats to produce healthy fish that are safe for human consumption, or to support or produce aquatic organisms upon which fish depend.

Rail-mounted gantry crane (RMG): Crane that is able to travel horizontally along a length of rail to transfer containers to and from railcars and terminal transport equipment or truck chassis.

Ramsar sites: Wetlands of international importance, recognised globally due to the Ramsar Convention, an international treaty for the conservation and sustainable utilisation of wetlands.

Red list: The BC CDCConservation Data Centre designation for species that are considered extirpated, endangered, or threatened.

Riprap: Rocks used to protect shorelines, bridge abutments, pilings, and other shoreline structures against scour, water, or ice erosion.

Ship-to-shore gantry crane: Gantry crane able to travel horizontally on rails along the berth next to the ship reaching over a container ship in order to transfer containers to and from the ship.

Shore power: The supply of electrical power to vessels moored at the berths to allow diesel powered electrical generators to be shut down during loading and unloading operations, which will reduce the generation of greenhouse gases and noise.

Shuttle carrier: Equipment used primarily to move containers between vessels and the container yard or intermodal yard which can pick up or put down a container on the ground.

Site association: A group of related ecosystems physically and biologically similar enough that they have or will have similar vegetation at maturity.

Stacking Cranes: Rail-mounted cranes to move and stack containers within the container yard.

Support track: A type of track used to support rail activity. Supporting functions could include railcar movement, railcar storage, railcar repair, engine fuelling, and crew changes.

Terminal infrastructure: Includes the land on which the terminal operations take place, including sub-grade utilities and ground improvements, and the wharf structure and berths.

Threatened: Species that are likely to become endangered if the factors that limit their numbers and/or range are not reversed.

Transfer pit: A subsurface marine area used for temporary storage of material, such as sand, that is used as backfill for construction purposes.

Wave Shadow: Sub-tidal irregularities in bathymetry or shoreline, such as groins or sheltered bays, could create certain zones where waves do not propagate. Wave energy leaks toward this shadow zone, in a direction different from wave propagation. This energy leakage is termed wave diffraction.

Wharf: A structure where ships may dock to load and unload cargo or passengers and includes one or more berths (mooring locations).

APPENDIX G

Introduction to Species at Risk

SPECIES AT RISK - INFORMATION ON PROVINCIAL AND FEDERAL DESIGNATIONS

Introduction

In describing the existing biological setting in and around the Project Area, several plant and animal species of conservation concern or at risk are noted. In the context of the Project, *species at risk* are considered to be those indigenous species, subspecies, or ecological communities identified as being vulnerable by federal and provincial regulators.

The purpose of this appendix is to provide: 1) a brief summary of the provincial and federal organisations responsible for designating species at risk, 2) definitions for list designations and risk status, and 3) clarification of whether or not risk status equates to protected status.

British Columbia Species at Risk Designations

The task of identifying species (also referred to as elements) at risk provincially rests with the BC Conservation Data Centre (BC CDC), which is part of the BC Ministry of Environment, Environmental Protection and Sustainability Division. The BC CDC is also aligned with national and international organisations that cooperate to gather and exchange information on threatened elements of biodiversity. The Conservation Data Centre (CDC) systematically collects and disseminates information on elements at risk in BC and assigns a provincial conservation status rank according to set criteria. Elements are placed on provincial Red and Blue Lists for the purposes of helping to set conservation priorities, and to provide more formal designations either provincially under the *BC Wildlife Act* or nationally by the Committee on the Status of Endangered Wildlife (COSEWIC).

The Red list contains elements considered to be extirpated, endangered, or threatened in BC. Extirpated elements no longer exist in the wild in BC, but occur elsewhere. Endangered elements face imminent extirpation or extinction. Threatened elements are likely to become endangered if factors that limit their numbers and/or range are not reversed. The Blue list includes elements of special concern in BC. These elements are sensitive to or at risk from human activities or natural events, but are not extirpated, endangered, or threatened. A Red or Blue list designation does not automatically confer protection to the element or its habitat; nevertheless, it does highlight species and ecological communities that have particular threats, declining population trends, or restricted distributions to provincial authorities (e.g., BC Ministry of Environment, or BC Ministry of Forests, Lands and Natural Resource Operations).

Federal Species at Risk Designations

The Government of Canada maintains a list of all plant and animal species in Canada recognised as being at risk, or tending towards becoming at risk, under Schedule 1 of the *Species at Risk Act (SARA)*. The species assessment process is conducted by an independent group of experts called Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The formal assessment recommendations developed by COSEWIC are based on status reports prepared by independent experts, and are informed by the best available scientific research, community knowledge, and traditional Aboriginal insights. The result is an assessment of the status of wildlife species that classifies a species as extinct, extirpated, endangered, threatened, of special concern, data deficient, or not at risk.

Since SARA became law in June 2003, species designated at risk by COSEWIC must now be reassessed according to the new criteria of SARA before they can be added to Schedule 1 (known as the *List of Wildlife Species At Risk*). COSEWIC designations are regarded as recommendations to the federal government, which makes the final decision on whether species will be listed under SARA. Species with COSEWIC designations listed on SARA Schedules 2 and 3 are not yet officially protected under SARA. Once the species on Schedules 2 and 3 have been reassessed, the Schedules themselves will be eliminated, and species will simply be listed or not listed on Schedule 1. Once a species is listed under SARA, it becomes illegal to kill, harass, capture, or harm it in any way. Under SARA, the habitat of a threatened, endangered, or extirpated species may be legally protected, provided this habitat is federally regulated, and provided a formal recovery plan for the species has been developed and approved.

Provincial CDC and federal SARA Schedule 1 designations for at risk species, subspecies, and ecological communities known or likely to occur within the Project Area are provided for each biophysical component.