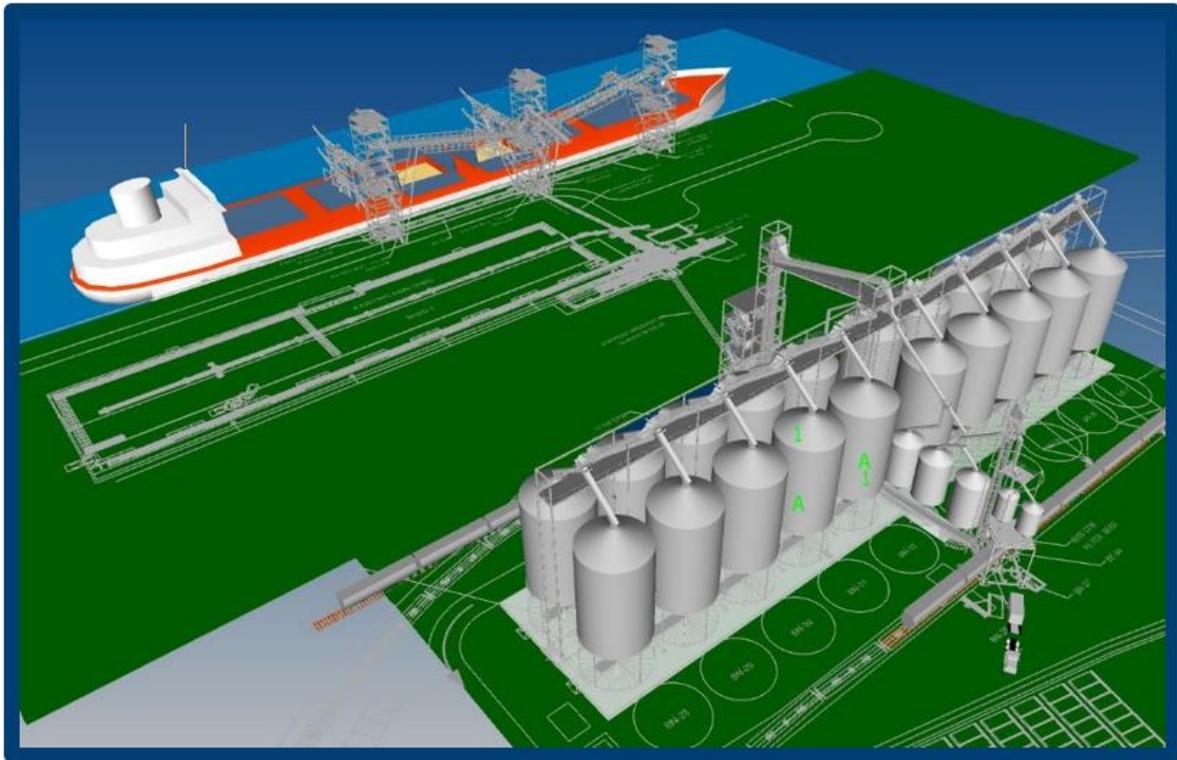


# Construction Permit Application Fraser Grain Terminal 11041 Elevator Road, Surrey, BC



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## EXECUTIVE SUMMARY

### Project Overview

Fraser Grain Terminal Ltd. is proposing to construct a grain export facility, Fraser Grain Terminal (FGT or the “Project”) to receive, store and ship bulk grain products. Fraser Grain Terminal Ltd. (the “Proponent”) is a Canadian family-owned and operated grain company with more than 100 years of experience in agribusiness and locations across Canada. Serving more than 10,000 Canadian farmers and producers, we market grain to over 40 countries. The Project is located adjacent to Fraser Surrey Docks, at 11041 Elevator Road in Surrey, BC (the “Site”) on Vancouver Fraser Port Authority (VFPA) land designated as Port Terminal.

The Project will support Canadian farmers, increase efficiency in grain exports and build strong business relationships with international customers. Since 2014, Canadian exports of grain and specialty crops have increased by more than 20%. This Project will help address key constraints in exporting Canadian grain by:

- Improving utilization of the limited western Canada rail capacity, and
- Enhancing capacity of port industrial land for grain handling.

The Proponent has submitted this Project and Environmental Review (PER) Application (the “Application”) to VFPA for a PER Project Permit. This Application has been prepared in accordance with the Category D Application Submission Requirements for PER Process No. 15-041 (version issued 24 March 2017) and addresses requirements for General Submission, Project Description, Drawings, Studies and Reports, and Consultation.

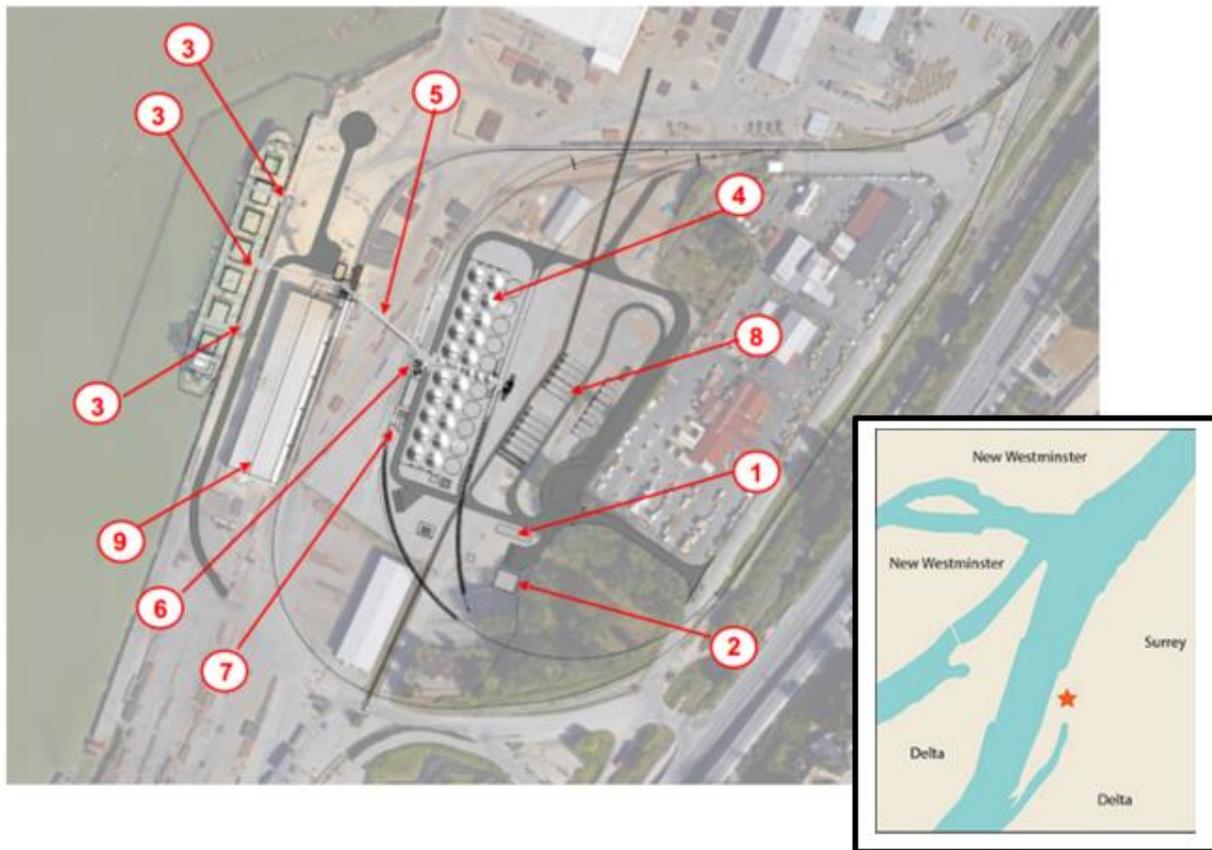
The Project will trans-ship up to 3.5 million tonnes per annum (Mt/a) grain products including wheat, barley, oil seeds, and pulses. Grain will be received by rail and either loaded directly to vessels or stored temporarily prior to loading. A small proportion of the total volume will be loaded to containers or trucks for local distribution. Layout of the new facility is shown in the figure below and includes state-of-the art grain handling features to minimize noise and dust. The 24-month construction period will follow demolition of two existing buildings<sup>1</sup>, and construction will include the following new components:

- Semi-loop rail track and loading track connected to the adjacent PARY.
- Construction of a new loop track serving the new rail unloading building, plus a new spur serving the new rail/truck loading structure. This is the minimum change required to allow the FGT to function under current operating conditions.
- Extension and switch relocation of tracks in the PARY, to be completed post construction of the initial plant construction.
- Rail unloading station and transfer tower with fully-enclosed conveying equipment and a built-in dust suppression system.

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<sup>1</sup> The demolition work is the subject of PER No. 17-035..

- Three (3) fixed tower shiploaders with telescoping spouts, each with dust-reducing features for vessel loading, replacing existing shiploader mobile conveyors. Each tower will be supported on steel piles in the foreshore and land-side shore area.
- 25 above-ground steel storage bins (20 x 3,500 MT, 4 x 400 MT and 1 x 710 MT)
- Ground densification for the silo and shiploader foundations using Rammed Aggregate Pier (RAP) densification. The foundation densification program for the silo area was developed to minimize potential movement of in-situ contamination plumes.
- Single integrated container, bulk truck, and rail loading structure.
- Container storage yard.
- An administration building and maintenance and sample storage building, two control rooms, electrical rooms and container preparation area with fabric rain cover.



#	Description	#	Description
1	Administration Building	6	Rail Unloading Building
2	Maintenance & Sample Storage Building	7	Transformer
3	Tower Shiploaders	8	Container Storage Yard
4	Storage Silos	9	Existing JV Facility
5	Transfer Conveyor		

**Project Location and Key Project Components**

## Required Studies and Project-Related Effects

Vancouver Fraser Port Authority identified Application submission requirements to address the engineering and environmental requirements to satisfy their regulatory mandates for assessment. The FGT Application summarizes design, design analysis and effects assessments and provides all reports as attachments. The Application includes a **Project Description and Description of Operations** that includes the Project's engineering specifications.

To address construction, the Application includes the following reports and studies:

- **Habitat Assessment (including Nesting Birds Survey and Species at Risk):** Terrestrial and aquatic species (including birds and species at risk) and their habitats were assessed for potential Project-related effects. Temporary effects to aquatic and terrestrial resources can generally be mitigated through construction best practices. The Project is projected to result in the permanent loss of 0.95 ha of vegetated area, 12.5 m<sup>2</sup> of green-coded aquatic habitat under the existing berth and 70 m<sup>2</sup> of non-fish-bearing freshwater habitat (due to infilling of an existing ditch). With appropriate mitigation in place, Project construction is unlikely to cause significant adverse effects to terrestrial and aquatic resources. New rail track that parallels Elevator Rd overlaps with critical habitat for the federally-listed plant streambank lupine. Currently, this habitat is vegetated with trees, shrubs and grasses and has little suitability for this species, which prefers gravelly open sites, such as railway ballast. Given the overlap of the rail loop with critical habitat for this species, a permit application under Section 73 of *SARA* has been submitted to Environment and Climate Change Canada for the Project.
- **Archaeological Resources:** An archaeological overview assessment describes areas of low, moderate and high archaeology potential within the Project Site and recommended measures for construction including the use of a Chance Find Procedure.
- **Construction Environmental Management Plan (CEMP):** The CEMP describes site environmental management and mitigation for construction, particularly for soil and water management. A **Soil and Groundwater Management Plan, Hazardous Material assessment and Chance Find Procedure** for archaeology are appended to the CEMP. The CEMP also addresses mitigation for construction-related noise and air quality effects, as well as temporary impacts to aquatic and terrestrial species and habitat.

For the operations phase of the Project, the Application includes the following studies and reports:

- **Noise Assessment:** Noise levels during operations were modeled based on the proposed design. The assessment determined that, in 2020, Total Noise Rating Level was projected to increase by 1dBA or less. The change in the percentage of people highly annoyed is predicted to range from 0% to 2%, well below than the Health Canada criterion of 6.5%.
- **Air Quality Assessment:** Air quality during operations was modelled based on the proposed design. The assessment predicted that particulate matter emissions in 2020 will substantially decrease compared to existing conditions. This improvement in air quality is predicted to occur, even with the increased throughput, primarily due to implementation of best available technologies (e.g., the cascading shiploader).

- **Hazardous Materials Handling:** Describes how the hazardous materials will be managed during construction.
- **Geotechnical Report:** Describes site seismic and geological hazards, and recommended measures for design and construction.
- **Stormwater Pollution Prevention Plan:** Describes daily terminal operation related to storm water management.
- **Traffic Impact Study:** The study reviewed interactions between road and rail traffic, under existing conditions and with the Project in place and found Project-related traffic effects on Fraser Surrey Port Lands were minimal.
- **Rail Operations Plan:** Describes the proposed rail operations.
- **Marine Traffic:** Describes proposed vessel design, vessel traffic levels, and anchorage requirements and includes an operational plan for berthing/unberthing.
- **Best Available Technology Not Entailing Excessive Cost (BATNEC) Report:** The assessment found that use of BATNEC and operational best practices, the Project has the potential to improve air quality in the area surrounding the Project.
- **Energy Efficiency Study:** The study compared typical facility electrical energy consumption levels with the Project's use of energy-efficient technology and methods and found that the Project be between 5% and 21% more energy efficient than a facility that uses traditional technologies and methods.
- **Lighting:** Proposed exterior lighting (e.g., location, type, orientation and level of illumination) was assessed and found that Project-related light trespass and sky-glow effects were minimal, due to effective lighting design and distance to local residences. Construction-related effects of Project lighting are unlikely given the daylight operating hours of the Project, existing light environment and distance from sensitive receptors (at least 250 m).
- **View and Shade Impact Analysis:** 3D rendering was used to assess potential Project effects on community views and shade. The analysis concluded that, in general, the Project will have minimal impact on views and shade, given that the Site is surrounded by industrial and transportation land-uses and that these land uses would buffer nearest public places, residences and community facilities from adverse effects.
- **Alternative Siting Options:** Alternative configurations of proposed building and structures were assessed based on economic, technical, social and environmental perspectives.
- **Fire Protection and Life Safety:** Fire risk and dust explosion hazards were assessed for the Project and safety countermeasures are recommended as part of plant design and operation.
- **Flood Protection:** Describes vulnerability of the Site to flooding.

## Consultation

The Proponent is working with the VFPA to ensure that community interests are considered as part of the PER Process. Public and stakeholder consultation and Aboriginal engagement activities occurred during the Preliminary Review Phase (prior to the submission of this Application) and will occur during the Application Review Phase and during construction implementation.

- **Preliminary Public Comment Period Engagement Summary Report:** Findings from the Preliminary Public Comment Period are summarized for the Project. The public, stakeholders were actively engaged during a Comment Period from November 3 to December 1, 2016. Consultation materials and activities included a public website, information brochures, online feedback forms, notification letters, newspaper advertisements and community meetings including Coffee Shop Drop-in sessions. Materials and outreach was designed to introduce the Project to interested parties and answer any preliminary comments or questions.
- **Preliminary Public Comment Period Input Consideration Report:** The report demonstrates how comments and questions received during the Preliminary Public Comment Period are being considered in developing the scope of technical and environmental studies and will continue to be incorporated through the design phase of the Project.
- **Stakeholder Engagement:** The Proponent engaged neighbouring businesses during the Preliminary Review Phase. Stakeholder responses from the Preliminary Public Comment Period are summarized in the two reports described above.
- **Preliminary Comment Period First Nations Engagement Summary:** Guided by VFPA, the Proponent commenced early-engagement activities with multiple First Nations in February 2016. Introductory letters were sent to 14 First Nations, followed by Project update emails. The Proponent has met with all First Nations who indicated their interest in the Project and requested a meeting.
- **Application Review Phase Engagement and Consultation:** The Proponent, in collaboration with VFPA, will provide the public and stakeholders with Project details, technical study results and proposed mitigation. Future engagement with key stakeholders is anticipated to include letter notifications, a public comment period, meetings, online outreach, and a community open house. Future engagement with First Nations is anticipated to include meetings, emails, information sessions, workshops, and sharing of Project documents.

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Attachment 28	Recycled Concrete Aggregate Assessment

## LIST OF ABBREVIATIONS, ACRONYMS, AND DEFINITIONS

Abbreviation	Definition
AEP	Annual Exceedance Probability
AGT	Alliance Grain Terminal
AIS	automatic identification system
Application	Application for Category D Application Submission Requirements for PER No. 15-041
BATNEC	Best Available Technology not Entailing Excessive Cost
Bekaert	Bekaert Canada Ltd.
BKL	BKL Consultants Ltd.
CEMP	Construction Environmental Management Plan
CMC	CMC Engineering and Management Ltd.
DMD	DMD & Associates Ltd.
EG	Enns Gauthier Landscape Architects Inc.
Exp	exp Services Inc.
FGT	Fraser Grain Terminal
FGT lease area	the former Bekaert lease area, including land exchanged with FSD
FSD	Fraser Surrey Docks
FSPL	Fraser Surrey Port Lands
FWS	FWS Group of Companies
Hemmera	Hemmera Envirochem Inc.
JV Facility	An existing agri-products handling facility jointly operated by P&H and FSD
LOA	Overall vessel length
Mt/a	Million tonnes per annum
OCP	Official Community Plan
P&H	Parrish and Heimbecker, Limited
PARY	Port Authority Rail Yard
PER	Project and Environmental Review
PM	Particulate matter
Project	Fraser Grain Terminal, Fraser Grain Terminal Export Facility
Proponent	Fraser Grain Terminal Ltd.
QEP	Qualified Environmental Professional
RAP	Rammed Aggregate Piers
Site	11041 Elevator Road in Surrey, BC
STCW	Standards of Training, Certification and Watchkeeping for Seafarers
Submission Requirements	Category D Application Submission Requirements for PER No. 15-041
t	tonnes
t/h	tonnes per hour
VFPA	Vancouver Fraser Port Authority
VTS	Vessel Traffic Service
WSP	WSP Canada Inc.

## **1.0 GENERAL SUBMISSION REQUIREMENTS**

Fraser Grain Terminal Ltd. is proposing to construct a grain handling facility (the “Project”) to receive, store and ship bulk grain products. See **Figure 1** and **Figure 2** for Site location and construction boundary. The Project is located adjacent to Fraser Surrey Docks (FSD), at 11041 Elevator Road in Surrey, BC (the “Site”) on Vancouver Fraser Port Authority (VFPA) land designated as Port Terminal.

Fraser Grain Terminal Ltd. (the “Proponent”) has submitted this Project and Environmental Review (PER) Application (the “Application”) to VFPA for a PER Project Permit. This Application has been prepared in accordance with the final Category D Application Submission Requirements for PER Process No. 15-041 (issued 24 March 2017). To assist the reader in navigating the document and demonstrate compliance with the submission requirements, a Table of Concordance has been prepared and is included as **Attachment 1**.

The Application includes supporting studies provided as attachments (“Attachments”). Where Attachments have appended documents, these are identified as Appendices.

### **1.1 APPLICATION**

#### **1.1.1 Application Form**

See attached Category D Application form (**Attachment 2**).

#### **1.1.2 Application Fee and Documentation Deposit**

Information is included in **Attachment 3**.

### **1.2 BUILDING PERMIT**

The Proponent recognizes that a Building Permit will be required. The Proponent will follow VFPA guidance on the Building Permit requirements and submit a permit application following receipt of PER approval for construction. The overall construction time on site will be approximately 24 months, or 2 years of construction, starting in Summer 2018. The target date for completion is Fall of 2020 or sooner. The anticipated Project schedule is shown in **Figure 5**

### **1.3 PROJECT TEAM MEMBERS CONTACT INFORMATION**

The list of key Project team participants is provided in **Table 1-1** below.

**Table 1-1 Project Team Members Contact List**

Team Member	Address	Contact Number
Casey McCawley Director of West Coast Operations <b>Parrish and Heimbecker Ltd.</b>	#640 – 355 Burrard St. Vancouver, BC V6C 2G8	604-697-2550
Tanya Hayes Project Coordinator <b>Parrish and Heimbecker Ltd.</b>	#640 – 355 Burrard St., Vancouver, BC V6C 2G8	604-697-2556
Geraldo Araujo FWS Project Manager <b>FWS Group of Companies</b>	20-2920 Virtual Way Vancouver, BC V5M 0C4	(604) 454-2488
Robin Taylor Senior Environmental Assessment Manager <b>Hemmera Envirochem Inc.</b>	18th Floor, 4730 Kingsway Burnaby, BC V5H 0C6	604-669-0424, ext 289
Darrell Desjardin Special Advisor, Ports <b>Hemmera Envirochem Inc.</b>	18th Floor, 4730 Kingsway Burnaby, BC V5H 0C6	604-669-0424, ext 210
Morgan Tanner Aboriginal Engagement <b>Hemmera Envirochem Inc.</b>	18th Floor, 4730 Kingsway Burnaby, BC V5H 0C6	604-669-0424, ext. 493
Sarah Bowie Fish and Wildlife <b>Hemmera Envirochem Inc.</b>	18th Floor, 4730 Kingsway Burnaby, BC V5H 0C6	604-669-0424, ext. 441
Caroline Astley Vegetation <b>Hemmera Envirochem Inc.</b>	18th Floor, 4730 Kingsway Burnaby, BC V5H 0C6	604-669-0424, ext. 223
Kirsty Dick Community and Stakeholder Engagement <b>Lucent Quay Consulting Inc.</b>	#430 – 688 West Hastings Street Vancouver, BC V6B 1P1	604-637-6456
Mark Bliss Acoustics <b>BKL Consultants Ltd.</b>	#308 – 1200 Lynn Valley Road North Vancouver, BC V7J 2A2	604-988-2508, ext. 102
Chris Kosher Air Quality <b>WSP Canada Inc.</b>	#200 – 1985 West Broadway Vancouver, BC V6J 4Y3	604-736-5421
Mike Enns View and Shade <b>Enns Gauthier Landscape Architects Inc.</b>	#202-175 East Broadway, Vancouver, BC, V5T 1W2	778-379-3173
Rajan Mann Fraser Surrey Docks Liaison <b>Fraser Surrey Docks Limited Partnership</b>	11060 Elevator Road Surrey, BC V3V 2R7	604-754-6492

## 2.0 PROJECT DESCRIPTION REQUIREMENTS

This section addresses the project description requirements of Section 2 of the Submission Requirements.

### 2.1 GENERAL SCOPE

#### 2.1.1 Applicant Background

The Proponent is Fraser Grain Terminal Ltd, a Canadian family-owned and operated grain company with more than 100 years of experience in agribusiness with locations across Canada, including the Alliance Grain Terminal (AGT), a joint venture located on the south shore of the Burrard Inlet. Serving more than 10,000 Canadian farmers and producers, we have a worldwide distribution that includes 40 countries.

The Proponent, in partnership with FSD, has been operating a port terminal facility that has been handling agri-products at FSD since 2011 (JV Facility). This consists of a small rail unloading facility, a 18,000 t storage shed (Shed #1), portable conveyors to load vessels and a shiploader. In 2015, selected as the baseline year for the environmental assessment, this existing JV Facility handled more than 800 000 t of agri-products.

#### 2.1.2 Project Overview

The Project proposes to trans-ship approximately 3.5 million tonnes per annum (Mt/a) of grain products including wheat, barley, oil seeds, and pulses. Grain will be received by rail and either loaded directly to vessels or stored temporarily prior to loading. A small proportion of the total volume will be loaded to containers or trucks for local distribution. The new facility will include state-of-the art grain handling features to minimize noise and dust and will replace an aging and obsolete manufacturing facility on vacant port land that has not been used for more than two years. The Project land was formerly leased by Bekaert Canada Limited, a steel wire manufacturer.

The Project location and anticipated construction boundary are shown on **Figures 1** and **2**. A 24-month construction period will follow demolition of two existing buildings<sup>2</sup>, and construction will include the following new components:

- Semi-loop rail track and loading track connected to the adjacent PARY.
- Rail unloading station and transfer tower with fully-enclosed conveying equipment and a built-in dust suppression system.
- Extension of Tracks 94, 95 and 96, and switch changes in the PARY.
- Three (3) fixed tower shiploaders with telescoping spouts, each with dust reducing features during vessel loading, replacing existing shiploader mobile conveyors. Each tower will be supported on steel piles in the foreshore and land side shore area.
- 25 above-ground steel storage bins (20 x 3,500 MT, 4 x 400 MT and 1 x 710 MT)

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<sup>2</sup> The demolition work is the subject of PER No. 17-035.

- Ground densification for the silo and shiploader foundations using Rammed Aggregate Pier (RAP) densification. The foundation densification program for the silo area was developed to minimize potential movement of in-situ contamination plumes.
- Single integrated container, bulk truck, and rail loading structure
- Container storage yard.
- An administration building and maintenance and sample storage building, two control rooms, electrical rooms and container preparation area with fabric rain cover.

The main administration building from the former Bekaert's operations will be retained. All other buildings, associated foundations, and utilities will be demolished and removed.

To densify the new plant structure, the existing Bekaert building slab, foundations, and existing rail spur will be removed. The existing slab concrete shall be tested for contamination, prior to removal. Clean concrete shall be crushed on-site, stored temporarily then, used as road sub-base, directly under paved areas. Any excavated material requiring testing will be stored temporarily on-site. Clean material shall be re-used on-site, where possible or hauled off site. Contaminated materials shall be handled according regulatory requirements and the CEMP (**Attachment 20**).

During operation, the Project facility will receive and unload bulk grain arriving by railcar. The product will either be loaded directly onto a vessel or stored in silos. Grain stored in the silos will eventually either be loaded to a vessel or container, destined for export; or to a railcar or truck, destined for the local market.

### **2.1.3 Project Rationale**

Two major constraints exist in getting farmers' grain to overseas customers: limited port industrial land and limited western Canadian rail capacity. As such, the Proponent proposes to build a modern grain terminal on the Fraser River. The agri-products shipped through the Project will originate from a combination of grain produced by Parrish & Heimbecker and third-party shippers. The Proponent has joint operating experience, including a successful partnership at AGT in Vancouver and a terminal in Thunder Bay.

The federal government mandates railways to move grain under the *Fair Rail for Grain Farmers Act* (S.C. 2014, c. 8). Moreover, fines are imposed for railways not achieving the weekly volume targets. The Proponent recognizes that:

- Reducing bottlenecks in the grain supply chain is a high priority for the federal government.
- The North Shore or Burrard Inlet terminals are currently constrained by congestion.
- Turnaround time for trains serving the Project could be 2.5 days less than those servicing the North Shore or Burrard Inlet terminals.

Efficient container loading is a key component of Project design. The typical method of unloading railcars directly to containers is slow and inefficient. The Project facility will be designed to load containers directly from the same bulk storage used to load vessels. The container stuffing operation will be handled separately from the rail receiving and unloading operations. Products destined for container shipment, will be received by rail (to maximize efficiency of unloading) and placed in storage silos also used for vessel loading. Products destined for containers will therefore be drawn from storage silos.

#### 2.1.4 Project Components

This description of the Project is primarily based on the Fraser Terminal Project Description and Description of Operations (**Attachment 5**). The Project property includes:

- The former Bekaert lease area, including land exchanged with FSD (the FGT lease area),
- The adjacent FSD lease area, and
- The adjacent Port Authority Rail Yard (PARY) licence area.

Project lease boundaries are shown on FWS Drawing P017 (**Attachment 4A**).

Project components are shown in **Figure 3**. While majority of construction works and operations will occur on land, marine works (e.g., piling) will also be constructed. The proposed Project components are described below by lease and licence area. Project drawings are provided in **Attachment 4A**, with drawing reference numbers provided in **Table 3-1**.

Full rail development will be done in two phases. Phase 1 of rail construction consists of a new loop track serving the new rail unloading facility, plus a new spur serving the new rail/truck loading structure. This is the minimum change required to allow the FGT terminal to function under current operating conditions. A future expansion of the PARY is also to be considered as Phase 2 of this project. Phase 2 will be required only when operating conditions at FSD change, i.e., to accommodate a new coal or potash terminal. This phase consists of changes to Tracks 94, 95 and 96, and other changes in the PARY. Please refer to Mott Macdonald drawings 391747-MMD-00-P0-DR-RW-1003 through -1005. Track alignment lengths will be extended as follows: Track 94 by 888 m, Track 95 by 877 m, Track 96 by 907 m. Final lengths after extension are shown on Mott Macdonald drawing 391747-MMD-00-PO-DR-RW-1003. Final implementation of Phase 2 does not increase overall switching time or number of rail movements.

##### 2.1.4.1 FGT Lease Area

On the FGT lease area, the following new infrastructure rail, unloading and loading, storage, conveying, containers, buildings and utilities will be built:

#### Rail System

- New semi-loop rail for the unloading of railcars, which will transit through an unloading building and connect to the PARY tracks.
- Realignment of an existing spur line, which will connect to the semi-loop rail track transiting through a railcar loading building.

### Unloading System

- An unloading station consisting of a series of shallow unloading hoppers, one railcar door opener, and a car indexer. The unloading station is enclosed by a steel frame building that accommodates two railcars plus a drip shed to the north as rain protection. A receiving conveyor will be installed in the basement of the rail unloading building. The unloading pit approximate dimensions are: 32.2 m long, 7 m wide and 4.8 m deep.
- A leg pit adjacent to the rail unloading building to contain the boot of the receiving leg and serving as the foundation for a transfer tower. The leg pit approximate dimensions are: 9.2 m wide, 12.8 m long and 8.4 m deep.

### Transfer Tower

- A steel-frame 52 m tall transfer tower will house processing equipment (e.g., legs, bulk weighers, shipping bin, samplers, diverter valves).

### Grain Storage System

- Twenty 3 500 t, 14.6 m diameter, 35.6 m high, corrugated steel silos, each mounted on steel legs and steel conical discharge.
- Four, 400 t, 7.3 m diameter, 16.5 m high corrugated steel silos, each mounted on steel legs and steel cone bottom discharge to serve as surge storage for container stuffing as well as rail and truck loading.
- One, 710 t, 10.0 m diameter, 16.5 m high corrugated steel silo, mounted on steel legs and steel cone bottom discharge to serve as surge storage for container stuffing as well as rail and truck loading.
- A series of totally enclosed inclined idler supported conveyor belts and associated enclosed valves and spouting will be installed above the large silos to feed all silos. A totally enclosed reclaim belt conveyor will be installed below each row of silos for shipping/transfer purposes.
- All silos will be located on a 1 m thick foundation slab supported on RAPs.
- A reclaim tunnel (about 61 m long x 4.0 m wide x 2.4 m deep and constructed of concrete) will run perpendicular to the main silos to accommodate a common reclaim conveyor that feeds a reclaim bucket elevator. The boot of the reclaim bucket elevator will be installed in the concrete pit.

### Conveying System

- A 2 000 t/h totally enclosed receiving conveyor (BC01) from the unloading pit to the receiving leg in the transfer tower.
- A 2 000 t/h transfer conveyor (BC02) from transfer tower to upper distribution conveyors (BC03 through BC12) in a single central open truss that feeds all storage silos. Each conveyor has multiple

discharge valves that can direct the grain to each silo. Only specific conveyors required to reach a single silo will operate at one time.

- Four 2 000 t/h totally enclosed reclaim conveyors (BC013, BC14, BC15, and BC16) below large silos that feed the reclaim conveyor (BC 17) located in the concrete reclaim tunnel and in turn feeds the reclaim leg (BE03).
- 500 t/h totally enclosed reclaim conveyor BC18, below five (5) smaller silos feeding the container stuffing/truck loading facility and blending products for loading ships.

#### Container Stuffing

- A container stuffing facility will include a loading leg, conveyor, surge bin, two container tilting and weighing platforms, enclosed product return to storage spouting (no return dump pit required), a sampler, and a vinyl fabric rain cover.
- An asphalt and concrete paved area will be built for the storage of containers.

#### Rail and Truck Loading

- Loading systems for rail and bulk trucks are integrated into the container stuffing tower at the east side of the Site with the following features:
  - One 100 t surge bin mounted on load cells for batch weighing product for rail or truck loading.
  - A dust suppression hopper on retractable loading spout.
  - Provision for adding an indexer in the future to move strings of ten railcars.
  - Enclosed product return to storage spouting (no return dump pit required).
  - A product sampler.

#### Buildings

- A 246 m<sup>2</sup> pre-fabricated steel administration will be placed on a concrete slab and will include the following:
  - Employee welfare and change rooms
  - Washroom facilities
  - IT server room and reception area
  - Offices
- A pre-fabricated steel building will be erected on a new concrete slab to house a maintenance shop.

#### Other Infrastructure and Ancillary Systems

The following systems will be located on the FGT lease area:

- Dust control system.
- Hydraulic power (including potential hydraulic actuators).
- To provide compressed air for various ancillary functions, a central modular compressed air system will be established Fire protection system including:

- Fire detection and alarm system for structures: Final design for occupied facilities (e.g., office building and lab) will comply with National Building Code fire protection requirements and will have stand-alone fire alarm systems.
- Site facility design where there is little or no human presence will consider best available technology and good engineering practice for the prevention of explosions and protection of lives and assets.
- Site fire protection includes location of hydrants and fire lanes, fire access route and means of egress.
- Fire Access Plan includes routing for primary and alternate routes for access to and egress from the terminal.
- Electrical system includes design of components for continuous heavy-duty operations.
  - A new power distribution system will be provided
  - New installations include one medium voltage switchgear and four distribution transformers and 6 prefabricated electrical rooms.
- Lighting: The lighting design includes roadway lights, floodlights, wall mount-down lights, and lighting controls.
- Security: Security fencing will enclose the Site and include gated access: a staffed main gate, remotely-operated gates for the rail system, and cardlocked gates for dock-side access.
- Dust control system design includes:
  - All material handling equipment will be totally enclosed.
  - Installation of special baffles above unloading hopper.
  - Installation of special cascading type or choke fed discharge loading spout on the shiploader
  - Provision of bag or cartridge type air filters and aspiration fans connected to each conveyor, leg, and containers to create a negative pressure inside the equipment plenum to eliminate dust emission.
  - Dust accumulated in the cartridge filters in the form of dust lumps will be returned immediately to the product flow.

### Civil Services

Civil design includes that for utilities such as water supply, sanitary sewer, stormwater, and electrical. Prior to construction, FGT will provide consent correspondence from authorities or jurisdictions that need to provide consent or conduct works to establish connections to utilities and confirmation that capacity exists within those 3rd party networks. Those authorities or jurisdictions include Metro Vancouver, BC Hydro, and City of Surrey (for municipal connections). No natural gas services are required for the Project. FGT is responsible for locating all existing utilities associated with the Project footprint. It is understood that VFPA will provide known utility information.

The following were considered in the design of Project civil services:

- Needs for domestic, sanitary and electrical power services will have lower demand loads than that required for the previous tenant.
- The existing domestic water supply feed to the Site lacks sufficient pressure for fire-fighting services at the upper elevations of the facility
- Very little fugitive dust or spilled grain is expected at the Project facility that could make its way to the storm sewer.

Design of Project civil works includes:

- Water supply:
  - A new ring distribution pipe will be installed around the silo area perimeter to provide water for domestic and fire-fighting services.
  - Although the existing municipal feed to the site has sufficient capacity to supply the required water volumes, the stand pipe is not connected to the municipal water supply. The single fixed standpipe located at the transfer tower will require local fire department trucks to provide additional supply pressure for fire-fighting water at the upper elevations of the structure.
- Sanitary Sewer:
  - The existing facility's holding tank is located in the south-west corner of the property, and uses a duplex pump system to feed a force main that discharges to the sanitary sewer.
  - The Project's sanitary design includes several small pump stations that feed a collection system that discharges to the existing holding tank and reduces the required depth of the new piping system.
- Storm Sewer:
  - The total area of the Project property is similar to that of the previous tenant and the total surface drainage load will remain similar.
  - Multiple new structures and buildings required modification of the drainage and stormwater collection system.
  - The stormwater system design includes oil and grit separators to limit potential discharge of contaminants to the storm sewer system.
- Electrical Services:
  - In general, FGT will use less electrical power than the previous tenant. A new 25kV substation will be located at the south end of the facility and will be fed from the existing Robson Road line.
  - The existing electrical room will be demolished and removed from site using Metro Vancouver Proximal Work procedures. Note that this existing structure is currently overtop the existing Metro Vancouver AN3 water main line.
  - All other buried wiring (control or power) will be run in plastic piping approximately 1.0 m below the ground surface and will be designed and executed according to the latest applicable codes and guidelines (BC Electrical Code, CSA 22, BC Hydro guidelines, etc.)
  - All piping work will be carried out in accordance with the Master Municipal Construction Documents Association.

- Where feasible, trenching and excavations will not exceed 2.0 m in depth.

#### **2.1.4.2 Port Authority Rail Yard (PARY) Licence Area**

To connect to existing trackage at the JV facility, the following is required:

- Phase 1:
  - Removal of the existing spur track entering the old Bekaert site back to the bifurcate rail traffic into FGT (Track FG1).
  - Raise existing JV track elevation by addition of ballast east of the existing FSD crossing.
  - The FGT exit track at the south of the facility will join up with the existing JV track (Track 90) that connects to the PARY.
- Phase 2:
  - Extension of Tracks 94, 95 and 96, and switch changes in the PARY. Track alignment lengths will be extended as follows: Track 94 by 888 m, Track 95 by 877 m, Track 96 by 907 m. Final implementation of Phase 2 does not increase overall switching time or number of rail movements required for Phase 1.

#### **2.1.4.3 FSD Lease Area**

In the area leased from FSD, three 2 000 t/h fixed tower shiploaders will be installed. Each shiploader will have the following features:

- Ability to load Handy, Handymax and Panamax vessels with an LOA of 225 m and up to 32.3 m of beam.
- Cascade- or choke-fed type discharge for loading spout.
- Totally-enclosed 2 000 t/h conveyors on the boom (shiploader conveyor supported by bents and towers running from FGT and the JV shed to a central tower at Berth #4).
- Piled foundations fortified by a berm of densified soil to the east of the towers to mitigate for potential liquefaction. This will involve locally removing sections of the existing berth deck for pile installation with no contact between the new piles and the existing structural dock supports. Structural dock supports remain unchanged.

Construction laydown areas are shown on FWS Drawing P012 (**Attachment 4A**). Construction laydown areas are required for staging material, pre-assembly of equipment and structures, and crane placement. Once the Project sitework has begun and most utilities and sitework are complete, a finished gravel surface will be prepared for the construction laydown area as shown in FWS Drawing P012. Construction laydown areas within the FSD lease area shall not have any underground utilities or other surface preparation required.

Temporary construction rights-of-way are required for the Project during construction on FSD leased land as shown in FWS drawing P017. Temporary fencing delineating the rights-of-way and appropriate work areas will be installed as needed and relocated during different construction phases in coordination with JV Facility operations.

### 2.1.5 Project Setting

The Project Site is on the south side of the Fraser River in Surrey, British Columbia (**Figures 1 and 2**). The Project is situated in an industrial area adjacent to Highway 17 (South Fraser Perimeter Road) within Surrey's Whalley town centre and is approximately 100 m from the boundary of the Corporation of Delta (Delta). The City of New Westminster is located directly across from the Project on the north side of the Fraser River.

The Project is located entirely on federal lands designated by VFPA's Land Use Plan as Port Terminal (PMV 2014). The Project Site has operated as an industrial port facility since the early 1930's.<sup>3</sup> Lands surrounding the Project west of Highway 17 are designated as commercial, industrial, and mixed use. East of Highway 17, land use is predominantly residential and institutional (school).

The majority of the Project area has been leased directly from VFPA by the Proponent, with the remainder on a license over adjacent FSD lands. The land leased directly from VFPA was formerly leased by Bekaert Canada Limited, a steel wire manufacturer. As agreed with VFPA, discussions will be held between CP Rail, Rabanco, Chemetron, and VFPA during the review period to obtain appropriate property rights for those portions outside of the lease and licence areas (i.e. the PARY track extension areas). The Project Site, including several buildings, is currently vacant.

The nearest sensitive human receptors are residences on Regal Drive, Royal Crescent, and 96 Avenue in Surrey which are located approximately 100 m from the Project Site boundary (**Figure 4**). The nearest schools are Royal Heights Elementary school, located on 11665-97 Avenue in Surrey, and Annieville Elementary School, which is located on 112 Street in Delta. Both schools are approximately 800 m from the Project Site (**Figure 4**). The nearest parks include Annieville Park and Kendale Place Mini-Park in Delta, and Ravine Park, Royal Heights Park, and Tom Hopkins Ravine Park in Surrey (**Figure 4**).

In the context of biophysical receptors, the Project Site is located adjacent to the Fraser River, ~75 m from Gunderson Slough, and ~50 m from Shadow Brook (**Figure 4**). The Fraser River is a regionally-important, fish-bearing waterbody. Shadow Brook, the nearest fish bearing watercourse to the Site (**Figure 4**), runs under Robson Road and Elevator Road via a series of culverts, and drains into Gunderson Slough.

## 2.2 PROJECT CONSTRUCTION

The Project involves the following construction and associated activities:

- Buildings (storage area, rail unloading building, transfer tower, container loading structure, railcar/truck loading structure, administration building, maintenance & sample storage building);
- Removal of existing concrete slab, pavement, Shed 4, electrical substation building and rail spur. Shed 4 requires demolition to make way for the proposed new rail. The demolition is covered under VFPA approval for the Direct Transfer Coal Facility and FGT will carry out this work on behalf of FSD under the existing approval (Project Permit Number 2012-072-1);
- Installation of services (water and sewer systems, mechanical and electrical);

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<sup>3</sup> The Project and adjacent Port lands are designated Industrial in the City of Surrey Official Community Plan (2014).

- Installation of a shipping system (wharf, transfer system, and gallery), and
- Road and rail line construction.

Construction activities include pile driving for the shipping system, pouring of concrete for building foundations, and erection of buildings and structures. Limited excavation will be required and is anticipated to require management and disposal of contaminated soil and groundwater. Note that removal of the existing shiploader is not part of the scope of this application.

Construction activities are described in below. Project operations are described in **Section 2.3**.

### 2.2.1 Construction Schedule and Staging

Construction is planned to start shortly after receipt of the Project permit from the VFPA. Construction is planned to commence once demolition activities<sup>4</sup> are complete and is anticipated to take approximately 24 months from mobilization to commissioning. VFPA requirements. Phase 2 of rail construction would not need to be completed prior to Fall 2021. Phase 2 of rail construction will be required only when operating conditions at FSD change, such as accommodating a new coal or potash terminal or CN delivery service to the PARY changes. For example, if CN service requires bringing in a full unit train before removing an empty, then Phase 2 PARY extension would be required. **Figure 5** shows the proposed construction schedule for the Project. **Section 2.7.1** of the Project Description (**Attachment 5**) details the sequence construction activity for the Project.

Construction works have been planned according to functional areas of the Site such as storage, receiving, shipping, and container loading. Construction is anticipated to be sequenced as follows:

- Prepare for on-site construction:
  - Mobilize to site
  - Establish temp service & power
- Demolition:
  - Demolition of Shed 4
  - Demolition of substation
  - Demolition of slab
  - Construct new access roads and driving surfaces
- Main Project construction
  - Civil services
    - Remove existing utilities
    - Establish permanent storm sewer and interceptor
    - Install underground services
    - Roads and site development

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<sup>4</sup> The demolition work is the subject of PER Application 17-035.

- Main plant:
  - Densification
  - Receiving and unloading pit
  - Reclaim/transfer tunnel
  - Main storage silos
  - Piling for shipping and loadout
  - Steel bin erection
  - Structural steel erection
  - Plant electrical
  - Container/rail/truck loading – steel & equipment install
- Shiploader construction
- Rail loop construction
  - Clearing and vegetation management
  - Rail line install
  - Extension and switch relocation of tracks in the PARY, to be completed post construction of the initial plant construction.
- Maintenance building construction
- Administration building construction
  - Foundation
  - Install pre-fabricated building
  - Final site work and paving
- Commissioning:
  - Dry commissioning
  - Commissioning with grain
  - Testing

Note that construction sequencing described above may change once a contractor is retained.

### **Construction Equipment**

Equipment anticipated to be used during Project construction are summarized in **Table 2-1**. Actual equipment to be used for the Project will be identified by the Contractor. A detailed list and sequencing of equipment is provided in **Section 2.7.2 of Attachment 5**.

**Table 2-1 Equipment to be Used by Construction Activity**

Construction Equipment	Construction Services	Demolition		Civil Services (Water, Sewer System, Roads)	Storage Area			Receiving Area					Transfer System				Berm Densification	Wharf and Shiploaders		Rail Works (Main Loop and Spur Line)	Container/Rail/Truck Loading		Buildings		Utilities		Clean Up
		Demo Slab Removal	Demo Shed 4 & Substations		Densification	Storage Area Preparation	Storage Area Concrete	Storage Area Steel	Receiving Area Excavation and Piling	Receiving Area Concrete	Receiving Area Steel	Receiving Area Equipment	Receiving Area Building	Main Transfer Tower Concrete	Main Transfer Tower Steel and Equipment	Transfer System Piling and Concrete		Trans. Syst. Steel and Equipmt. (Balance of Plant)	Wharf Area; Water Side Piling and Concrete Works		Shiploader Erection	Concrete & Piling	Steel & Equipment	Office Building	Maintenance Building	Mechanical Equipment Installation	
Rough Terrain 30 T crane(S)	1					1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	*	*	
Skid-steer loader(s)	1			2	2											2			1	2							2
Forklift(s) 3 T capacity	1				1	1	1	1	1	1			1	4	1	1	1	1		1			1	1	1	1	1
Miscellaneous cars and trucks for personnel and deliveries	M	M	M	M	M	M	M		M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M			M
5 T truck(s) with integral folding boom crane				2			1	1		1	1	1			1	1	1			1	1		1				
5 T excavator(s)	1		1	2	2				2							1		2			1		1	1	1		
Compactors				2		2															2						
Concrete saw																1						1	1	1			
50 T crane											1	1	1											2	2		
Concrete pump(s)					2		2			2				1		2				1			1	1	1		
Ready-mix concrete truck(s)							6			6				3		6				3		3	3	3	3		
Concrete vibrators							10			4				4		4				2		2	2	2			
Miscellaneous hand tools: hammers, impact wrenches, etc.					M		M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M			M
Welders							6	2		2	2	1	1	2		2				1			2	1	1		
300T crawler crane							1							1		1				1							
200T hydraulic crane							1							1		1				1			1				
articulating boom lifts							4							4		4						2	1	1			
sheet pile driving unit (vibrator type)									1																		
pile driving unit									1						1				1								
dump trucks		6	2	2	2	1			3						2		2	2	2	2			1	1			1
Concrete breaker		3	1																1		2			1			
Mobile Primary Jaw Crusher		1																									
Air compressor																			1		1						
Service barge and tug																				1							
Rail laying machine																						1					
Spreader/grader				1		1																1	1				
Densification Rig					2													2									
Front End Loader		2																									
Hydro-vac Truck	1		2	2	1																						

M = Miscellaneous  
\* = All equipment installation included in other items

## 2.2.2 Construction Traffic

**Attachment 4** shows Site access, parking and traffic routes (see **Table 3-1** for drawing number).

Based on the construction duration, construction traffic volumes for the Project are estimated as follows.

For delivery trucks

- Total Work days – 6 days/week x 4 weeks/month x 24 months = 576 work days
- Average trucks /day = 8 trucks/day

Truck traffic is anticipated to be very heavy (about 100 trucks per day) during the large foundation concrete pours. The foundation concrete is split into five separate pour days, spread over a 125-day period.

In addition to delivery trucks, worker vehicles will be accessing the FGT site. Parking spaces for worker vehicles (based on a vehicle occupancy of 1.5 people/vehicle) is shown in **Attachment 4A**. The estimate was further based on the following assumptions:

- Average attendance = 80 people
- Average vehicles = 53 vehicles
- Peak attendance = 160 people (approx. 2x average day attendance)
- Peak vehicles = 106 vehicles

## 2.3 PROJECT OPERATIONS

General activities during Project operations will consist of unloading trains, loading vessels for export, and loading railcars and bulk trucks for local markets. The agri-products will arrive at the facility in bulk railcars and be transferred to the unloading pit. From the unloading pit, the grain is directed either to vessels or to storage silos. A small amount of the annual terminal throughput will be received by railcars or bulk trucks for distribution to the local market.

### 2.3.1 Existing and Proposed Capacities and Throughput

Capacities and throughput of the proposed Project are summarized in **Table 2-2** below. Further detail is provided in the Traffic Impact Study (**Attachment 9**). Peak periods of activity will be dependent on ocean going vessel (OGV) and train arrivals and may arrive at any time of the day/night.

**Table 2-2 Summary of Proposed Throughput Capacities**

Description	Facility	Quantity	days/a	h/day	Throughput
<b>Incoming</b>					
Trains	JV Shed 1	22 trains/a @ 5,000 t 39 trains/a @ 11,200 t	22 39	8 19	≈ 547,000 t/a*
	Proposed Fraser Grain Terminal	309 trains/a @ 11,200 t	309	≈ 13 ≈ 16	≈ 3,500,000 t/a
<b>Total Incoming</b>					<b>≈ 4,008,000 t/a</b>

<b>Outgoing</b>					
<b>OGV</b>					
Vessel Loading	JV Shed 1	≈ 18 ships/a @ ≈ 30,400 t	≈ 43	24	≈ 547,000 t/a*
	Proposed Fraser Grain Terminal	≈ 62 ships/a @ ≈ 42,400 t	≈ 67	24	≈ 2,631,000 t/a
<b>Sub-total by OGV</b>					<b>≈ 3,178,000 t/a</b>
<b>Land</b>					
Railcar loading	Proposed Fraser Grain Terminal	8.8 cars/d @ 90 t	253	10	200,000 t/a
Bulk truck loading	Proposed Fraser Grain Terminal	2.6 trucks/d @ 45 t	253	10	30,000 t/a
Container filing	Proposed Fraser Grain Terminal	95 TEU/d @ 25 t	253	10	600,000 t/a
<b>Sub-total by Land</b>					<b>830,000 t/a</b>
<b>Total Outgoing</b>					<b>≈ 4,008,000 t/a</b>

\*Note: Currently permitted

During operations, parking for Project employees, visitors, and trades will be provided around the proposed administration building and maintenance shop. Based on employee, visitor and handicapped parking requirements, 12 parking spots have been designed. The general arrangement for parking stalls is included in **Attachment 4A** (see **Table 3-1** for drawing number).

### 2.3.2 Hours of Operation and Employment

The hours of operation at the existing JV Facility over the years have varied from 8 hours to 24 hours per day depending on railcar receipts and vessel schedule. Project hours of operation are anticipated to be similar to those of the existing JV Facility. The Project facility is anticipated to operate seven days a week, except statutory holidays.

The expected personnel required for full operation at the planned capacity is shown in **Table 2-3**. A total of 35 full-time equivalents (FTE) are estimated. The Project does not currently employ staff at the Site.

**Table 2-3 Expected Direct Project Employment**

Positions	Personnel (FTE)
Office	16
Operations	15
Maintenance	2
Quality Control	2
<b>Totals</b>	<b>35</b>

### 2.3.3 Proposed Increase in Terminal Capacity

The JV Facility loads vessels at the existing FSD Berth #3. The railcars for this operation make use of the PARY trackage which is connected to the JV Facility unloading station. The throughput for the JV Facility for the years 2011 to 2015 is shown on **Table 2-4** below.

With the commissioning of the proposed Project, the existing JV Facility will be dedicated to handling specialty agri-products. All other grains will be redirected to the Project facility as it will be able to more efficiently ship products and maintain quality. As noted earlier, Project throughput is estimated at 3.5 Mt/a. There is no existing throughput via truck and vehicular traffic.

**Table 2-4 JV Facility Throughput from Train to Vessel 2011 - 2015**

Year	Number of Vessel Calls	Throughput (tonnes)
2011	7	122 599
2012	12	261 817
2013	31	405 182
2014	31	436 511
2015	56	805 543

## 2.4 OVERVIEW OF POTENTIAL PROJECT EFFECTS AND PROPOSED MITIGATION MEASURES

This section provides an overview of potential Project effects from construction and operations activities to land, water, air, land and adjacent community and businesses. This assessment is based on the scope identified in the Submission Requirements, interactions and effects and mitigation are summarized below in **Table 2-5**.

Studies completed to support of the Application are listed in **Section 4.0**.

**Table 2-5 Summary of Potential Project-related Interactions, Effects and Mitigation**

Project Scope	Description of Interaction	Further Details	Potential Effects	Potential Mitigation		
				Attachment	Application Section Title	Application Section #
Hazardous Materials Handling	Hazardous materials will be used in the construction and operation of the Project. Spills or poor disposal practices may allow hazardous materials could result in exposures to human or environmental receptors.	Spill Prevention, Emergency Response, and Hazardous Materials Handling Plan	<ul style="list-style-type: none"> <li>Potential for health effects to humans and the environment from exposure to hazardous materials.</li> </ul>	Attachment 6: Spill Prevention, Emergency Response, and Hazardous Materials Handling Plan	Hazardous Materials Regulations and Hazardous Materials Storage	4.1
Marine and Upland Geotechnical	<p>Upland: Pouring of raft slab foundations for the silos and buildings. Piles under the main receiving tower, receiving pits, and gallery support bents. Ground densification for the silo and shiploader foundations using RAP densification.</p> <p>Marine: Up to 19 new piles to support the shiploader will be installed through the wharf deck. Riprap will need to be cleared from pile locations and then replaced following pile installation.</p>	Sections 2.2, 4.7, and 4.16	<ul style="list-style-type: none"> <li>Upland: Noise and air quality effects due to Project-generated traffic and equipment; potential for spills and concrete-affected wastewater reaching sensitive aquatic receptors</li> <li>Marine: Potential for overpressure or direct effects to marine life due to impact pile driving; sediment resuspension due to removal and replacement of riprap; potential for spills due to marine equipment operation.</li> </ul>	Attachment 20: CEMP	CEMP	4.16
Stormwater Pollution	Stormwater runoff during construction and operations flows over land or impervious surfaces such as paved roadways, parking lots and building rooftops into catchbasins, ditches and directly to watercourses and the stormwater treatment system.	Stormwater Pollution Prevention Plan	<ul style="list-style-type: none"> <li>Stormwater runoff may accumulate debris, soil and sediment, and contaminants that could adversely affect water quality and fish and fish habitat.</li> <li>Stormwater quality may affect sewage treatment operations.</li> </ul>	Attachment 8: Stormwater Pollution Prevention Plan	Stormwater Pollution Prevention Plan	4.3
Traffic Impacts	Construction traffic will enter and exit the Site via the proposed new road access across Port Authority land from Robson Road. This new access road is expected to be completed prior to the start of Project construction. Attachment 27 provides written confirmation that agreements are in place between Fraser Grain Terminal Ltd. and Fraser Surrey Docks to build the access road, independent of the FSD coal facility project. Construction activities will cause a slight increase in road traffic, and key activities such as concrete pours will involve short-term increases in truck traffic.	Site Plan Traffic Impact Study	<ul style="list-style-type: none"> <li>Slight increase in local traffic during Site construction.</li> <li>Additional increase in truck traffic during key activities, such as concrete pours.</li> <li>Operational effects are anticipated to be minimal.</li> </ul>	Attachment 20: CEMP Attachment 9: Traffic Impact Study	Site Access, Mobilization, and Laydown Area	4.4 4.16
Rail Operations	Project operations will introduce an additional 309 trains per year, and increase density of rail tracks in the PARY yard.		<ul style="list-style-type: none"> <li>See Noise Study</li> <li>See Air Assessment</li> </ul> <p>Operational effects are anticipated to be minimal. Biophysical effects at PARY are anticipated to be minimal</p>	Attachment 13; Environmental Noise Assessment Attachment 14: Environmental Air Quality Assessment	Rail Operations Plan	4.5

Project Scope	Description of Interaction	Further Details	Potential Effects	Potential Mitigation		
				Attachment	Application Section Title	Application Section #
Marine Traffic	Handysize, Handymax, Panamax vessel profile similar to existing. Berthing and unberthing, loading, bunkering while at the Project Site as well as mooring and anchorage in transit.	Marine Traffic	<ul style="list-style-type: none"> <li>Potential interactions with other vessel traffic while in transit to anchorage or berthing at the Project; Vessel numbers to increase to about 80 per year</li> <li>Spills to the wharf or Fraser River during bunkering or loading</li> <li>Increased noise and air emissions due to increased vessel numbers over existing.</li> </ul>	Attachment 13; Environmental Noise Assessment Attachment 14: Environmental Air Quality Assessment Attachment 6: Spill Prevention, Emergency Response, and Hazardous Materials Handling Plan	Marine Traffic Noise Study; Air Assessment; Spill Prevention, Emergency Response, and Hazardous Materials Handling	4.1 4.9 4.10
Noise	Noise emissions from construction equipment, vehicles, piling and other activities. Construction work will be completed during daytime hours, therefore nighttime noise is not anticipated. Operations activities (receiving product from trains, train and truck movements, transferring product to vessels and silos and loading) may increase total noise levels, however noise from the Project will not be the dominant noise source in the area.	Noise Study	<ul style="list-style-type: none"> <li>Construction vehicles and light and heavy equipment noise and Project-induced traffic may affect noise levels in the vicinity of the Site. If impact pile driving and on-site concrete crushing occur, this will affect noise levels in the vicinity of the Site</li> <li>Increase in the Total Noise Rating Level is modeled during operations to be less than 1 dBA for the majority of receivers.</li> </ul>	Attachment 20: CEMP Attachment 13; Environmental Noise Assessment	Noise Study Potential Mitigation	4.9 4.16
Air Quality	Construction-related vehicle and equipment and fueling emissions and dust generation from exposed soils, and tracking of materials within and from the Site. During Project operations, increased air emissions due to Project-related train, vehicle and vessel movements operations, and loading and unloading of agri-products.	Air Assessment	<ul style="list-style-type: none"> <li>During construction, vehicle and equipment emissions (e.g., particulate matter (PM10), hydrocarbons, volatile organic compounds, carbon monoxide, nitrogen oxides, and sulphur dioxide) and fugitive dust emissions may affect air quality in the vicinity of the Site.</li> <li>During operations, Project-related particulate matter and combustion emissions are predicted to be less than existing ambient levels</li> </ul>	Attachment 20: CEMP Attachment 14: Environmental Air Quality Assessment	Air Quality Mitigation Potential	4.10 4.16
Energy Efficiency	Energy loads during operation of the plant (motor loads, lighting, and miscellaneous house loads) and energy conservation measures inherent in current design (type of equipment and operational methods).	Energy Efficiency Study, BATNEC Report	<ul style="list-style-type: none"> <li>Adverse effects due to inefficient electrical energy consumption mitigated by design.</li> </ul>	Attachment 15: Energy Efficiency Study Attachment 12: BATNEC Report	Energy Efficiency Study BATNEC Report	4.11 4.8
Lighting	Lighting required outside of normal construction hours (e.g., if required for concrete pours) may impact the adjacent community and businesses. Operations lighting may impact the adjacent community and businesses.	Lighting Analysis and Lighting Plan	<ul style="list-style-type: none"> <li>Due to daytime operations, construction-related disturbance from light pollution due to the Project to the local community is anticipated to be minimal</li> <li>During operations, light sources with the most potential off-site light trespass impacts are the stanchion mounted lights (Type 3) for the Container Storage Area and Shipping Area Upper Levels and the floodlights located on the walkway that illuminate the ships. These lights are aimed downward and away from residences located 250 m away from the Site. Given the distance of Site lighting from local residences, light trespass due to the Project Site is likely to be consistent with the LZ3 Lighting Zone definition and therefore not a significant factor.</li> </ul>	Attachment 16: Lighting Plan and Lighting Review Memo	Lighting Study	4.12 4.16

Project Scope	Description of Interaction	Further Details	Potential Effects	Potential Mitigation			
				Attachment	Application Section Title	Application Section #	
View and Shade Effects	Visibility of Project infrastructure from surrounding communities. Potential for shading due to Project infrastructure on surrounding community features and residences.	View and Shade Study Report	<ul style="list-style-type: none"> <li>The proposed building heights for the new facility are anticipated to have minimal potential to affect views from the surrounding communities.</li> <li>The highest potential for affected views to the Site are from the north, along the New Westminster and Queensborough water fronts facing south and south west</li> <li>No shading effects to residences are predicted.</li> </ul>	Attachment 17: View and Shade Study Report	View Study Impact Assessment and Recommendations	4.13	
Alternative Siting	Building configuration on Site and potential to adversely affect community features and views from the community. Configuration are reviewed from economic, technical, community and environmental perspectives.	Alternative Siting Options Report	<ul style="list-style-type: none"> <li>Configuration was selected based on financial and environmental factors.</li> </ul>	Attachment 18: Alternative Siting Options	Alternative Siting Options	4.14	
Archaeology	No archaeological resources have been found on Site, however there still remains a possibility on encountering a chance find during excavation, particularly if excavation depth is greater than fill depth (average 2.5 m).	Archaeological Potential – Preliminary Assessment report and Archaeological Overview Assessment	<ul style="list-style-type: none"> <li>During construction, disturbing or otherwise adversely affecting intact archaeological resources during excavation or other works involving deep disturbance of soils.</li> <li>N/A during operations.</li> </ul>	Attachment 20: CEMP, Appendix D: Chance Find Procedure	Archaeological Resources	4.15	
Soil and Groundwater	<p>Previous soil and groundwater contamination has been identified at the Project Site and known areas of contamination will be generally avoided during construction earthworks. Unexpected contamination may be encountered during excavation.</p> <p>Potential leaks and spills from construction vehicles and equipment could adversely affect soil and/or groundwater.</p> <p>Poorly managed construction waste could adversely affect soil and / or groundwater.</p>	CEMP	<ul style="list-style-type: none"> <li>Encountering unexpected soil and / or groundwater contamination during excavation.</li> <li>Potential leaks and spills from construction vehicles and equipment.</li> <li>Mishandling of construction waste.</li> </ul>	Attachment 20: CEMP	Contaminated Soil and Groundwater Management	4.17	
					Spill Response Plan	4.16	
					Fuel Management Plan	4.16	
					Waste Management	4.16	
Habitat Assessment and Nesting Bird Survey	<p>Terrestrial habitat</p> <p>The Project Site is an industrial, previously disturbed area with little native vegetation; vegetation mainly consists of weedy and invasive plant species. Vegetation removal on the Site will be carried out during construction.</p> <p>The forested area east of the Site represents bird nesting habitat and foraging and cover habitat for small and medium sized mammals. This area could be impacted by the future construction of a rail loop.</p>	Habitat Assessment Report and Nesting Bird Survey Report	<ul style="list-style-type: none"> <li>Temporary construction disturbance and 0.95 ha permanent loss of vegetated area (predominantly invasive and non-native species).</li> <li>Introduction of invasive plant species through imported soil and/or equipment.</li> <li>If clearing is required in the period when bird nesting could occur: <ul style="list-style-type: none"> <li> Destruction of active nests or breeding areas</li> <li> Temporary disturbance of birds present during Project activities</li> <li> Injury or mortality to birds as a result of equipment operation</li> </ul> </li> <li>Temporary disturbance of wildlife present during Project activities</li> <li>Injury or mortality to wildlife as a result of equipment operation</li> </ul>	Attachment 21: Habitat Assessment	Vegetation and Wildlife Management	4.16 4.18	
					Attachment 20: CEMP	Sensitive Habitat Features and Species	4.18
		Habitat Assessment Report		<ul style="list-style-type: none"> <li>Marine habitat effects: Temporary disruption during pile driving and minor permanent loss of about 12.5 m<sup>2</sup> of low productivity nearshore habitat (FREMP 2015) due to installation of new piles in the Fraser River. Temporary disturbance of 310 m<sup>2</sup> of riprap during piling. Potential for overpressure effects (injury or mortality of fish)</li> </ul>			Erosion and Sediment Control
					Concrete Works and Grouting		4.16

Project Scope	Description of Interaction	Further Details	Potential Effects	Potential Mitigation		
				Attachment	Application Section Title	Application Section #
	<p>Aquatic habitat</p> <p>Most of the proposed construction works are located approximately 120 m from the Fraser River.</p> <p>Sedimentation due to earthworks could enter the Fraser River or Gunderson Slough via Site drainage and affect the aquatic environment. This would be of particular concern in areas which are being cleared for future construction of roads, rail lines or other infrastructure in proximity to Site ditches. Sedimentation could also adversely affect the storm drain system.</p> <p>Dewatering and concrete-affected water could affect the aquatic environment if discharge is not contained and treated.</p> <p>Marine pile installation (vibratory hammer) will be required. Piling activities could also pose effects on the aquatic environment due to habitat disturbance.</p>		<p>due to impact pile driving during marine works. Adverse effects (e.g., injury or mortality to fish) due to introduction of deleterious substances during construction works or resulting from equipment operation.</p> <ul style="list-style-type: none"> <li>Freshwater habitat effects: Change in habitat quality due temporary loss of riparian vegetation from clearing for the semi-loop rail track.</li> <li>Infill of 70 m<sup>2</sup> of non-fish bearing (Class C) ditch habitat due to culvert installation</li> </ul>	Attachment 21: Habitat Assessment Attachment 20: CEMP	Marine Works	4.16 4.18
Species at Risk Assessment	Critical habitat for an at-risk plant species (streambank lupine) is located just east of Elevator Road where a portion of the rail loop will be constructed.	Species at Risk Assessment and Habitat Assessment Report	<ul style="list-style-type: none"> <li>Rail loop construction will require the removal of 1,922 m<sup>2</sup> of streambank lupine critical habitat (note: this alteration is not expected to degrade habitat quality, and may represent an improvement in the compared to existing sub-optimal habitat conditions) through removal of competition, and increased light availability. A permit application has been submitted to Environment and Climate Change Canada for permitting the use of SARA-designated critical habitat for streambank lupine in the Project areas adjacent to Elevator Road. This application is intended to address the effects of railway development from proposed projects currently in the VFPA PER process on the FSD lands.</li> </ul>	Attachment 21: Habitat Assessment Attachment 20: CEMP	Vegetation and Wildlife Management  Sensitive Habitat Features and Species	4.16 4.18  4.16 4.18
Fire and Dust Hazards	Accumulation of dust inside buildings and other enclosed spaces or near ignition sources.	Preliminary Review of Applicable Codes and Standards, Process Hazard Analysis and Operational Fire Safety Plan	<ul style="list-style-type: none"> <li>Risk of dust fires and explosions due to accumulation of grain dust in enclosed spaces or adjacent to ignition sources. Risks include fire or explosion occurring; fire spread beyond the area of origin; injury or death; and building damage. The Project was designed to minimize these risks.</li> </ul>	Attachment 22: Preliminary Review of Applicable Codes and Standards, Process Hazard Analysis and Operational Fire Safety Plan	Fire Protection and Life Safety	4.19
Flood Protection	Potential for Site inundation during a 200 year flood and effects to Project facilities.	Flood Protection Report	<ul style="list-style-type: none"> <li>Under a 200-year flood scenario, new structures were not inundated, except for static structural elements of the shiploader that should not be affected by short term flooding.</li> </ul>	Attachment 23: Flood Protection	Flood Protection	4.20

### **3.0 DRAWING REQUIREMENTS**

Drawings and associated information needs as identified in the Submission Requirements are listed in the **Table 3-1: Drawing Concordance**. These drawings have been prepared by qualified professionals and are provided in PDF format in **Attachment 4**. A separate digital file will be provided with the AutoCAD files.

**Table 3-1 Drawing Concordance**

Drawing Requirements	FWS Revised Drawing Number (Attachment 4A, Series 08-17-075C)	MottMacDonald Drawings Number (Attachment 4C, Series 391747-MMD-00-P0-DR-RW)	COMCO Drawings Number (Attachment 4D, Series 10022)	Advisian Drawings Number (Attachment 4B, Series 307071-01159-00-MA-DSK)	ISL Drawings Number (Attachment 4E, Series 3022 )
<b>Location</b>					
Plan showing the relationship of the proposed Project to surrounding area at a 1:5000 scale	P014				
<b>Site Plan</b>					
Lease and property boundaries, easements and rights-of-way.	P017				
Legal high water mark where applicable.	P600, P601	-	-	1504, 1506	-
Location and dimensions of all existing and proposed buildings, structures, equipment, and marine structures.	P001 - P006, P008-P011, P600, P601	-	-	-	-
Access points including roadways, driveways, parking areas, walkways, berths, gangways, docks.	P003-P006, P013	-	-	-	C-16, C-17
Area of demolition or construction staging/laydown area.	P012	-	-	-	-
<b>Buildings, Structures &amp; Equipment</b>					
Elevations of front, rear, and two sides with dimensions.	P004, P005, P006, P018-P022	-	-	-	-
Floor levels and height above and below finished grades.	P004, P005, P006, P018-P022	-	-	-	-
Building floor plans of all storeys including door, window and skylight locations.	P008, P009, P020, P022	-	-	-	-

Drawing Requirements	FWS Revised Drawing Number (Attachment 4A, Series 08-17-075C)	MottMacDonald Drawings Number (Attachment 4C, Series 391747-MMD-00-P0-DR-RW)	COMCO Drawings Number (Attachment 4D, Series 10022)	Advisian Drawings Number (Attachment 4B, Series 307071-01159-00-MA-DSK)	ISL Drawings Number (Attachment 4E, Series 3022 )
Roof plans with dimensions and elevations of roof parapet, mechanical and elevator/stair housing.	P004, P005, P006	-	-	-	-
Finishing details and materials.	Please refer to View & Shade Study, table 2	-	-	-	-
Excavation depths anticipated (receiving pits, foundations, trenches for utilities, etc.), including depth of excavation required to construct any below-ground infrastructure.	P004, P005, P006, P011	-	-	-	C-02 to C-15
Signage (location, dimensions and lighting details).	-	-	L01 to L09	-	C-17
Information on Site loading for foundation design criteria and any other anticipated loads.	N001	-	-	-	-
<b>Marine Structures</b>					
Site plan specific to proposed marine works only. Identify existing marine structures and those intended to be removed or relocated or will be impacted (e.g. storm water outfall impacted by rip rap placement).	-	-	-	1502, 1503	-
Dimensions, and cross-sections of front, rear and two sides of proposed marine structures including dolphins, piles, docks, piers, gangways, floats, fenders, bollards, rip rap, navigational lighting, navigation aids, ranges, dredging channels, dams, and areas to be filled etc.	-	-	-	1504, 1506	-
Dimensions and characteristics of proposed materials.	-	-	-	1505	-
Structures in relation to the tidal Higher High Water and Lower Low Water lines including water depth.	-	-	-	1504, 1506	-

Drawing Requirements	FWS Revised Drawing Number (Attachment 4A, Series 08-17-075C)	MottMacDonald Drawings Number (Attachment 4C, Series 391747-MMD-00-P0-DR-RW)	COMCO Drawings Number (Attachment 4D, Series 10022)	Advisian Drawings Number (Attachment 4B, Series 307071-01159-00-MA-DSK)	ISL Drawings Number (Attachment 4E, Series 3022 )
Plan of proposed dock facility to include location and SWL of mooring securing points.	-	-	-	1504	-
Confirm the design vessel (maximum size that can be accommodated) at the berths on the plans.	-	-	-	1501	-
Lot Grading and Utilities					
Separate plans showing existing and proposed utilities.	-	-	-	-	C-09, C-10, C-13, C-14, C-15
Lot grading plan showing existing/proposed paving and drainage. Separate to two plans if required for clarity.	-	-	-	-	C-02, C-03, C-06, C-07
Discrete Site plan showing existing/proposed fire hydrants and emergency vehicle access routes.	-	-	-	-	C-16
Proposed service connections to utilities or systems (water, sewer, storm water, power, gas), both above and below ground.	-	-	-	-	C-08, C-09, C-10, C-11, C-12
Provide written confirmation of which other authorities or jurisdictions need to provide consent or conduct works to establish connections to utilities, and confirmation that capacity exists within those 3rd party networks.	-	-	-	-	-
The Applicant is responsible for location of all existing utilities. VFPA will provide known utility information, but location of buried utilities must be confirmed by the applicant.	-	-	-	-	-
Lighting Plan					

Drawing Requirements	FWS Revised Drawing Number (Attachment 4A, Series 08-17-075C)	MottMacDonald Drawings Number (Attachment 4C, Series 391747-MMD-00-P0-DR-RW)	COMCO Drawings Number (Attachment 4D, Series 10022)	Advisian Drawings Number (Attachment 4B, Series 307071-01159-00-MA-DSK)	ISL Drawings Number (Attachment 4E, Series 3022 )
Lighting shown on the Site plan for all proposed exterior lighting including the location, type of bulbs, orientation, and level of illumination on the ground. For further information, please review Port of Vancouver's Lighting Guideline, available at: <a href="http://www.portvancouver.com/development-and-permits/project-and-environmental-reviews/technical-guidelines/">http://www.portvancouver.com/development-and-permits/project-and-environmental-reviews/technical-guidelines/</a>	-	-	L01 to L09	-	-
<b>Parking and Access</b>					
Widths of proposed roadways and driveways.	P013	-	-	-	-
Dimensions of maneuvering areas including turning radii.	P013	-	-	-	-
Fire access routes or lanes to be shown on a Site plan.	P003	-	-	-	C-17
Proposed employee and/truck parking area with dimensioned and numbered parking stalls.	P003, P013	-	-	-	-
Typical cross sections and proposed grades of all streets, and details of curbs, gutters, sidewalks, and other improvements.	P013	-	-	-	C-16
<b>Rail</b>					
Existing and proposed rail tracks, switches, and other associated rail works.	-	1000 to 10005			
Description of the rail operations expected, and how rail cars are delivered to the Site and managed while on the Site.	-	0001 and Rail Operations Plan			
<b>Vegetation Plan</b>					

Drawing Requirements	FWS Revised Drawing Number (Attachment 4A, Series 08-17-075C)	MottMacDonald Drawings Number (Attachment 4C, Series 391747-MMD-00-P0-DR-RW)	COMCO Drawings Number (Attachment 4D, Series 10022)	Advisian Drawings Number (Attachment 4B, Series 307071-01159-00-MA-DSK)	ISL Drawings Number (Attachment 4E, Series 3022 )
Existing trees and vegetation types (including listed plant species, biodiversity/species richness, invasive species types and relative abundance) landscaping, fencing, and location, quantity, and type of proposed vegetation removal (including number of trees to be removed, if applicable).	Refer to Habitat Assessment (Attachment 21)	-	-	-	-
Proposed vegetation mitigation plan, including a plan showing the location of replanting, the species of plants proposed (native species are strongly preferred, and may be required), fencing, invasive species monitoring and management areas and other landscape elements.	Refer to Habitat Assessment (Attachment 21)	-	-	-	-

## 4.0 REQUIRED STUDIES, REPORTS AND PLANS

This section summarizes studies and reports prepared for this Application by qualified professionals<sup>5</sup> in their respective fields. Technical reports prepared in accordance with Section 4 of the Submission Requirements and attached to this Application are:

- Spill Prevention, Emergency Response, and Hazardous Materials Handling Plan (**Attachment 6**)
- Geotechnical Report (**Attachment 7**)
- Stormwater Pollution Prevention Plan (**Attachment 8**)
- Traffic Impact Study (**Attachment 9**)
- Rail Operations Plan (**Attachment 10**)
- Marine Structures Study (**Attachment 11**)
- Marine Traffic Information Requirements
- BATNEC Report (**Attachment 12**)
- Noise Study (**Attachment 13**)
- Air Assessment (**Attachment 14**)
- Energy Efficiency Study (**Attachment 15**)
- Lighting Study (**Attachment 16**)
- View and Shade Impact Analysis (**Attachment 17**)
- Alternative Siting Options (**Attachment 18**)
- Archaeological Potential – Preliminary Assessment
- Archaeological Overview Assessment (**Attachment 19**)
- Construction Environmental Management Plan (CEMP) (**Attachment 20**)
- Soil and Groundwater Management Plan (**Attachment 20**)
- Habitat Assessment (**Attachment 21**)
- Nesting Bird Survey (**Attachment 21**)
- Species-at-Risk Assessment (**Attachment 21**)
- Preliminary Review of Applicable Codes and Standards, Process Hazard Analysis and Operational Fire Safety Plan (**Attachment 22**)
- Flood Protection (**Attachment 23**)
- Recycled Concrete Aggregate Assessment (**Attachment 28**)

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<sup>5</sup> Qualified professionals are identified in Sections 4.1 to 4.20.

#### **4.1 SPILL PREVENTION, EMERGENCY RESPONSE, AND HAZARDOUS MATERIALS HANDLING PLAN**

CMC Engineering and Hemmera jointly prepared a Spill Prevention, Emergency Response, and Hazardous Materials Handling Plan in accordance with industry best practice and Port guidance.

The Spill Prevention, Emergency Response, and Hazardous Materials Handling Plan in **Attachment 6** includes:

- Procedures for emergency response to reportable spills;
- An inventory of hazardous materials anticipated to be handled or stored on Site during normal operations.
- Procedures for spill prevention, containment and clean-up plan for hydrocarbon products (including fuel, oil and hydraulic fluid) and any other deleterious substances using standards, practices, methods and procedures to a good commercial standard, conforming to applicable laws.
- Procedures for proposed employee training, emergency response communication plan, emergency procedures, spill tracking and reporting, records of facilities inspections.
- Reference to appropriate spill containment and clean-up supplies available on Site at all times and commitment that all personnel working on the Project will be familiar with the spill prevention, containment and clean-up plan.
- Guidance for plan updates.

Hemmera has prepared a draft summary of hazardous materials storage and handling methods and a table of applicable regulations which is included in **Attachment 6**.

#### **4.2 GEOTECHNICAL REPORT**

Geotechnical investigations at the Site were completed by exp and summarized in their assessment report (**Attachment 7**). Also included in **Attachment 7** is a supplemental memo prepared by GeoPacific to address changes to the Project layout. Geotechnical assessment was used to inform design for ground improvements and foundations to support the Project's storage silos, conveyor and ship loader system, unloading building and transfer towers. The report details recommended foundation types, design parameters, calculated settlements and other geotechnical considerations and discusses temporary construction works, including shoring and dewatering, and consideration of methods to significantly reduce excavation dewatering due to environmental concerns.

See Marine Structures **Section 4.7** for discussion of seismic assessment of the berth.

#### **4.3 STORMWATER POLLUTION PREVENTION PLAN**

Hemmera has prepared a Stormwater Pollution Prevention Plan that describes stormwater management for daily terminal operations, considering the local climate and water capture and treatment systems (see **Attachment 8**).

#### 4.4 TRAFFIC IMPACT STUDY

Stantec completed a transportation impact assessment for the Project (**Attachment 9**). Project operations will consist of cross-dock movements between the Project and the JV Facility, shipment by truck from the Project to/from commercial/industrial operator and to/from other ports (e.g., Deltaport, Centerm, and Vanterm) around the Metro Vancouver region. Product will arrive by rail and will be transferred from rail cars to the storage facility, and then from the storage facility via conveyor onto ships bound for Asia and elsewhere, or in the case of the JV Facility, directly from rail cars via conveyor to awaiting ships.

Regional road network access to the Site will be via the Tannery Road interchange on Highway 17. From the interchange, vehicular, pedestrian, and cyclist modes would access the Site via Timberland Road, across FSD Lands, and Robson Road. Access to the Site from the Fraser Surrey Port Lands (FSPL) network is proposed via an access road located south of Western Cleanwood Preservers Ltd. All Project employees, along with Project's truck traffic are proposed to use this entrance. FSD staff associated with Project operations, will access the Site using Plywood Road, and a level-grade pedestrian crossing currently in operation.

All greater rail network access is anticipated to come via Canadian National (CN) Mainline. All arriving trains upon entering the Port of Vancouver Rail Yards, will be split and queued up on Tracks 92 to 99 of the south PARY. Installation of a semi-loop track will service loading of queued cars from rail to storage operations. A spur from the coal unloading loop track, will service the direct rail to sea unloading operations.

Existing traffic volumes combined with Project traffic volumes were used to evaluate the current roadway network, including the network changes associated with new Site access. No capacity issues occur when the rail crossings are not blocked, and some delay is anticipated when crossings are blocked.

Stantec concluded that the overall impact of Project traffic on that of the Fraser Surrey Port Lands is minimal.

#### 4.5 RAIL OPERATIONS PLAN

FWS completed a rail operations study that assesses and describes the rail operations required for the Project (**Attachment 10**). The rail service connection serving the unloading facility at the proposed Project consists of a u-shaped (semi-loop) track with both ends connected to the PARY. The Project semi-loop will be installed inside the existing semi-loop that services the existing JV Facility. A new turnout approximately 250 m into the JV Facility will split the traffic with the Project traffic to the left (southwest) and JV Facility traffic to the right (west). The outputs from the two facilities will occur on two separate tracks heading into PARY; the JV Facility track (on the outside) uses an extended Track 90 and the Project track (on the inside) uses Track 91.

On the incoming lead to JV Facility /Project, a second turnout approximately 145 m prior to the main split will branch off to a short spur into Project’s loading facility. This spur line will handle 9 to 10 car strings per day.

The u-shaped track has been designed to eventually to be part of a complete rail loop. However, initially, the PARY tracks will be used to stage incoming Unit Trains of grain and agri-products and Manifest Cars of agri-products. Unit Trains will be unloaded at the Project and the JV Facility, while agri-products Manifest Cars will be unloaded only at the existing JV Facility. Unit Trains will be composed of up to 112 railcars, Manifest Cars will arrive in strings of 50 railcars.

P&H submitted a variance request to CN on May 11, 2018. CN approved the variance request via email on May 14, 2018. **(Attachment 27)**.

As agreed with VFPA, a high-level overview of how the Project affects proposed future operation (10-year horizon) will be completed during Application review in consultation with VFPA personnel.

#### 4.6 MARINE TRAFFIC INFORMATION REQUIREMENTS

Hemmera prepared the following summary based on information provided by the Proponent. The summary discusses: vessel design range, anticipated vessel traffic, vessel operations, bunkering, and moorage.

##### 4.6.1 Vessel Design Range

The Project at FSD Berth 3 -4 is designed to accommodate restricted Panamax vessels **(Attachment 11)**. The historical activity of ocean going vessels (OGV) calling on, and corresponding grain throughput, for FSD Berths 3-4 are shown in **Table 2-4**. The current range and characteristics of OGVs calling on FSD Berth 3-4 is presented in **Table 4-1**.

**Table 4-1 Current Range of Ocean Going Vessels calling on FSD Berth 3-4**

Vessel	DWT Metric Tonnes (MT)	LOA (m)	Beam (m)
Handysize	28,000	150 – 200	27
Handymax/Supramax	55,000 to 60,000	150-200	32.26
Panamax	74,000 to 76,000	Approximately 230	32.26

Design of bulk carrier vessels has evolved to meet user demands and multiple cargo types. Bulk carriers contain large, unobstructed holds that accept a wide range of bulk cargoes, and have strengthened holds and hulls to permit loading of low-density cargoes, as well as alternative hold loading. Modern bulk carriers normally handle heavy grains as deadweight cargo. Self-trimming characteristics and wider beam lead to higher stability, less trimming and securing. Bulk vessel types and profile predicted for the Project are likely to be similar to the existing OGV classes currently calling on FSD Berth 3-4.

The Project berth will accommodate vessels to a maximum 294 m (LOA) x 32.26 m (Beam) and 11.5 m draft. Due to the current Fraser River draft restrictions of 11.5 m, the Project facility cannot completely load Supramax or Panamax-sized vessels to maximum capacity. The loading of vessels is also dependent on the tides, Fraser River water levels (freshet vs low flow) and the vessel configuration. Currently, the Site is averaging about 514,000 metric tonnes (MT) loaded on Supramax or larger class vessels. This limitation will not change with the installation of the new shiploader. Larger size vessels will be loaded to about 80 to 90 % capacity and repositioned to Alliance Grain Terminals in Vancouver Harbour to “top up” the vessel. The new shiploader is designed to accommodate a range of vessel sizes up to Panamax. Loading height is currently a restriction with the larger class of vessels (Supramax and Panamax) however the proposed new shiploader will accommodate the loading of all vessel classes.

#### 4.6.2 Anticipated Vessel Traffic Levels

The average grain cargo size in the Port of Vancouver has been increasing from an average of about 28,000 tonnes in 2001 to about 45,000 tonnes in 2015<sup>6</sup>. The anticipated average cargo size per vessel to be loaded at the Site will be about 40,000 tonnes, considering the mix of vessel sizes and allowing for partial loadings. Considering the estimated Project throughput (3.5 Mt/a) and the anticipated vessel profile, the Project will receive an estimated range of 63 to 80 vessel calls per annum. Profile calculations for 63 vessels are shown in **Table 4-2**. Vessel traffic is expected to be generally spread evenly throughout the year although there may be a seasonal slow-down during summer months.

**Table 4-2 Anticipated Vessel Traffic Levels at 3.5 Mt/a**

Vessel Type	Portion of Vessels	Number of Vessels / Annum	Average Number of Vessels/ Month	Throughput Tonnes / Annum*
Panamax	25 %	16	1.33	851,141
Handymax/Supramax	50 %	31	2.6	1,392,776
Handysize	25 %	16	1.33	386,882
Total		63	5.26	2,630,800

\*The remaining volume goes out by containers, railcars and bulk trucks.

#### 4.6.3 Vessel Operations

For vessel transit to the Project, the current operational controls are in place:

- All OGVs carry pilots throughout the transit of the Fraser River to the Project and FSD.
- Tugs generally carry experienced operators familiar with the Fraser River and operations.
- There is no speed restrictions applied in Fraser River and the river is open for 2-way traffic at all times.

<sup>6</sup> Annual Report of the Monitor – Canadian Grain Handling and Transportation System, 2014-2015 Crop Year Quorum Corporation 2015

- Tug and barge traffic transits at average 6.3 knots speed over ground.
- A surveillance-based Vessel Traffic Service (VTS), using automatic identification system (AIS) or primary radar applies throughout the Fraser River.
- In general, there is excellent communication between vessel traffic in the river, tug masters, VTS and facilities, in addition, all tugs in the river are AIS equipped.

Based on a review of vessels calling on FSD, vessels calling on the Project will require tug boat assist for 25 minutes inbound and 40 minutes outbound, for a total of 65 minutes, based on a maximum of one inbound and one outbound vessel per day. Arrival and departure is restricted to transit windows as per the Fraser River Tidal Window. Vessel passing requirements are coordinated by Fraser River Pilots/Ship's Master and monitored by Canadian Coast Guard Vessel Traffic Service and VFPA Marine Operations. For berthing and unberthing in all cases, the Fraser River Pilot's discretion will apply, taking into consideration the weather, sea conditions, predicted current, freshet, draft, maneuvering characteristics, fender capacity of the berth, space available and mechanical history of the vessel. Safe speed as defined by International Regulations for Preventing Collisions at Sea (COLREGS) - Rule #6 and controlled by the Fraser River Pilot on board vessel.

#### **4.6.4 Bunkering**

All vessel bunkering, if required, will adhere to the Bunkering Practices and Procedures as stipulated in the Port of Vancouver's Harbour Operations Manual. Vessel bunkering will take place primarily in Vancouver Harbour, either at designated anchorages or at berth. If vessel bunkering is required at the Project in the Fraser River, bunkering will only occur alongside at berth. A stand-by tug will be in attendance of bunker barges moored alongside or otherwise at FSD. If a towing company is used, it is the responsibility of the bunkering agent to ensure the towing company is aware of the bunkering and berthing schedule at FSD. When bunkering operations are under way, tug masters are required to maintain communication with Victoria Traffic on VHF Channel 74 to monitor for deep-sea traffic that may affect bunkering operations and advise when bunkering operations begin and complete. In the event a ship must transit past a berth within the same breakwater where a bunkering operation is underway, the barge must be removed to allow for the safe and timely transit of arriving, shifting or departing vessels. All bunkering operations will be carried out in accordance with the latest edition of International Safety Guide for Oil Tankers and Terminals (ISGOTT) and the additional information provided in these practices and procedures.

#### **4.6.5 Moorage**

The existing wharf at FSD Berth 3-4 is currently utilized by the existing JV Facility to load vessels with outbound grain. The existing system can be oriented to sweep across a portion of each hatch but it can reach only the land side half of the vessel. To completely fill the vessel, the loading operation is to turn the vessel about and filled from hatch to hatch. Furthermore, because of its limited shiploader capacity (averaging 500 t/h), and limited throw characteristics, a front-end loader must be lowered into each hatch to level the load and reach under the coamings. The mooring arrangement of vessels are shown in **Attachment 11**.

The new shiploading system, with a peak rate of 2 000 t/h, will average approximately 1,625 t/h and will not require any vessel movement or trimming time. The new shiploader will also be utilized by the existing facility at reduced capacity, dictated by the existing reclaim rate from the storage shed. However, the overall average performance of the existing facility will increase somewhat with the elimination of vessel movement and of front-end loader trimming requirements. Berths 1 and 2 and a portion of Berth 3, located just downstream of Berth 4, will be utilized by FSD in the future to load coal onto vessels. An analysis of the operation of the three berths revealed that it will not be possible to warp the grain vessel towards Berth 3 while coal ships are present at Berths 1 and 2 and a portion of Berth 3. The Project's new shiploader at Berth 4 eliminates turning or warping the vessel.

All vessels alongside a berth will maintain a continuous deck watch at all times. The officer in charge of the watch will follow the requirements contained in the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) Code, as amended, as well as be guided accordingly by these practices and procedures. In maintaining such a watch, the officer in charge will ensure that:

- The latest tidal and weather conditions are available.
- A listening watch on VHF 16/12, 16/11 or 16/74 is maintained for the duration of the vessel's call.
- The vessel's mooring lines are checked on a regular basis and adjusted accordingly.
- MCTS must be notified for any shifting of the vessel, engine immobilizations, lowering of any boats into the water, or any other work that may affect other vessels in the area.
- The officer is aware of all loading or discharging operations being carried out, as well as any vessel discharges.
- Vessel traffic in the area is monitored.

#### **4.6.6 Anticipated Anchorage Requirements and Utilization Periods**

OGVs calling on the Project terminal will require anchorage at some point during the vessel transit. Approximately 75% of the vessels will require anchorage in the Port of Vancouver either upon arrival to the Project or transit to harbour loading operations. The average anchorage utilization periods per vessel is anticipated to be 48 hours, although anchorage requirements could range from as little as four hours to several days.

The main anchorages serving ships calling the Port of Vancouver are in Burrard Inlet referred to as: English Bay anchorages (North and South), Inner Harbour anchorages and Indian Arm anchorages. Other anchorages include short term anchorages operating more as holding areas for vessels calling Fraser River terminals and Roberts Bank terminals as well as several emergency anchorages strategically located in the main anchoring areas. Anchorages in English Bay and Indian Arm are assigned for a period of up to seven days. The period might be extended on request if there are no other ships requiring anchorages in English

Bay or Indian Arm. However, bulk vessels could be asked to vacate the Burrard Inlet anchorages and transit to Vancouver Island if they exceed 7 days.

FGT is well aware that anchorages are heavily utilized and in short supply. There are seven inner harbor anchorages (plus one more as emergency use only), and 18 English Bay anchorages. There are no permanent designated anchorages within the Fraser River. Anchoring is only at the discretion and authorization of the VFPA. Anchoring within Steveston Harbour is strictly prohibited. Managing the grain supply chain to minimize vessel wait times is a complex issue that must consider multiple variables such as railway performance, rail car supply and weather. Considering the direct railway access and faster turnaround times to the Project when compared to other more congested rail corridors in the Port, the Project will be able to deliver faster ship turns, resulting in lower than average days in Port for grain vessels.

#### **4.7 MARINE STRUCTURES STUDY**

Advisian completed a Marine Structures Study for the Project (**Attachment 11**) and the associated drawings (**Attachment 4B**). Marine structures for the Project include:

- Re-use most of the existing FSD Berth No. 3/4 infrastructure including the existing concrete pile and deck, the fender system, and the bollards.,
- Three new piled foundation structures consisting of steel pipe piles with a cast-in-place concrete pile cap to support each of the three shiploader towers. Piles will be installed at both water side and shore side of the existing bulkhead, and
- Ground improvements (GI) on the shore side of the existing bulkhead below the tie-rods in the vicinity of the tower foundations to improve the seismic performance of the soils behind the existing wharf structure in the vicinity of the tower foundations.

The existing FSD fenders and bollards are considered satisfactory for the berthing and mooring of the largest design vessel – a restricted Panamax which is the same size as the largest vessel currently calling at FSD Berth 3/4. It is not expected that any modification or relocation of existing services will be required to facilitate the installation of the new foundations for the shiploader towers.

The shiploader tower foundations will be designed to withstand the inertia forces and the effects of soil liquefaction (lateral soil flows, loss of soil strength, and post liquefaction settlement) associated with ASCE 61-14 - Design Earthquake for a wharf of “Low” design classification; i.e., life safety protection will be provided in the design.

#### **4.8 BATNEC REPORT**

For Project design, the Proponent has strived to consistently choose the Best Available Technology Not Entailing Excessive Cost (BATNEC). The BATNEC report (**Attachment 12**) presents a summary of the

different techniques that were chosen and describes why they were selected as the “best” considering safety, environmental effects, energy utilisation, product quality maintenance, and overall efficiency.

#### **4.9 NOISE MANAGEMENT**

The Project has reviewed construction and operations phase noise separately in accordance with VFPA guidance. Construction noise mitigation is addressed in the CEMP (**Attachment 20**) and documentation of baseline noise and noise modeling of future noise levels during operations is addressed in the environmental noise assessment (**Attachment 13**).

Hemmera prepared the CEMP to mitigate potential effects due to Project-related construction activities including noise. During the construction phase, key noise generators are expected to be vehicles and equipment, piling and traffic taking materials to and from the Site. Mitigation of construction noise includes reducing vehicle and equipment idling, hours of work restrictions, speed limits and notification to local communities of the nature and likely duration of any noisy operations.

Rail cars are pulled from the PARY to the FGT rail unloading building in multiple strings. Cars will be delivered by CN to the PARY in the current PARY configuration, and a future Phase 2 extension of the PARY is contemplated. Final implementation of Phase 2 does not increase overall switching time or number of rail movements. Operation and switching of full and empty cars to/from the PARY will be similar to the Phase 1 Time in Motion Study, but starting with cars on Tracks 94 & 95 instead of Tracks 92& 93. For this reason, the assessment results would apply to the both Phase 1 and Phase 2 of the PARY extension.

BKL Consultants Ltd. (BKL) conducted an environmental noise assessment for the Project in accordance with VFPA PER guidelines and requirements for operational activities. This assessment was completed in accordance with the Port-accepted terms of reference. The objectives of this environmental noise assessment were to review existing conditions at nearby residential receivers, construct a noise model to predict existing and future noise levels with the Project operating at full capacity, perform a noise impact assessment and provide mitigations options where applicable. In addition, BKL completed a noise screening and score sheet in accordance with VFPA review comments (**Attachment 13**).

The environmental noise assessment predicts an increase in the Total Noise Rating Level for the future scenario of 1dBA or less. Non-Project source will continue to be the dominant noise source at receivers. The change in the percentage of people highly annoyed is predicted to range from 0% to 2% which is less than the Health Canada criterion of 6.5%.

The Project design incorporates the following low noise initiatives:

- All filter unit fans are to be fitted with a silencer.
- Multiple smaller baghouses and point source filters will be used at the site. Conveyors will utilize low noise polyethylene rollers.

- Conveyors will be fully enclosed with a solid enclosure.
- Rail squeal has been addressed by rail track layouts and greasing of tracks.
- Loading operation of the container yard will be limited to daytime/weekday only.

#### **4.10 AIR ASSESSMENT**

Construction-related air emissions and associated mitigation are addressed in the CEMP (**Attachment 20**) in accordance with Port guidance. Air emissions are expected from vehicle/equipment exhaust, fugitive dust sources (e.g. soil stockpiles), and emissions associated with construction activities on-site. Mitigation includes reducing vehicle and equipment idling, maintaining construction equipment and vehicles in good working order, monitoring dust-generating activities, using suppression agents if necessary, covering soil stockpiles, covering loads on trucks, regular Site cleaning and wheel washing.

WSP Canada Inc. (WSP) conducted an environmental air assessment for the Project in accordance with VFPA PER guidelines and requirements for operational activities (**Attachment 14**). The objectives of this environmental air assessment were to review existing conditions and complete an emissions inventory and air dispersion modelling assessment to determine impact and mitigation potential by comparing baseline to future with Project (which considers the implementation of BATNEC).

Rail cars are pulled from the PARY to the FGT rail unloading building in multiple strings. Cars will be delivered by CN to the PARY in the current PARY configuration, and a future Phase 2 extension of the PARY is contemplated. Final implementation of Phase 2 does not increase overall switching time or number of rail movements. Operation and switching of full and empty cars to/from the PARY will be similar to the Phase 1 Time in Motion Study, but starting with cars on Tracks 94 & 95 instead of Tracks 92& 93. For this reason, the assessment results would apply to the both Phase 1 and Phase 2 of the PARY extension.

The environmental air assessment indicates a significant decrease in estimated particulate matter emissions when the 2020 Future with Project scenario is compared to the 2015 Baseline, even with a significant increase in throughput. This is primarily due to the implementation of BATNEC for the Project, in particular, the new shiploader with telescoping cascading spout. With implementation of recommended air emissions mitigation including use of BATNEC and operational best practices, the Project has the potential to improve air quality in the area surrounding the Project.

#### **4.11 ENERGY EFFICIENCY STUDY**

CMC Engineering completed the energy efficiency study which describes how the Project (buildings, motorized equipment, and lights) will affect electrical energy consumption levels (**Attachment 15**). The Project is a green-field application where current energy conservation technology and operational methods have been included in the preliminary design process. Based on discussions with VFPA and BC Hydro, the energy efficiency study was completed by comparing current energy usage calculations for the Project with non-optimized design, thus showing the efficiency of the selected technologies and methods. The study considered the energy loads in the plant (motor loads, lighting, and miscellaneous house loads)

and energy conservation measures inherent in current design (type of equipment and operational methods). The study concluded that the energy efficient technologies and methods used for the Project will reduce total energy usage by approximately 5% and 21%, respectively.

#### 4.12 LIGHTING STUDY

Construction will be conducted primarily during daylight hours, therefore, given existing light environment and distance from potentially affected sensitive receptors (at least 250 m), construction-related effects due to Project lighting are unlikely to occur.

DMD & Associates Ltd. (DMD) completed a lighting assessment for the Project operations (see **Attachment 16**). DMD reviewed the potential for impacts of proposed exterior lighting on adjacent residential areas and general areas off-site additional to that already included in the Project lighting design. DMD concluded that, based on review of the Project lighting design, the drawings meet VFPA requirements for content.

Project light sources with the most potential off-site light trespass impacts are the stanchion mounted lights (Type 3A, 3B and 3C) for the Container Storage Area and Shipping Area Upper Levels and the floodlights located on the walkway that illuminate the ships. These lights will be aimed downward and away from residences located 250 m away from the Site. South Fraser Perimeter Road, located between the Project and the residences, is illuminated according to TAC standards for a four-lane expressway and is a dominant light source for residences near the Project. Given the distance of Project lighting from local residences, light trespass due to the Project is likely to be consistent with the LZ3 Lighting Zone definition and therefore not a significant factor.

Urban sky-glow is a factor that can impact views of the night sky and can affect sensitive receptors (including wildlife) and their behaviour. The majority of fixtures shown on the Project lighting drawings have optical systems to limit up-light<sup>7</sup> and where floodlights are proposed, shields and visors have been added as per the recommendations in IESNA RP-33 Lighting Exterior Environments. Light will be reflected off surfaces, such as pavement and steel structures, and redirected into the sky, however this is common for lighting installations. The Project lighting design is effective in minimizing sky-glow to the greatest extent practical.

DMD concluded the Project lighting design and proposed lighting operation is consistent with industry practice and minimizes potential for adverse lighting effects due to the Project to the greatest extent practical.

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<sup>7</sup> Uplight – The percentage of lumens distributed above the luminaire between 90 and 180 degrees vertical (IESNA RP-33-14)

#### **4.13 VIEW AND SHADE IMPACT ANALYSIS**

Enns Gauthier Landscape Architects Inc. (EG) completed a viewscape and shade study to assess effects due to the Project (see **Attachment 17**). As per the VFPA Submission Requirements for view and shade, EG modelled the proposed siting, massing and height and materials of the Project infrastructure. Site visits were conducted in and around the Project area to determine feasible locations in the surrounding community that may be impacted by the development. EG then modelled future views of the Project buildings and structures for each of the viewpoints selected. EG assessed:

- How these structures would affect public and private views of the landscape and skyline in the surrounding community.
- The potential shade impacts on the surrounding areas from the proposed Project by completing 3D shadow modelling.

EG concluded that, in general, the proposed Project will have minimal impact on views from the surrounding communities. Likewise, the shade impact on the Site and surrounding areas would be minimal, given the current industrial land-use zone surrounding the Site, as well as the large distances from the Site to any public place, roadway, pathway, gathering space or residence. Where required, recommended mitigation measures include retaining existing trees and shrubs, planting of new trees and shrubs, using building materials that reduce sun-glare and to explore opportunities to educate the public about the Fraser River's industrial heritage.

#### **4.14 ALTERNATIVE SITING OPTIONS**

Hemmera prepared an alternative siting options summary for the Project based on drawings of alternative Site configurations considered (see **Attachment 18**). The assessment included review of environmental, community, physical construction, economic and view and shade considerations pertaining to each configuration. The summary concluded that the selected configuration and location are preferred primarily due to physical and technical constraints such as ability of the ground to support Project structures and allowing sufficient area for effective Project operations. Environmental constraints considered included avoidance of excavation in areas with contaminated soil and minimization of development on areas with existing vegetation.

#### **4.15 ARCHAEOLOGICAL ASSESSMENT**

In October 2015, Archer CRM conducted an Archaeological Overview Assessment (AOA) (see **Attachment 19**) to identify and assess archaeological resource potential or sensitivity within the proposed Project area and provide recommendations concerning the appropriate methodology and scope of work for subsequent inventory and/or archaeological impact assessment studies. In May 2018, Kleanza Consulting Ltd. (Kleanza) provided a memo to update the Archaeological Overview Assessment originally prepared by Archer CRM. Kleanza's memo addressed the updated layout of the Fraser Grain Terminal.

#### 4.15.1 Archaeological Overview Assessment

The Archer CRM AOA (2015) reviewed the Site for archaeological potential and identified areas that could contain cultural or other archaeological remains and where Project excavations could disturb intact archaeological remains. Much of the Project site was determined to be located on fill. The AOA provided the following information:

- Characterization of general locations of fill on-site;
- Locations and estimated depths to native soils;
- Location of the site in relation to the original shoreline;
- Identification that the site is located on relatively level ground.

The Kleanza AOA Revisions (2018) conclusions are consistent with the previously identified areas of archaeological potential, the only change being the location of developments within the areas of potential, see Figure 1 in the Kleanza AOA Revisions (2018). Kleanza's recommendations are as follows:

- *All known and not yet recorded archaeological sites are protected by provincial legislation across Canada. On Federal land, the management of archaeological resources typically follows the Parks Canada Cultural Resource Management Policy (Parks Canada 2013). It is recommended that the proponent conduct archaeological field investigations where necessary to avoid or mitigate impacts to archaeological sites.*
- *Field investigations in the form of an AIA are recommended. If possible, testing for archaeological materials should be conducted in advance of any ground altering activities in areas identified as having potential for archaeological remains. If advanced testing is not possible then archeological monitoring should occur co-currently with any ground altering activities in areas identified as having potential for archaeological remains.*
- *The AIA should be conducted by a qualified professional who is recognized at the BC Archaeology Branch as an Archaeological Field Director in the Northwest Coast culture are.*
- *The archaeologist responsible for the AIA may refine the above recommendations, based on the results of AIA testing or initial monitoring work. Strategies for monitoring only sediments at specific depths or monitoring samples of larger areas may be deemed valid as additional subsurface data becomes available.*
- *Where archaeological potential is deemed low, no ground-based archaeological investigations are deemed necessary prior to project commencement.*
- *It is recommended that the client be in possession of a 'chance-find' due-diligence policy to address accidental discoveries of heritage remains. Despite the information presented in this overview assessment, the measure of archaeological potential is relative, not absolute. The possibility remains that cultural material remains may be uncovered in areas identified as possessing low archaeological potential.*

The Project chance find procedure is appended to the Construction Environmental Management Plan (CEMP) (**Attachment 20**).

#### 4.15.2 Archaeological Potential and Monitoring Considerations

Kleanza reviewed the footprint and depth of Project ground alteration works in view of geotechnical borehole logs (see **Attachment 7**) and determined that planned excavations would be deeper into native soils below typical depths of fill in areas where there was potential for intact archaeological resources along original shoreline areas. Geotechnical borehole records indicate the presence of an organic layer (including peat in some locations) of varying thickness between an estimated depth of 4 and 11 m below ground surface (bgs) at several locations across the Project area. Kleanza concluded that monitoring should occur for any excavations that could encounter this organic layer. Monitoring these excavations will help ensure archaeological materials are not accidentally destroyed during excavation activities.

Kleanza recommended that excavations that exceed the minimum 3.0 m depth below ground surface (bgs) present archaeological risk and should be monitored (field investigation) by a professional archaeologist. Ground altering activities (excavations) are planned within areas of moderate/low archaeological potential. No subsurface components of the updated layout are located in areas considered to have high potential for encountering archaeological materials. Kleanza recommends archaeological monitoring for excavations associated with the following Project components():

- Receiving Conveyor Tunnel, excavated to 4.8 m below ground surface (bgs).
- Boot Pit of Receiving and Reclaim Legs, excavated to 8.4 m bgs.
- Reclaim Conveyor Tunnel Concrete slab, excavated to 2.4 m bgs.

These components are located in areas identified to have moderate archaeological potential and are shown on Figure 1 of the Kleanza report (**Attachment 19**). The excavation depth of utility trenching for water and sewer connections will generally be no greater than 2.0 m bgs and given the 3.0 m bgs threshold, will generally not need archaeological monitoring. However, electrical utility manholes tend to be constructed deeper than the linear infrastructure, and if so, should be monitored if they exceed the 3.0 m threshold.

In summary, for excavations more than 3.0 m deep in areas of moderate or high archaeological potential (as identified in the AOA), these excavations should be monitored by a professional archaeologist.

#### 4.16 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

Environmental management during construction is described in the Construction Environmental Management Plan (CEMP) (**Attachment 20**). The CEMP addresses management for potential effects to the biophysical environment, archaeology and heritage resources, and to sensitive human receptors by providing environmental management and mitigation measures for the following:

- Site access, mobilization and laydown
- Air quality
- Noise and vibration

- Machinery and equipment
- Erosion and sediment control
- Contaminated soil and groundwater management, including that for ground improvements
- Vegetation and wildlife management
- Concrete works and grouting
- Concrete crushing
- Material re-use on-site
- Marine works
- Archaeological resources, including a Chance Find Procedure (**Attachment 20, Appendix D**)
- Sensitive habitat features and species
- Emergency and spill response
- Waste management.

#### **4.17 SOIL AND GROUNDWATER MANAGEMENT PLAN**

Based on previous investigations, soil and groundwater contamination was identified on the Site. The Soil and Groundwater Management Plan provides guidance to the Proponent about the existing Site contamination, soil management practices in relation to ground improvement, excavation and handling as well as health and safety measures. The Soil and Groundwater Management Plan is appended to the CEMP (**Attachment 20, Appendix C**).

#### **4.18 HABITAT ASSESSMENT**

Hemmera conducted the Habitat Assessment Report (**Attachment 21**) in accordance with the Submission Requirements for the terrestrial and aquatic habitat assessment, nesting bird survey and species at risk assessment for the proposed Project. Temporary disturbances to vegetation and wildlife (including birds and aquatic species) as well as temporary changes to riparian habitat and water quality are expected during construction. Approximately 310 m<sup>2</sup> of riprap located in the intertidal zone will need to be temporarily disturbed for installation of up to 19 new piles. In addition to these temporary effects, the Project is anticipated to result in the permanent loss of 0.95 ha of vegetated area, 12.5 m<sup>2</sup> of low-productivity shoreline habitat (FREMP 2015), and 70 m<sup>2</sup> of non-fish bearing (Class C) aquatic habitat. With appropriate mitigation in place and adherence to best management practices, construction of the Project is unlikely to cause significant adverse effects to fish, wildlife, or terrestrial and aquatic habitat.

Mitigation for effects of vegetation clearing on birds is identified in the assessment and is carried forward to the CEMP (**Attachment 20**). Vegetation removal will be scheduled to occur within the least risk work window for breeding birds (September 1 to February 28). Where this is not possible, a pre-clearing survey using a qualified environmental professional (QEP) will be conducted in advance of any works.

The proposed semi-loop railway track overlaps with critical habitat for the federally listed plant streambank lupine adjacent to Elevator Road. This critical habitat is designated under the *Species at Risk Act* (SARA). Streambank lupine requires open, gravelly well-drained sites such as those typical of railway ballast. The Site is currently overgrown with shrub and young trees and is currently not suitable for colonization by streambank lupine.

Given the overlap of the rail loop with critical habitat for this species, a permit application under Section 73 of SARA has been submitted to Environment and Climate Change Canada for the Project. This application is intended to address the effects of railway development from proposed projects currently in the VFPA PER process on FSD lands. Mitigation measures are proposed, consistent with the Recovery Plan for Streambank Lupine in BC (Environment Canada 2016). The application is included in Appendix F of the Habitat Assessment (**Attachment 21**). The Project will comply with permit conditions relating to streambank lupine as may be specified in the SARA permit.

#### **4.19 FIRE PREVENTION AND LIFE SAFETY**

FWS completed a fire prevention and life safety study for the Project (**Attachment 22**). The study:

- Reviews applicable codes as mandated by the National Building Code, standards, and legislation
- Identifies hazards present during Project operations (i.e., fire and dust explosion)
- Specifies design requirements and operational plans to mitigate these hazards, and
- Provides a summary of recommendations.

Fire prevention and life safety recommendations are outlined for the unloading building and pit area; enclosed conveyors; bucket elevators and their support structures; storage silos, scales and bins; wharf and loading dock as well as emergency access to the facility.

#### **4.20 FLOOD PROTECTION**

NHC conducted a flood inundation assessment for the Project (**Attachment 23**). The study involved a review of existing information, producing an inundation map for the Site, and providing comment and recommendations for improving flood protection for the Site.

The standard design event for flood hazard on the Fraser River is the 1 in 500 Annual Exceedance Probability (AEP) event with moderate climate change allowance and 1.0 m Sea Level Rise (SLR). The PER Application Submission Requirements from VFPA specifies that the flood protection assessment be conducted using the 1 in 200 year AEP event, with moderate climate change allowance and 0.5 metre SLR as presented in “Simulating the Effects of Sea Level Rise and Climate Change Scenarios on Fraser River Flood Scenarios” (FLNRO, 2014). Flood levels for this scenario range from El. 3.98 m in the downstream end of the property near Berth 2 to El. 4.10 m in the upstream end of the property near Berth 6.

Attachment 23 includes a flood inundation map to assist with the assessment. While industry best practices were followed to produce the map, actual depths and extents of inundation may vary from those shown. Such variations can result from the inherent uncertainty and assumptions in all stages of the process including discharge measurement, stage-discharge rating, estimates of historical flood frequency distribution, estimates of projected sea level rise and climate change effects, numerical modelling of river flows, and topographic data collection.

**Attachment 23, Figure 2** shows the predicted depths and extents of flooding in a 1 in 200 year AEP event. Direct ingress from the Fraser River is limited to the area fronting Berths 2 through 6. Most of the area between the berths and rail lines would experience ponding of water up to 1.0 m deep. Based on the review of the flood inundation mapping, FWS concludes that no areas of the Project are at risk of flooding that would result in adverse effects to the value and vulnerability of commodities to be handled by the Project. In addition, no contaminated risk due to accidental release of commodities or other Project components are anticipated.

#### **4.21 RECYCLED CONCRETE AGGREGATE ASSESSMENT**

The concrete slab for the Bekaert operations building must be removed to allow for ground improvements required to meet seismic criteria and accommodate site facilities and utilities. A high-level review of options was conducted to evaluate 1) disposal of concrete offsite or 2) re-use of concrete as Recycled Concrete Aggregate (RCA) material.

## 5.0 COMMUNITY AND STAKEHOLDER CONSULTATION

The following section describes public and stakeholder consultation that has been undertaken during the Preliminary Review Phase period and consultation planning for the Application Review Phase.

### 5.1 PRELIMINARY REVIEW PHASE

The Project's approach for the Preliminary Public Comment Period was developed using the requirements outlined by the port authority for public and stakeholder consultation. The Preliminary Public Comment Period was held from November 3 to December 1, 2016 and included the following activities:

- Developed a Project website to make information available to the community and stakeholders (frasergrainterminal.ca)
- Created an information brochure with a Project description and details about how to participate (made available at public meetings and for download on the Project website)
- Developed an online feedback form to collect community and stakeholder input (paper copies were available at public meetings)
- Developed notification letters for stakeholders and residents, including a Project description and details about how to participate
- Delivered notification letters by hand, regular mail and email to local residents and businesses and three community associations between November 2 to 14, 2016
- Placed newspaper advertisements in three local papers (November 3 and 4, 2016)
- Hosted two information meetings in the community (November 16 and 26, 2016)

Participation results are as follows:

- 62 people attended the two public information meetings
- 29 participants completed the online feedback form
- 90 people requested to be added to the Project update database
- 4 written submissions were received by email

Further details about the Preliminary Public Comment Period are provided in the Preliminary Public Comment Period Consultation Summary Report (**Attachment 24**), available at frasergrainterminal.ca and on the port authority's website. Comments and questions received during the Preliminary Public Comment Period, and the related responses and actions from the Project Team, are summarized in the Input Consideration Report (**Attachment 25**).

#### 5.1.1 Stakeholder Consultation

The Proponent understands that the stakeholder notification and consultation is being led by VFPA during Application Review Phase with the involvement of the Proponent at the request of VFPA. As per VFPA requirements, the Proponent has identified neighbouring businesses and engaged them as part of the

Preliminary Public Comment period. The Proponent will work with VFPA to identify the stakeholders and level of notification required as part of the Consultation and Engagement Plan. The Proponent acknowledges that VFPA may revise the list of stakeholders upon acceptance and review of the complete Project Application.

### **5.1.2 Community Consultation**

Community consultation is being led on behalf of the Proponent by Lucent Quay Consulting Inc. As per VFPA requirements, the Proponent has engaged the public prior to the submission of the Application through the Project website, the online feedback form, through community newspaper ads in Surrey, Delta and New Westminster and through Coffee Shop Drop-in sessions conducted on November 16 and November 23 in Surrey and New Westminster. Engagement with the community will continue as part of the Application Review Phase.

## **5.2 PLANNED CONSULTATION DURING APPLICATION REVIEW**

The Proponent is committed to providing relevant and timely information about Project-related activities so that interested parties can be informed about how to participate and provide feedback. The first step in furthering discussions includes sharing Project technical information, as committed during the Preliminary Review Phase in 2016.

To support public and stakeholder consultation for the Application Review Phase, at minimum, VFPA is expected to require the following:

- An updated Consultation and Engagement Plan
- Notification (letters to nearby residents, stakeholders and businesses a minimum of 10 business days prior to open houses, local newspaper advertising, etc.)
- A 20-business day public comment period
- Meetings with stakeholders, as required
- Meetings with specific interested groups, if identified
- Online outreach including an opportunity for online feedback
- Community open houses
- Consultation Summary Report
- Input Consideration Report showing how feedback has been considered

Stakeholder meetings will be formally documented and Project enquires will be tracked and responded to in a timely manner (as appropriate).

During the Application Review Phase of public consultation, Fraser Grain Terminal will provide the public and stakeholders with details of the project, results of the technical studies and any proposed mitigations.

### **5.2.1 Materials for Public and Stakeholder Consultation during Application Review Public Comment Period**

The following consultation materials will be developed for the Application Review Phase:

- Public and Stakeholder Communications and Engagement Plan, including map or description of mail drop area (revised from Preliminary Review Phase plan);
- Updated Project website text;
- Newspaper advertisements;
- Notification letter/email;
- Discussion guide;
- Online feedback form; and
- Display boards.

All materials in final form will be submitted to VFPA for review and approval prior to distribution to the public and stakeholders and the commencement of the public comment period. The list of stakeholders will also be confirmed with VFPA prior to notification and commencement of the Public Comment period.

### **5.2.2 Reporting for the Application Review Public Comment Period**

Following the completion of the public comment period for the Application Review Phase, the following reports will be prepared and submitted to VFPA for review and approval:

- Application Review Phase Public Comment Period - Consultation Summary Report
- Application Review Phase Public Comment Period - Input Consideration Report

Following approval, these reports will be posted to the Project website and a notification will be sent to the Project database.

### **5.3 PLANNED COMMUNICATIONS DURING CONSTRUCTION**

A Construction Communications Plan will be developed prior to construction and will include:

- A brief description of the Project and background;
- Construction timelines;
- Considerations and challenges;
- Engagement objectives;
- Key audiences and stakeholders;
- Key messages; and
- Public and stakeholder notification activities prior to construction.

## **6.0 ABORIGINAL ENGAGEMENT**

### **6.1 PRELIMINARY REVIEW PHASE**

As guided by VFPA, the Proponent commenced early-engagement activities with 14 First Nations in February 2016. To date, First Nations that have expressed interest in the Project are Cowichan Tribes, Katzie First Nation, Kwantlen First Nation, Musqueam Indian Band, Penelakut Tribe, Qayqayt First Nation, Semiahmoo First Nation, Tsawwassen First Nation, and Tsleil-Waututh Nation.

Those First Nations yet to express an interest in the Project are Halalt First Nation, Hwlitsum First Nation, Lake Cowichan First Nation, and Lyackson First Nation. Stó:lō Nation deferred their interest in the Project after receiving the introductory letter. Following receipt of a Project location map and GPS coordinates, Penelakut Tribe has not requested further Project information.

Since February 2016, the Proponent has met with Cowichan Tribes, Katzie First Nation, Kwantlen First Nation, Musqueam Indian Band, Qayqayt First Nation, Semiahmoo First Nation, and Tsleil-Waututh Nation. Through these meetings, the Proponent has heard multiple issues and concerns from First Nations including those related to vessel traffic, effects to archaeology, fisheries, wildlife, and vegetation, grain spills, procurement, cumulative effects, storm water runoff, safety and others. To the extent that the Proponent can address issues that fall within their Project scope, the Proponent is committed to discussing and resolving issues during the PER Application Review and beyond. The first step in furthering discussions includes sharing Project technical information, as committed during introductory meetings.

The Proponent will continue providing regular Project information updates to Tsawwassen First Nation, per their request. Tsawwassen First Nation has confirmed they will request a meeting with the Proponent if/when required.

A Project update was emailed to participating First Nations on November 3, 2016 and highlighted the following:

- The Proponent's name change from P&H to Fraser Grain Terminal Ltd.;
- The intended submission of two Applications (Demolition Application and Construction Application)
- The new VFPA Aboriginal Affairs Project contact;
- The Project's website launch; and
- Sharing technical Project information.

The Proponent is committed to meaningful ongoing engagement activities with First Nations that have indicated their interest in the Project. Future engagement with First Nations through the Construction Application Review stage and beyond is anticipated to include meetings, emails, information sessions, workshops, sharing Project documents, and negotiating capacity funding documents to support First Nations review of Project information. The Proponent looks forward to continuing to work collaboratively with VFPA and First Nations as the Project progresses.

Engagement activities undertaken prior to Application submission are summarized in the First Nation Engagement Summary Report (**Attachment 26**). The summary includes records of information-sharing activities (including the email update noted above) and other interactions with respect to the proposed Project and information on any known First Nations interests in the Project area.

## **6.2 PLANNED ENGAGEMENT DURING APPLICATION REVIEW**

The Proponent is committed to meaningful ongoing engagement activities with First Nations that have indicated their interest in the Project. Future engagement with First Nations through the Application Review Phase and beyond is anticipated to include meetings, emails, information sessions, workshops, the sharing of Project documents, and the signing of capacity funding documents to support First Nations review of Project information.

Future engagement activities will support VFPA's Application Review Consultation Requirements including:

- Determine whether any part of the proposed work has the potential to impact Aboriginal rights;
- Continuing Aboriginal engagement upon VFPA's review and acceptance of the completed Project Application;
- Where non-confidential, providing records of information sharing activities, agreements, or other interactions with Aboriginal groups with respect to the proposed Project; and
- Providing information on any confirmed Aboriginal interest overlapping with the Project area.

The Proponent looks forward to continuing to work collaboratively with VFPA and First Nations through all stages of the VFPA PER process.

## **6.3 PLANNED COMMUNICATIONS DURING CONSTRUCTION**

Communications to occur during the potential construction period will be discussed and agreed to during the Application Review phase. Following Project approval, the Proponent will implement mitigation measures, monitor and follow-up on commitments made during consultation process.

## 7.0 REFERENCES

City of Surrey. 2014. Plan Surrey 2013: Official Community Plan. Accessed September 2015.  
<http://www.bcairquality.ca/airsheds/bc-airsheds.html>.

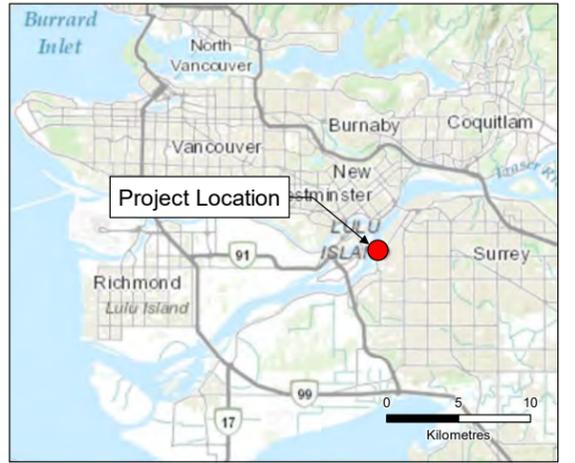
Fraser River Estuary Management Program (FREMP). 2015. Burrard Inlet Environmental Action Program – Fraser River Estuary Management Program. FREMP – BIEAP Habitat Atlas. Accessed October 2015. Available at: [http://www.cmnbc.ca/atlas\\_gallery/fremp-bieap-habitat-atlas](http://www.cmnbc.ca/atlas_gallery/fremp-bieap-habitat-atlas).

BC Ministry of Forests, Lands and Natural Resource Operations (FLNRO). 2014. Simulating the Effects of Sea Level Rise and Climate Change on Fraser River Floor Scenarios. Accessed January 2017.  
[http://www.env.gov.bc.ca/wsd/public\\_safety/flood/pdfs\\_word/Simulating\\_Effects\\_of\\_Sea\\_Level\\_Rise\\_and\\_Climate\\_Change\\_on\\_Fraser\\_Flood\\_Scenarios\\_Final\\_Report\\_May-2014.pdf](http://www.env.gov.bc.ca/wsd/public_safety/flood/pdfs_word/Simulating_Effects_of_Sea_Level_Rise_and_Climate_Change_on_Fraser_Flood_Scenarios_Final_Report_May-2014.pdf)

Port Metro Vancouver (PMV). 2014. PMV Land Use Plan Designation Maps – Planning Area 5. Accessed December 2015. <http://www.portmetrovancover.com/wp-content/uploads/2015/04/Planning-Area-5-Fraser-River-Central.pdf>.

# **FIGURES**

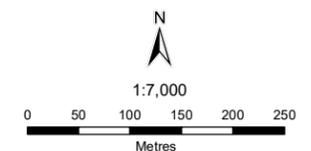
**Project Location and Construction Boundary**



**Legend**  
 Site Boundary for Construction Works

**Notes**  
 1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

**Sources**  
 - Aerial Image: City of Surrey, 2014



NAD 1983 UTM Zone 10N  
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Path: S:\GIS\emaf\Project\2191-001\11041 Elevator Road\Project\Summary\Fig\_2191\_001\_01\_SiteLocation\_Construction\_180514.mxd

**Project Location and Construction Boundary**

**Legend**

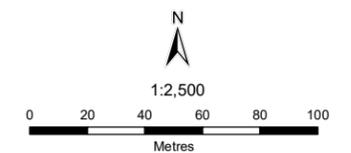
 Site Boundary for Construction Works

**Notes**

1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

**Sources**

- Aerial Image: City of Surrey, 2014



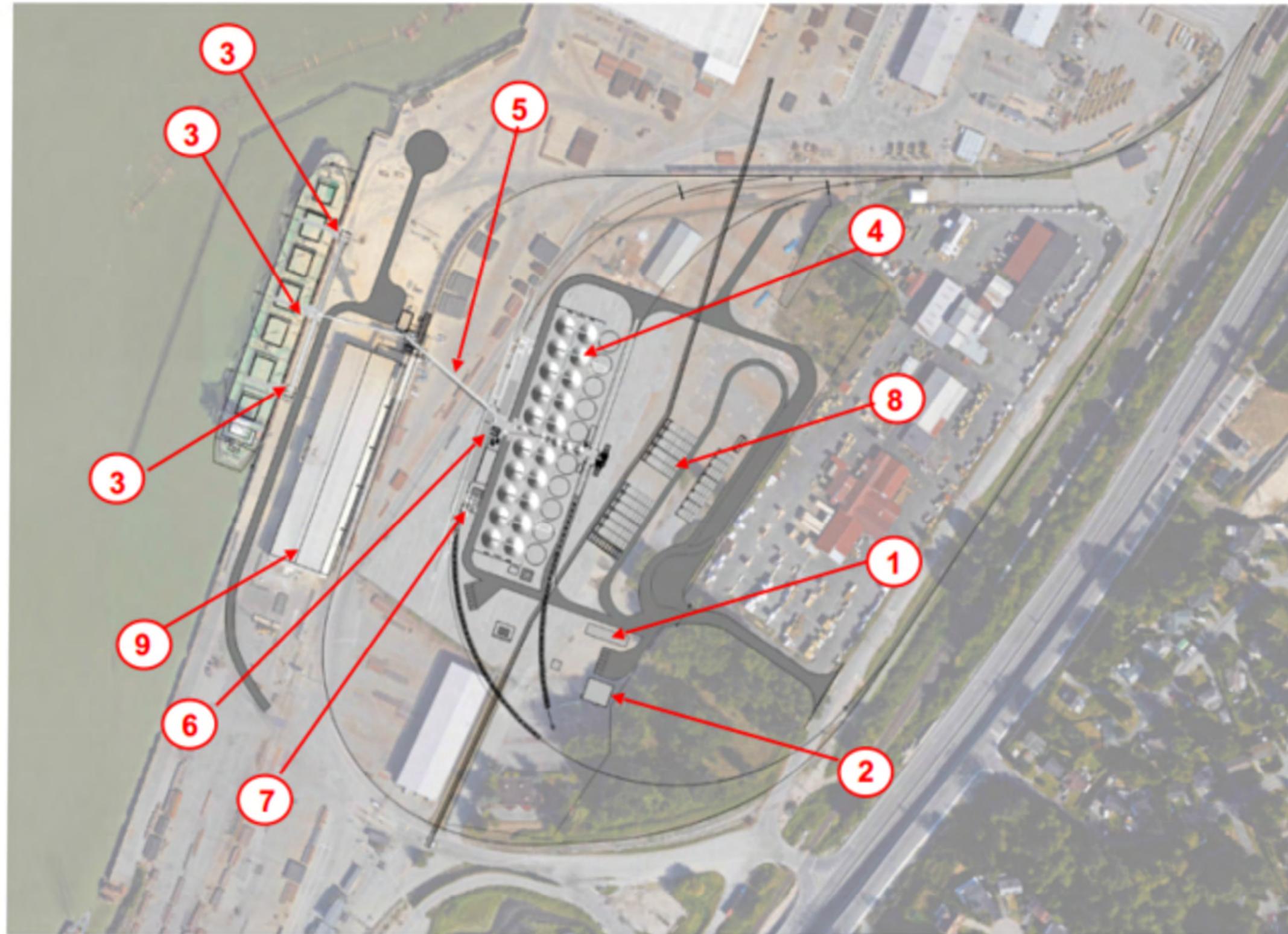
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**Project Components**

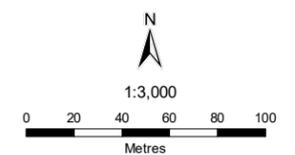
**Legend**

- 1. Administrative building
- 2. Maintenance & Sample Storage Building
- 3. Tower Shiploaders
- 4. Storage Silos
- 5. Transfer Conveyor
- 6. Rail Unloading Building
- 7. Transformer
- 8. Container Storage Yard
- 9. Existing JV Facility



**Notes**

- 1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.



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**Human and Biophysical Receptors**

**Legend**

-  Site Boundary for Construction Works
  -  Residential Area
  -  Potential Streambank Lupine
  -  Parks and Protected Areas
  -  Culvert
- Channel Type:
-  Fish bearing
  -  Non-fish bearing

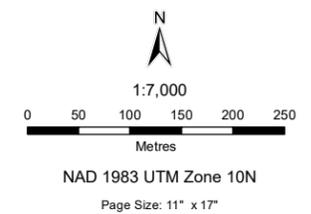


**Notes**

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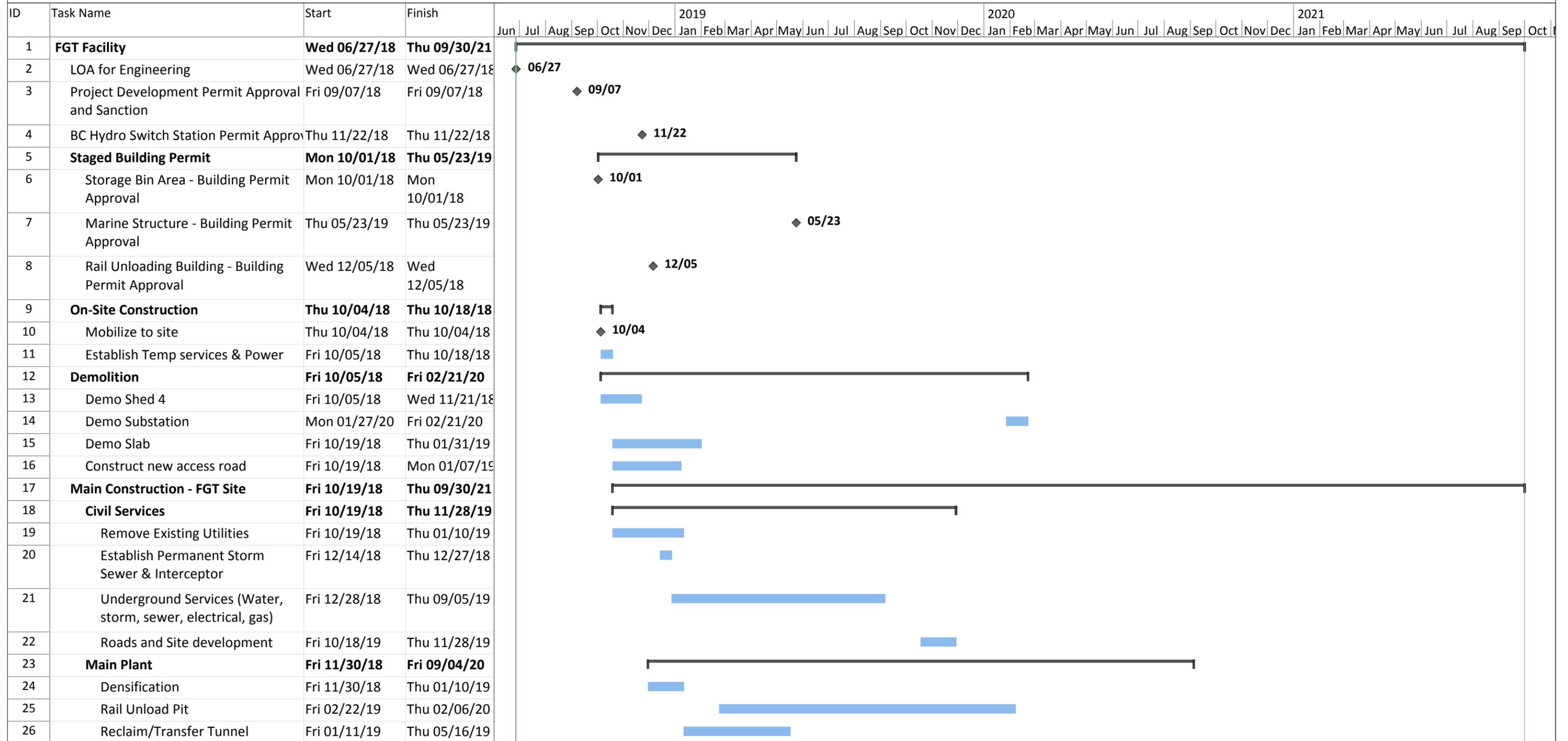
**Sources**

- Open Channels: City of Surrey  
- Aerial Image: City of Surrey, 2014





FRASER GRAIN TERMINAL  
CONCEPT SCHEDULE



Project: FGT CONCEPT SCHEDULE Date: Wed 06/27/18 Filename:180626_FGT-Cncpt_Sch	Task		Project Summary		Inactive Milestone		Manual Summary Rollup		Deadline	
	Split		External Tasks		Inactive Summary		Manual Summary		Progress	
	Milestone		External Milestone		Manual Task		Start-only		Manual Progress	
	Summary		Inactive Task		Duration-only		Finish-only			

