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BG GROUP

Summary of Project Description

PRINCE RUPERT LNG

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Project Number:
60284368

Date:
April 2013

AECOM

1. General Information and Contacts

Prince Rupert LNG Limited (PRLNG) proposes to develop a Liquefied Natural Gas (LNG) facility on Ridley Island at the Port of Prince Rupert British Columbia (BC). The name of the project is Prince Rupert LNG (the Project).

The Project includes construction of a natural gas liquefaction plant and associated port and infrastructure facilities to export natural gas to international markets. The LNG facility (the Facility) will be developed in two phases, reaching a nominal capacity of up to 21 million tonnes per annum (mtpa) when all three parallel LNG production trains[1] (trains) are constructed and operational.

The Project site (the Site) covers approximately 125 ha in area on the southwestern part of Ridley Island (Figure 1.1). The Site was selected because of its available deep-water port and safe navigation access, road access, and existing infrastructure. Ridley Island is Federal Crown Land under the administration of the Prince Rupert Port Authority (PRPA) and has been designated for industrial use by the PRPA.

Ridley Island is partially developed, with the Ridley Terminals Inc. (RTI) coal trans-shipment facility, the Prince Rupert Grain (PRG) Terminal and the Quickload Container Examination Facility located on the northern portion of the island. The former Skeena Cellulose pulp mill site on Watson Island is located to the east of the Site. The Canpotex potash export terminal is expected to be constructed north of the Site on Ridley Island. The Ridley Island Road, Rail and Utility Corridor Project will extend access from the north and loop around the central part of the island. The Pacific Northwest LNG Project is being proposed by Progress Energy Canada Ltd. on the adjacent Lelu Island, to the south of the Site.

The northeastern boundary of the project footprint will be about 850 metres (m) from the nearest residences in Port Edward, across Porpoise Channel. Ridley Island is 17 kilometres (km) from the city of Prince Rupert and 15 km from Port Edward via road. The communities of Metlakatla and Port Simpson (Lax Kw'alaams) are both located north of Prince Rupert. The Metlakatla reserve, S 1/2 Tsimpsean 2 is the closest to the Project at approximately 12 km away. The Lax Kw'alaams reserve, Lax Kw'alaams 1, is approximately 22 km from the Project.

[1] *An LNG train is the term used to describe the liquefaction and purification facilities in a liquefied natural gas plant.*

1.1 Proponent and Consultant Information

Project Name: Prince Rupert LNG Project
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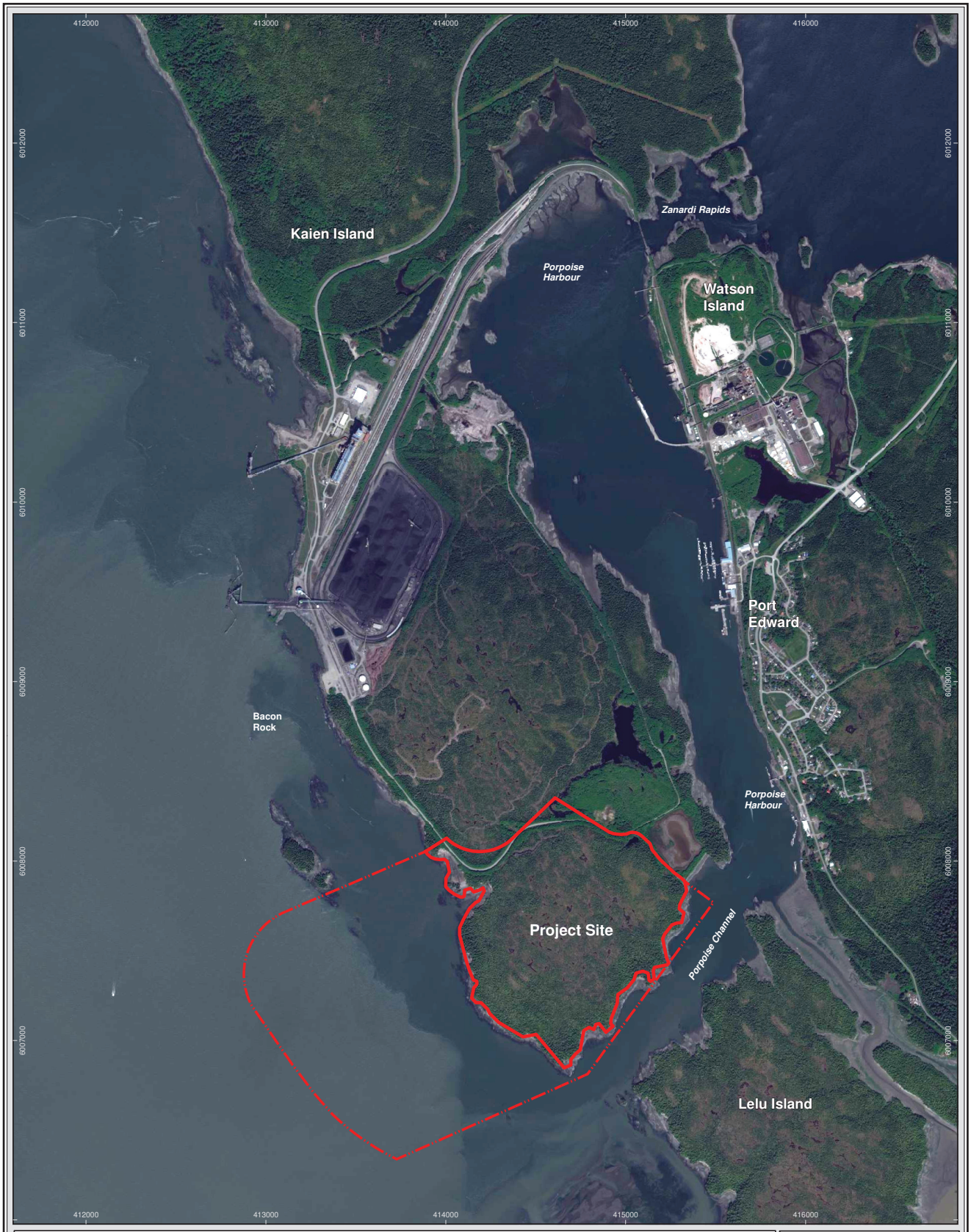

Basemapping from Department of Natural Resources Canada, Microsoft Bing, ESRI Basedata and AECOM 2013.

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NAD 1983 UTM Zone 9N

Legend

- Land Lease
- Water Lease

Overview Map

BG Baseline Studies
Location: Ridley Island, BC

Proposed Site Location on Ridley Island

April 2013
Project: 60284368

AECOM

Figure 1-1

File Location: P:\60284368\000-CADD\050 GIS WIP\02_Maps\SOCIO_ECONOMIC_PROGRAM\2013-01-16-ProjectDescription\Fig1-1-2013-04-03-ProposedSiteLocation-60284368.mxd Date Revised: April 03, 2013 Prepared by: DL Project: 60284368

1.2 Overview of Engagement and Consultation to Date

PRLNG has engaged with local communities and First Nations through meetings, open houses, correspondence, community newsletters and mail-outs. A representative of the Project resides in Prince Rupert, is responsible for outreach to local communities, and is available to answer questions and receive feedback on the Project. Open houses were conducted in November 2012 in Port Edward and Prince Rupert.

PRLNG has identified the following categories of groups that would be engaged and consulted as part of the environmental assessment (EA) of the Project: Aboriginal Groups, federal government, provincial government, local governments, landowners, land and resource users and other stakeholders.

1.2.1 Aboriginal Groups to be Consulted and Engaged

BG Group's Social Performance Standard commits PRLNG to adopt an approach that recognizes and respects the rights of Indigenous People potentially affected by its activities. Aboriginal Groups have been identified that will be consulted and engaged as part of the EA process and with whom PRLNG hopes to form meaningful, respectful and lasting relationships (Table 1.1). Further information on consultation with Aboriginal Groups is provided in Section 6.

Table 1.1. Aboriginal Groups Potentially Affected

Aboriginal Group	Contacted to Date
Lax Kw'alaams	Yes
Metlakatla	Yes
Gitxaala	Yes
Kitselas	Yes
Kitsumkalum	Yes
Council of the Haida Nation	No
Coastal First Nations Great Bear Initiative	Yes

1.2.2 Stakeholders to be Consulted and Engaged

Stakeholders are defined by BG Group as interested and affected parties with either real or perceived stakes in the Project (financial, non-financial, or both). A Project's stakeholders include those who are affected by the Project as well as those who can affect the Project. Stakeholders involved in the Project to date include those with a direct interest in the Project and those who have been consulted for advice and information related to its social, environmental and regulatory context. Information on consultation with stakeholders is provided in Section 7.

1.3 Federal and Provincial Environmental Assessment

PRLNG is seeking approval under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) and an environmental certificate under the *BC Environmental Assessment Act* (BCEAA). PRLNG expects that, if the Project is required to undergo both federal and provincial EAs, the EA process would be

harmonized into a single process pursuant to the Canada-British Columbia Agreement on Environmental Assessment Co-operation (2004) or a new agreement in light of CEAA 2012.

The Project is a facility for the liquefaction of natural gas into LNG with a processing capacity of more than 3,000 tonnes per day (t/d), a threshold under Section 13(d) of the schedule to the CEAA 2012 *Regulations Designating Physical Activities*. As the anticipated processing capacity is 19,726 t/d per train, the Project meets that criterion of a federally designated project.

Power generation requirement of the Project are 540 MW (Phase 1) with an addition 260 MW (Phase 2) therefore activity 2(a) in the schedule of the *Regulation Designating Physical Activities*, which is "The construction, operation, decommissioning and abandonment of a fossil fuel-fired electrical generating station with a production capacity of 200 MW or more" applies to the Project.

The Facility will have the capability to store energy that can yield, by combustion, more than 3 petajoules (PJ) of energy, a criterion of a reviewable project pursuant to Part 4 of the provincial *Reviewable Projects Regulation* of BCEAA. The LNG storage capacity is 540,000 m^3 and, by using a typical energy density value (lower heating value) for LNG of 21 megajoule per litre (MJ/L), the LNG volume stored would have energy content upon combustion on the order of 11.34 PJ. Therefore, the Facility is reviewable.

1.4 Regional Environmental Studies

The Project is located in a region that has not been the subject of federal regional environmental studies.

2. Project Information

2.1 Project Summary

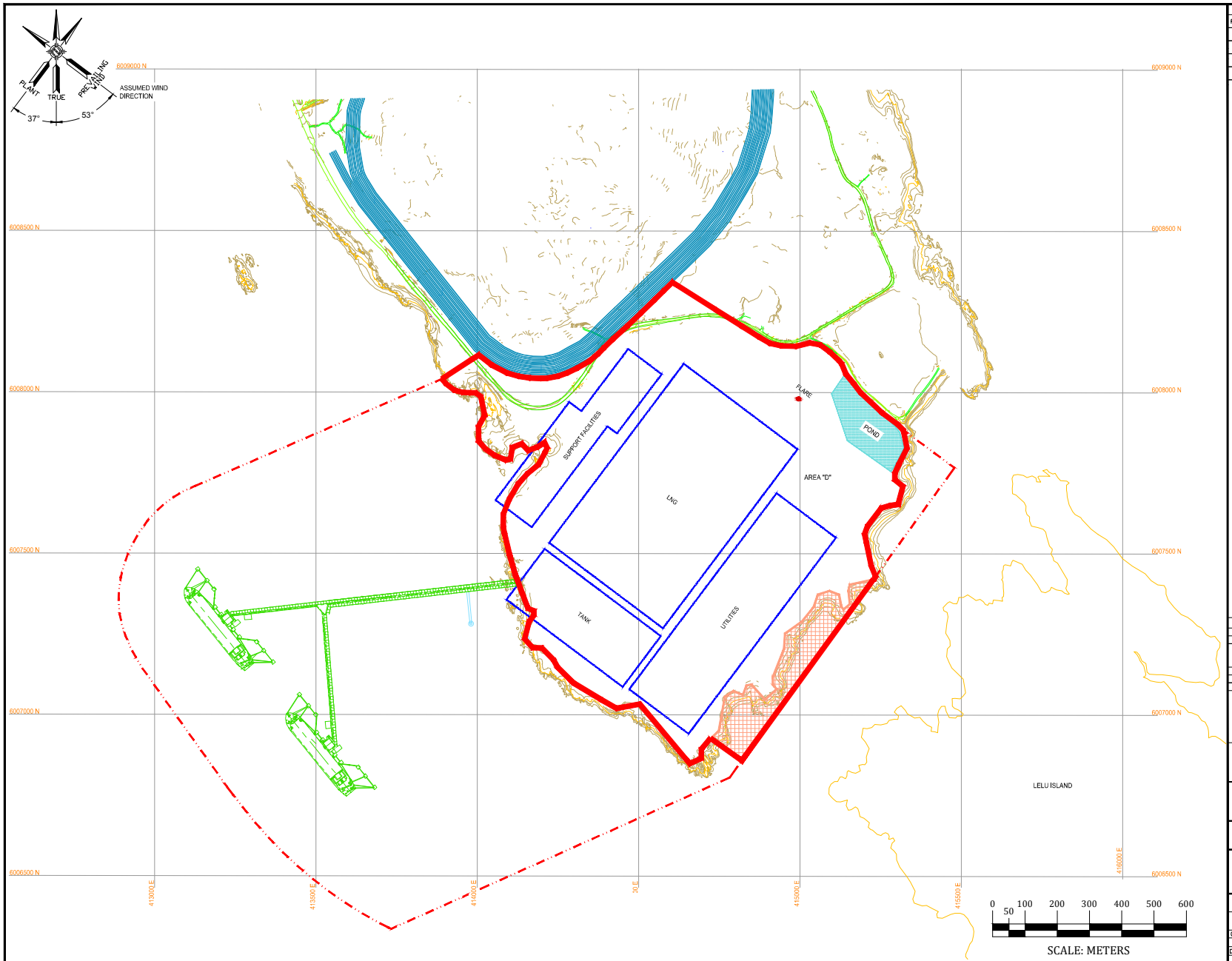
When fully developed, the Facility will include three LNG processing units, or "trains" with a total capacity of up to 21 mtpa, approximately 7 mtpa each. Production capacity of the Facility will be developed in two phases: Phase 1, to include Trains 1 and 2; and Phase 2, the addition of Train 3 to achieve full processing capacity. It is anticipated that construction of Phase 1 will begin in 2016, with the timing of Phase 2 dependent on market conditions. Section 2.3 provides more detail on construction phases and timing.

LNG is produced by cooling natural gas to -162^{o}C, the temperature at which it becomes liquid. This process reduces the volume of the natural gas by more than 600 times, allowing it to be transported safely and efficiently by sea. LNG is non-corrosive and non-toxic, and is stored at low pressures near atmospheric levels.

LNG from the liquefaction process will be held in one to three LNG storage tanks, each with a capacity of up to 180,000 m^3. The tanks will be full containment type with an inner free standing metal tank fully enclosed in outer concrete walls and concrete roofs.

The marine terminal will initially include one trestle (jetty) and one ship-loading berth (Figure 2.1). The berth will accommodate current Q-Flex LNG carriers, with cargo capacity of up to 210,000 m^3. When Train 3 is constructed, a trestle extension and second berth will be added. Each berth will have a capacity of up to 12,000 m^3/hr. The marine terminal and deepwater channel approach will include navigation aids conforming to the standards under the *Canada Shipping Act*.

For Phase 1, there will be an estimated 189 vessel calls per year or three to four calls per week. When Train 3 comes into operation in Phase 2, an additional 95 vessel calls will be made per year, for a total of five or six carriers visiting the Facility per week.



REVISIONS

REV	DATE	BY	DESCRIPTION	CHKD	ENG	APPRD	APPVD
A			ISSUED FOR INFORMATION				

NOTES:

DRAWING KEY

- DENOTES NEW MATERIAL OFFLOADING FACILITIES (MOF)
- DENOTES AREA RESERVED FOR STORM WATER RETENTION
- DENOTES APPROXIMATE AREA "D" BOUNDARY
- DENOTES APPROXIMATE WATER LOT BOUNDARY
- DENOTES UNIT BOUNDARY BUFFER AREA (NORMAL BUFFER AREA = 15m)
- DENOTES GRAVEL ROAD

APPROVALS

OWNERS	SUBMITTED	APPROVED	ABS	SUBMITTED	APPROVED
U.S.C.G.	SUBMITTED	APPROVED		SUBMITTED	APPROVED

Technip
TECHNIP USA, Inc.

PRINCE RUPERT LNG
PRINCE RUPERT, BC

PRELIMINARY SITE LAYOUT PLAN

DRAWN	CHECKED	ENGINEER	SCALE
GN			NOTED
DATE	DATE	DATE	SHEET
8-23-12			SHT. 1 OF 1

CLIENT APPROVAL
DRAWING NUMBER
FIGURE 2-1
DATE:
TPUSA DRAWING NUMBER: DH031224-0000-DW-0051-SK0FR
REV. A
DATE:

During operations, power for the Facility will be generated by burning natural gas in turbines onsite. The Facility will be self-sufficient for all of its power needs.

During construction, temporary infrastructure will be required for access roads, borrow sites, construction laydown areas, and the construction camp. At Project completion the construction camp will either be fully decommissioned or partially decommissioned and the remainder retained for turnover (labour-intensive periods of facility maintenance). Temporary docks for off-loading equipment and materials during construction, and a permanent material offloading facility (MOF), will also be required.

The operational life of the Facility is 30 years but can be extended up to 60 years.

2.2 Purpose and Rationale

In 2009, global demand for LNG was 183 mtpa, but forecasts estimate that global LNG demand will rise by more than 50% to 280 mtpa by 2015 (BG Group, 2013b). Asia continues to be the primary source of LNG demand: alongside traditional markets Japan and Korea, PRLNG also expects to see high growth in China and India.

PRLNG believes that several large-scale LNG export projects will be required to meet this demand and that BC is well positioned to compete in the international LNG market. BC has substantial reserves of natural gas and export facilities located on the north coast of BC are advantageously located to ship LNG to areas of demand growth.

BG Group is well placed to capture additional demand with potential supply positions in the United States (US), East Africa and PRLNG's Project in Western Canada. This Project is needed to add long-term stable supply to BG Group's portfolio of LNG capacity for the company's existing and future client base.

2.3 Project Construction

The Project will be constructed in two phases. Phase 1, planned to commence in 2016 and expected to last 60 months, will include construction of two LNG processing units (Trains 1 and 2) and the supporting onshore and marine infrastructure for the Facility. The two trains will be constructed concurrently, with about six months to one year between commissioning of Train 1 and Train 2. Phase 2 is expected to last 42 months and will include construction of the third LNG processing unit (Train 3), an additional marine berth and LNG storage tank, and decommissioning of any temporary construction facilities. The start date for Phase 2 will depend on market conditions.

As space on the Site is constrained and specialized labour may be in short supply, a modularized construction methodology will be used for the Facility. Modules are key pieces of pre-fabricated, pre-assembled and tested equipment supplied by specialized companies sourced for their specific technical excellence in processing facilities and code stamped piping/equipment. Modules will be delivered on ocean-going barges. Significant elements of the Facility cannot be modularized, and those will be built or pre-assembled into smaller units onsite.

Construction will take place 24 hours per day, seven days per week. Construction activity during nighttime hours will be planned to minimize noise and vibration. Mitigation measures to control potential effects on wildlife and marine mammals during the construction phase will be considered as described in Section 5. Mitigation measures that may be appropriate include limiting tree-clearing or habitat-altering activities to

time periods outside of the critical life stage (e.g., not during breeding season for birds or amphibians) and avoidance of blasting or other noisy construction when marine mammals are in the area.

Phase 1:

- Site preparation
- Construction of the MOF
- Civil works, foundations and structures
  - Civil work for onshore facilities
  - Civil works for marine facilities, including dredging of berth areas and turning basin; pile installation; and erection of the jetty
  - Erection of pre-assembled modules, including LNG Trains 1 and 2, the Utility area and Power Generation Unit (PGU), and two LNG storage tanks
  - Erection/Installation of structures, including the flare, gas inlet facilities, and the pipe rack to the flare
- Mechanical and electrical installation
- Systems pressure, strength and integrity testing

Phase 2:

- Installation of pre-assembled modules for Train 3
- Erection of the second marine jetty
- Erection of the third LNG storage tank (if required)
- Completion of interconnecting and utilities pre-assembled modules
- Installation of the PGU for Train 3
- Systems pressure, strength and integrity testing

Facilities required to support the construction effort include an offsite construction camp (offsite), transportation infrastructure, docks and rail receiving facilities, warehouses, materials lay down areas and construction offices, concrete batch plant and rock quarry, and utilities.

Several options are being investigated for housing project personnel during construction. The objective is to find the optimal mix of housing options that will maximize benefits to local communities and minimize negative effects, while being operationally effective. Notwithstanding the adoption of different housing options, a construction camp will still be required to accommodate the numbers of construction workers required for the Project and to effectively mobilize workers to the Site without causing undue disruption to local traffic. The construction camp will be designed to accommodate 3,850 people during Phase 1 of construction and 2,000 people in Phase 2. An area along the Ridley Island Road has been investigated for potential camp locations. The engineering, environmental and social aspects of the area will be evaluated and assessed during coming months to determine whether there is a suitable camp location. Additional areas aside from Ridley Island Road may also be investigated. An area of approximately 16 ha will be required for the camp.

Electric power required during construction of the camp and Site will be supplied from the BC Hydro grid. There are existing transmission lines to Ridley Island and the area along Ridley Island Road being investigated as a potential location for the camp. Power for construction will be supplied by tying into

existing transmission lines. No new transmission lines are planned to support construction activities. Electric power required for the Site during construction is estimated to be 10 megawatts (MW), and for the offsite camp, 8.5 MW.

2.3.1 Emissions, Noise, Discharges and Wastes

Air Emissions – Air emissions will be generated from construction activities and operation of construction equipment. Air emissions from construction activities will consist primarily of dust or particulate matter (PM). These emissions will be generated during earthwork operations, such as clearing, grading, blasting and compaction of the Site, and during construction of buildings and other structures. As dispersion of dust is expected to be less than 1 km from the Site, adverse effects on air quality during construction are considered to be local and intermittent.

Construction equipment will produce atmospheric emissions from combustion of fuels, such as diesel and gasoline. These emissions include mono-nitrogen oxides (NO_x), hydrocarbons, carbon monoxide (CO), PM, and sulphur dioxide (SO_2). These emissions are expected to be temporary and intermittent during the construction phase of the Project, producing low level reductions in air quality.

Green House Gases (GHG)s – During the construction phase, road traffic, site clearing and grubbing, and operation of construction equipment may affect GHG levels. A number of mitigation measures will be considered where appropriate, as outlined in Sections 5.1.1 and 5.1.2.

Noise – Construction noise will be generated by pile installation (sheet piling for MOF, piling for LNG jetty, tank and module foundations), by earthmoving works and equipment, facility assembly, concrete batching plant operation, rock blasting, equipment movement, bolt tightening, pneumatic testing, line cleaning and pressure testing of pipework and pressure vessels onsite. A preliminary assessment of construction noise sources is included in Section 5.1.3.

Stormwater and Accidental Discharges – Stormwater discharge during construction will be directed to the site temporary drainage system. To control the adverse effects of erosion and sedimentation on surface waters, construction activities will be conducted in accordance with a Sediment Control Plan and Stormwater Management Plan. Precautions will be taken during construction to avoid hydrocarbon spills, both onshore and in near shore areas. However, small spills and leaks of hydrocarbon (fuel, grease and oils) or other substances from construction equipment are possible. The potential for spills to enter marine waters or freshwater ponds and streams will be controlled through: trained fuel-handling personnel, establishing a Spill Prevention Plan and spill prevention procedures, equipping barges and ferries with spill containment and clean-up equipment, and maintaining spill cleanup equipment in accordance with contingency plans.

Process Discharges – Process water from construction activities includes: dewatering, spent hydrotest water, discharges from concrete batch plants, water from maintenance shops, or equipment wash water. Process discharges will be collected and reused where possible. When the waste water can no longer be reused it will be sent to a sedimentation pond, treated onsite and monitored to ensure compliance with applicable permit requirements prior to being released to the environment.

Sanitary Sewage – The construction camp and temporary construction facilities will generate sanitary sewage. During construction works prior to establishment of sewered site facilities, portable toilets will be available onsite, supplied and maintained by a licenced contractor, with offsite disposal to an appropriately licenced facility. Packaged sanitary sewage treatment plants will be used to treat sanitary

waste from the construction camp, and to treat sewage from other temporary construction facilities prior to discharge. The treatment of sanitary sewage will meet all applicable regulatory requirements.

Liquid and Solid Wastes – Liquid and solid wastes that will be generated from construction and operation of the construction camp are listed in Table 2.1. A Construction Waste Management Plan will be developed that describes procedures for minimizing, segregating, safely storing and disposing of all wastes.

Table 2.1. Wastes Generated from the Construction Camp

Liquid Wastes	Solid Wastes
• Oil and oily wastes • Adhesives and lubricants • Spent paint and solvents • Spent antifreeze/radiator coolant	• Trees, brush, vegetation (once-only waste stream during site preparation) • General inert construction debris • Dunnage and scrap timber • Empty material containers • Office waste • Food waste • First-aid medical waste • Empty aerosol cans • Scrap metal (e.g., rebar, cable and piping) • Used welding rods • Empty aerosol cans • Sand blast waste • Dredge materials

Dredgeate – The Project will require dredging. Dredging will be conducted with appropriate controls to manage re-suspension of sediment in the water column. Dredged materials will be disposed of at sea in a permitted area selected to avoid possible future redeposit in sensitive zones. To find a suitable dredgeate disposal area, regulatory authorities, Aboriginal groups and the public will be engaged, and siting studies will be conducted in 2013.

2.4 Facility Operations

The various components and activities associated with operations of the Project are summarized in Table 2.2. The three main operational activities of the Project are LNG production, ship loading and shipping. Supporting activities include utilities, security and emergency preparedness, maintenance, onsite and offsite transport, warehousing and administration.

Table 2.2. Operational Components

Production	LNG Loading	Shipping	Supporting Infrastructure
Gas receiving and metering Gas pre-treatment facilities Acid Gas (carbon dioxide - CO_2 &H_2S) removal unit Amine regeneration unit Dehydration and mercury removal unit Liquefaction unit LNG storage tanks Vapour recovery systems	LNG jetty / trestle LNG Loading Berth(s)	LNG carrier transit Tug and pilot boat operation Shipping of equipment and other materials to the MOF	MOF Fire protection and safety systems Flare and vent systems Safety, Shutdown and depressurization systems Offsite accommodation for Facility turn-arounds (Utilities and supporting services) Process control systems Site buildings Administration building (offsite) Master Control Centre (MCC) building Control and laboratory building Fire, safety & first aid building Guard houses Main switchgear building Marine terminal building Maintenance building Warehouse Security General utilities Process heating Fuel and chemical storage and handling Compressed air and nitrogen systems Power Generation

2.5 Pre-Commissioning, Commissioning and Start-Up

The Facility will be brought into commercial production in two phases. Phase 1 is the development and commissioning of Train 1 and Train 2 and Phase 2, is the development and commissioning of Train 3. PRLNG plans to commission Train 1 in 2020 and Train 2 six to twelve months later in early-to-mid 2021. Timing of Phase 2 will depend on market conditions. Once the three producing LNG trains have been progressively brought online, the Facility will have a total annual LNG production capacity of up to 21 mtpa. The average production capacity of each train will be approximately 6.5 mtpa, taking into consideration the expected average feed-gas flow rates, ambient temperature variations and long-term availability of processing equipment.

2.6 Supporting Infrastructure

Supporting infrastructure includes all permanently installed facilities that support the safe operation of the plant.

2.6.1 Marine Loading Facilities

The location of the LNG carrier berths has been selected to optimize a number of criteria, including navigational approach and departure conditions, adequate water depth at the berth face with minimum requirements for dredging, approximate alignment of moored LNG carriers with predominant current and wind directions, minimal depth for marine structures, proximity to the uplands Facility site, and optimization of cryogenic piping and manifold requirements. For the Site, the location of the LNG carrier berths aligns with the PRPA's Master Plan for future industrial developments.

Jetty – Marine infrastructure will include a jetty/trestle and loading berths to enable loading of LNG onto carriers. The jetty will be designed to accommodate LNG carriers ranging from 138,000 m^3 to 210,000 m^3 in capacity. A single jetty/trestle and loading berth will be required for operation of the first two LNG trains and an additional jetty/trestle and loading berth will be required for operation of the third LNG train.

Jetty Platform – The jetty platform accommodates the LNG loading equipment, including loading arms, vessel monitoring system, gangway tower, product delivery and vapour return pipelines and racks, and other miscellaneous equipment. The jetty platform will be approximately 60 m wide at the berth face and 30 m deep, and located at mid ship.

Access Trestle – The loading platform access trestle provides structural support from shore to the loading platform for the LNG product piping, auxiliary mechanical and electrical systems, and access roadway. The roadway is capable of accommodating service vehicles.

Breasting (Berthing) Dolphins – The primary function of the breasting dolphins is to absorb the energy of the berthing LNG carrier, to provide contact points for the moored carrier, and to provide spring line mooring points as appropriate.

Mooring Dolphins – The function of the mooring dolphins is to secure the LNG carrier's fore and aft breasting lines, and the bow and stern lines as required. The mooring dolphins are typically pile-supported structures and accessible via catwalks from the breasting dolphins.

Access Catwalks – Berthing and mooring dolphins are connected to each other and to the central loading jetty platform via access catwalks. Catwalks are prefabricated aluminum or steel truss-type structures equipped with nonslip grating, toe rails, hand rails and guardrails, and lighting.

2.6.2 Materials Offloading Facility

The MOF will be constructed early during the Project and will remain throughout the life of the Project. It will form the primary entry and exit point for the Facility throughout construction and operations, enabling movement of equipment, supplies and materials.

2.6.3 Diesel/Gasoline Storage System

An above-ground diesel storage tank is proposed for the Facility to provide fuel for engine-driven equipment, such as fire pumps and emergency generators, facility vehicles, and tugboats.

2.6.4 Chemical Storage and Handling

Storage will be provided onsite for propane and other chemicals including oils drums, heat transfer fluid, mercury removal absorbent, ethylene, bulk nitrogen, and treatment chemicals to be used by the LNG process or ancillary activities. Storage facilities, including chemical and diesel and gasoline storage systems, will be set up to prevent spills into the environment by ensuring containment integrity, secondary containment, and drainage and collection.

2.6.5 Fire Protection and Safety Systems

The Fire Protection System will be designed in accordance with applicable national and international codes and standards. Firewater will consist of a closed-loop water system that uses raw water to protect the Facility. In addition to firewater, the Facility will employ active and passive safety measures. Systems and equipment will be used to mitigate incidents associated with LNG spills and vapour releases and to protect Facility personnel, equipment, and surrounding areas.

2.6.6 Flare and Vents Systems

Flaring is a necessary but infrequent activity to ensure safe operation of the Facility. PRLNG general policy is that there should be no continuous flaring or venting of gas. The Flare and Blowdown System provides reliable and safe disposal of the hydrocarbon stream during Facility start-up, shutdown, upsets or emergency scenarios. In addition, the Flare System will dispose of hydrocarbons released during regular maintenance operations, such as, venting, draining, gas purging, and heating and cooling of equipment and piping.

2.6.7 Safety, Shutdown and Depressurization Systems

Safety, shutdown and depressurization of the Facility will be performed by the Safety Instrumented System (SIS) functions. The SIS will include separate components for each LNG process train and for ship-loading facilities, and include a combination of manual and automatic shutdown processes.

2.6.8 Process Heat System

A closed-loop, circulating process heating system will provide process-heating requirements for the amine regeneration unit, feed gas heaters, amine reclaimer, regeneration boiler, and make-up fuel gas heaters. Waste heat recovered from the liquefaction units will be used to heat the oil. The process heating system is a closed system with no venting to the atmosphere.

2.6.9 Compressed Air and Nitrogen Systems

The Facility will be equipped with a combined air system to supply compressed air for Facility utilities and instruments and feed air to the nitrogen generation system. Other uses of compressed air in the Facility include pneumatic devices, turbine air filter cleaning, general blowing and maintenance, flame generators and air dryer regeneration. The Facility will use inert nitrogen gas for purging or blanketing of equipment. Nitrogen will be produced onsite or imported.

2.6.10 Process Control Systems

The process and utility operations at the Facility will be monitored from a Central Control Room (CCR). Equipment and facilities will be installed to enable any emergency or unusual event to be evaluated, monitored and managed from within the CCR.

2.7 Shipping Activities

Shipping activities include regular transit of LNG carriers, with up to 189 vessel calls per year or three to four calls per week for Phase 1 (two trains) and an additional 95 vessel calls per year for Phase 2 (three trains), for a total of five or six LNG carriers per week; tug and pilot boat operation to support safe passage of LNG; and shipping of equipment and other materials to the MOF.

LNG carriers will move through Hecate Strait within designated shipping zones and be conducted in accordance with shipping operations approved under the *Canada Shipping Act, 2001* and by-laws established by the PRPA. LNG will typically be shipped out of the Port of Prince Rupert by PRLNG (or an affiliated BG Group entity), with LNG carriers either owned by BG Group or contracted by BG Group to carry cargo; on occasions throughout the Facility life, LNG carriers not contracted by BG Group may also be used, including situations in which LNG is purchased Free on Board (FOB) from the Facility by a third party. All LNG carriers used will have double hulls and primary and secondary containment systems. Key shipping and ferry routes in and out of the Port of Prince Rupert are illustrated in Figure 2.2 and Figure 2.3.

2.7.1 Navigational Arrangements

Outside the Port of Prince Rupert – Shipping outside the bounds of the Port of Prince Rupert and within Canadian Territorial Waters will be undertaken within established shipping channels. There are two principal routes from the pilot station at Triple Island into Chatham Sound and towards the Port of Prince Rupert. The northern route leads south of Hanmer Rocks and north of another shoal. The southern route leads south of Stenhouse Shoal and northeast of Triple Island, Osborne Islands and Rushton Island.

Within the Port of Prince Rupert – The PRPA manages all waters of Prince Rupert Harbour, and ships within this area are subject to the orders of the PRPA. The Canadian Coast Guard's Marine Communication Traffic Services (MCTS) controls marine vessel traffic in the Prince Rupert area. Prince Rupert Harbour is designated as a compulsory pilotage area under the *Pilotage Act*, and every ship over 350 gross tons is subject to compulsory pilotage. The PRPA has the authority to establish an exclusion zone within the Port of Prince Rupert, either fixed or moving, around any vessel or shore structure to ensure public safety. Large, heavy displacement vessels will normally be prohibited within two nautical miles (3.7 km) ahead and astern, and 0.5 mile (0.9 km) on either side of the transiting LNG carrier. For manoeuvring and berthing the LNG carriers, a 600 m width swing is expected to be sufficient.

2.8 Facility Maintenance

The Facility will be subject to scheduled shutdowns for regular maintenance and major overhauls. Only one train would typically be on shutdown at any one time, and the other trains would remain fully operational during these maintenance periods. Equipment will be inspected and maintained in accordance with manufacturer recommendations and Canadian Safety Association (CSA) guidelines throughout the operational life of the Facility.

2.9 Electricity/Energy

The Facility design will enable it to meet all operational energy requirements through electricity generated by burning some of its natural gas supply in onsite turbines. These turbines will be able to power the liquefaction process and also utilities, such as electrical motors, lighting and heating. Mechanical drive

turbines will be used to turn the liquefaction refrigeration compressors directly, while electrical drive turbines will generate electricity for powering utilities.

Power generation requirements of the Project are identified in Table 2.3 by power type and Project phase.

Table 2.3. Power Requirements

Drive	Phase 1 (Two Trains)	Phase 2 (Three Trains)
Mechanical Drive	400 MW	600 MW
Electric Drive	140 MW	200 MW
Total Power	**540 MW**	**800 MW**

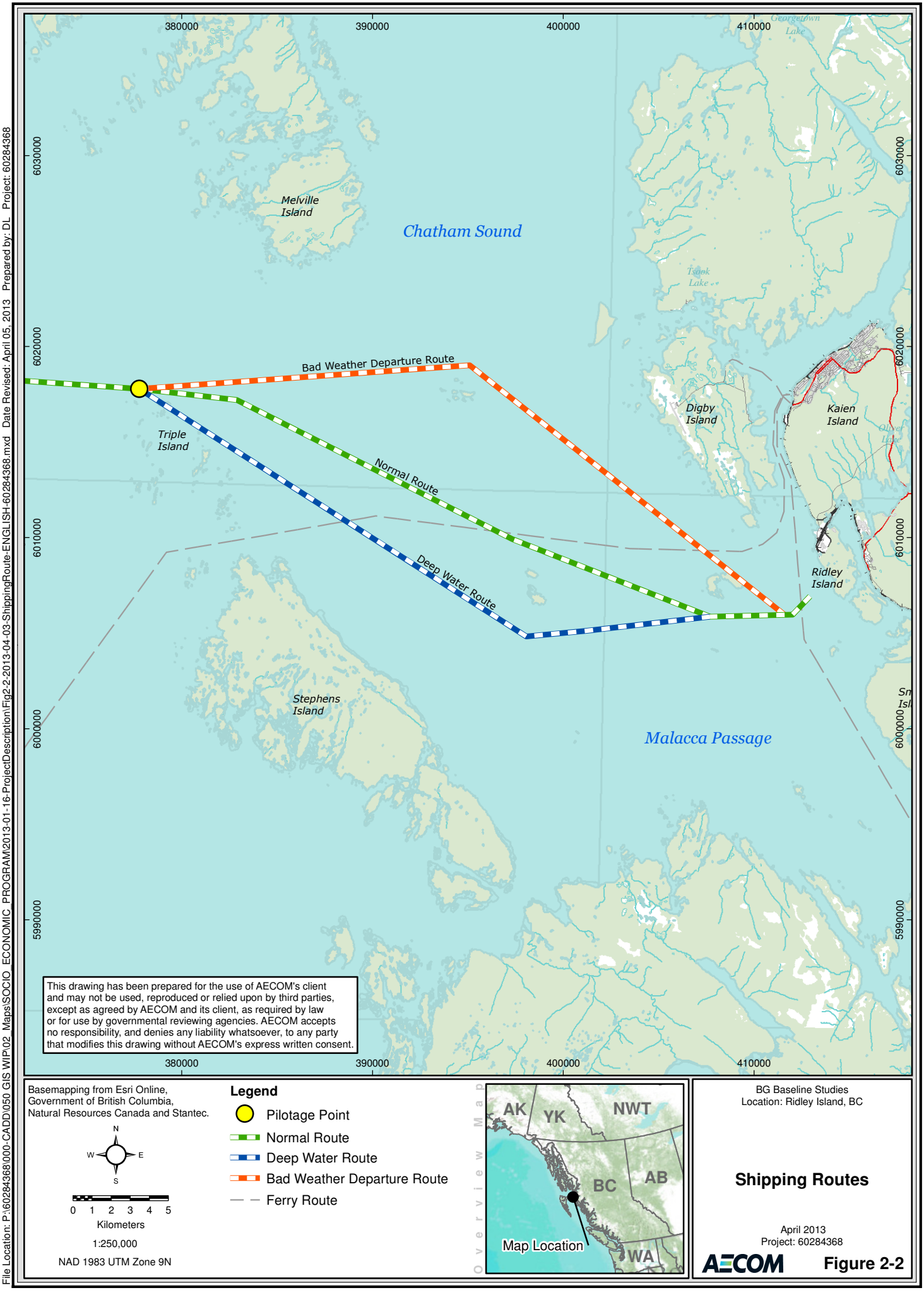
Although the Facility will be designed to be energy self-sufficient, both it and the camp will be connected to the BC Hydro grid. If reliable and sufficient, grid electrical power will be used in preference to site generated electrical power. It is anticipated that the Facility will be tied into existing power transmission lines servicing Ridley Island, while the camp will be tied into the existing line along Ridley Island Road. The length and specifications of the feeder line for the camp will be determined when a location is chosen.

2.10 Telecommunications

A telecommunication system will be required for the Site, and options currently being assessed include fibre-optic cables, telecommunication towers, an overhead connection using WI-FI (served by the existing mobile phone network), and/or a microwave system. Consultation with the telecommunications provider is ongoing to ensure integration into existing systems.

2.11 Water Supply and Management

All water required for the operation of the Facility and for providing the needs of staff and other personnel will be imported by pipeline via the PRPA's existing raw water supply as feed to water treatment systems providing potable water, demineralized water, utility water and firewater.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Stephens Island
Digby Island
Kaien Island
Ridley Island
Bad Weather Departure Route
Normal Route
Deep Water Route
Georgetown Lake
Isaac Lake
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Basemapping from Esri Online, Government of British Columbia, Natural Resources Canada and Stantec.
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Ferry Route
Overview Map
AK
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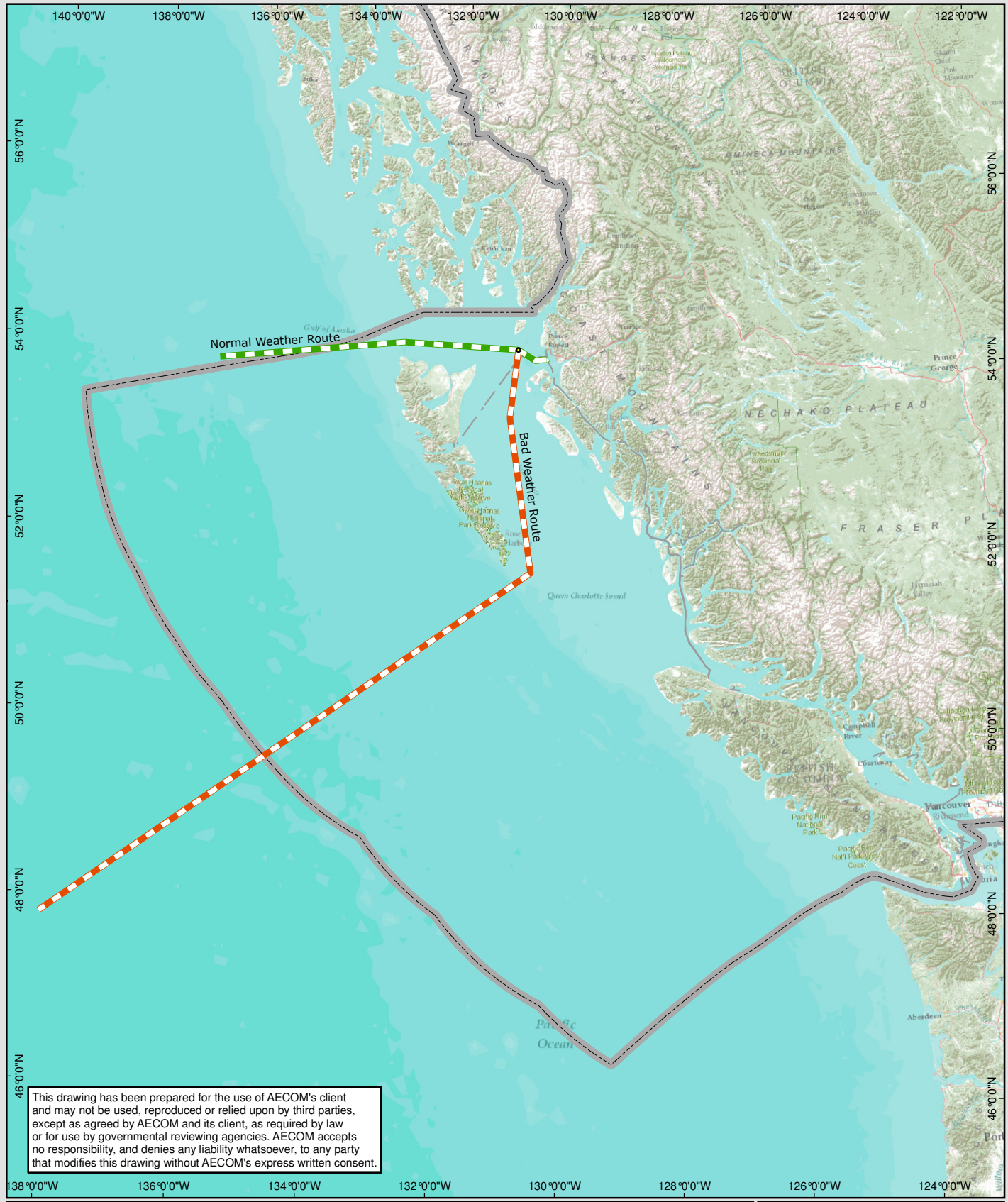
Map Location
BG Baseline Studies
Location: Ridley Island, BC
Shipping Routes
April 2013
Project: 60284368
AECOM
Figure 2-2
File Location: P:\60284368\000-CADD\050 GIS WIP\02_Maps\SOCIO_ECONOMIC_PROGRAM\2013-01-16-ProjectDescription\Fig2-2-2013-04-03-ShippingRoute-ENGLISH-60284368.mxd Date Revised: April 05, 2013 Prepared by: DL Project: 60284368



Basemapping from Esri Online, Government of British Columbia, Natural Resources Canada and Stantec.

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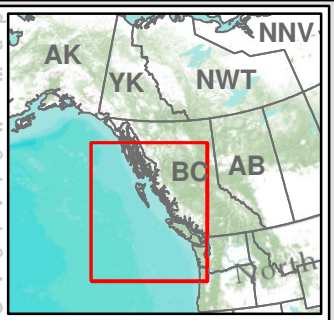
Legend

- Pilotage Point
- Normal Weather Route
- Bad Weather Route
- International Water Boundary

Overview Map



BG Baseline Studies
Location: Ridley Island, BC

Shipping Routes to International Waters

April 2013
Project: 60284368

AECOM

Figure 2-3

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2.12 Emissions, Discharges and Wastes

2.12.1 Air Emissions

The primary sources of emissions from the operation of the Facility and related shipping activities are described below.

AGRU – CO_2 and trace levels of H_2S are extracted from the natural gas feed by the AGRU. These impurities are collected and sent to the incinerator where the H_2S is combusted together with any trace hydrocarbons still present. A skimming pot collects skimmed hydrocarbons from this unit. Any vapourized hydrocarbon from the skimmed hydrocarbons is collected by the closed vent system and sent to the flare and oxidized as discussed in more detail below.

Gas Turbines – Exhaust gas will be generated from the mechanical drive gas turbines and power generation gas turbines, if used. Exhaust gas will be emitted to the atmosphere and will include CO_2, nitrogen (N_2), oxygen (O_2), water (H_2O), argon (Ar), sulphur oxides (SO_x), CO, and NO_x.

Flare Tip – The flare system is designed to safely and reliably collect and dispose of liquid and vapour hydrocarbons during upset and emergency conditions and during operational controlled events such as start-up, normal shutdown, venting and purging. Gaseous emissions to the atmosphere from flaring include CO and NO_x. These events are only occasional and of short duration.

Shipping – Emissions from shipping including LNG carriers and vessels transporting equipment, includes SO_2, NO_2, CO, particulate matter less than 10 microns (PM_{10}), particulate matter less than 2.5 microns ($PM_{2.5}$), and GHGs.

2.12.2 Noise Emissions

During the operational phase, potential noise sources may include daily operation of the Facility (air coolers, gas turbines and compressors), road traffic, marine vessel operations, and loading of LNG carriers.

2.12.3 Liquid Waste Streams

The design of the Facility includes provision for effluent collection, segregation, routing, treatment and monitoring followed by discharge to the sea once the effluents comply with discharge limits. The Facility will be designed to ensure that liquid effluents are controlled and that discharges are treated to comply with statutory limits as a minimum.

Liquid waste streams anticipated during site operation include stormwater runoff from non-process areas of the Site, process wastewater such as demineralization wastes, stormwater runoff from the Facility process areas and sanitary sewage.

Stormwater Runoff – Runoff from roads and buildings will drain to a drainage ditch system for discharge directly to the stormwater outfall. All runoff from the processing areas, process equipment and firewater system testing will be channeled to an American Petroleum Institute (API) gravity type oil separator where any oily residue will be skimmed off to a collection sump. Once fully treated, the effluent will be directed to the storm water outfall.

Hydrotest and Flushing Water – Water used during flushing and hydrotest will be collected and reused for future testing needs. When the waste water can no longer be reused it will be sent to an onsite wastewater treatment facility or to an offsite treatment facility.

AGRU – AGRU effluents are generated from the amine sludge, feed gas separator drain, dehydration unit and skimming pot drain. All oily waste will be collected and sent to an offsite oily wastewater treatment facility.

Dehydration Unit – Produced water from the dehydration unit is routed back to the AGRU.

Demineralization – Effluents in the demineralization unit include the backwash water from the sand filters, reverse osmosis concentrate, and resins regeneration solution. The backwash water from the sand filters and the reverse osmosis concentrate will be collected, tested to ensure it meets all applicable federal and provincial regulatory requirements prior to discharge to the ocean via the outfall for the non-contaminated sewer.

Oily Wastewater Treatment – Slop oil will be collected from the oily wastewater storage. The dissolved air flotation (DAF) will produce treated water and scum for disposal. Slop oil (about 10% of oil in water) will be sent to an offsite facility. The treated oily water from DAF will be discharged to the ocean once it meets all applicable federal and provincial regulatory requirements. The scum (maximum 6% of oil and solids in water) from DAF will be sent to an offsite facility.

Chemical Sewer Neutralization – Any chemicals used to clean equipment, piping, or tubing systems will be collected in the chemical sewer for neutralization. The neutralized chemical water will be routed to a tank for testing to ensure it meets all applicable federal and provincial regulatory requirements before discharge to the ocean.

Sanitary Wastewater Treatment – Sanitary wastewater from the Facility building sources will flow via an underground sewer system to centrally located lift stations. The sanitary wastewater will be pumped to the treatment units where the wastewater will undergo biological oxidation, clarification, and chlorination. The treated water will be monitored prior to discharge to the ocean to meet all applicable federal and provincial regulatory requirements.

2.12.4 Solid Waste

PRLNG is committed to continual improvement in waste management and will develop a waste management plan in accordance with relevant legislation prior to the commencement of site construction and operations. Sources of solid waste in the Facility will include administration and office buildings, plant area, amine and dehydration units, corrugated plate interceptor (CPI separator), DAF unit, and mercury adsorbent. Solid waste streams anticipated during site operations include non-hazardous wastes generated by the dehydration unit, including paper and cardboard, domestic rubbish such as food waste and hazardous wastes (e.g., waste oil and associated wastes, molecular sieve waste, used batteries and spent solvents).

Solid non-hazardous waste will be collected in a central secured area at the Site. Non-hazardous waste that cannot be recycled or reused will be disposed of in the local municipal landfill if capacity allows or in another suitable offsite facility.

Solid and liquid hazardous waste will be collected in a secure enclosed building. All hazardous waste will be shipped offsite by a licenced waste hauler to an existing licenced hazardous waste management facility. An area for bioremediation of hydrocarbon contaminated soils may be established on the Site.

2.13 Description of Related Activities

Related activities involve construction of a proposed natural gas pipeline from the Cypress Area of northeast BC to meet the demands of the Project. Development of the pipeline delivering gas to the Facility is a separate project being proposed by Spectra Energy on behalf of the company 0948090 B.C. Ltd. A project description for the pipeline was filed with the BCEAO on 18th October 2012.

2.14 Project Schedule

The federal and provincial EA processes and other regulatory approvals will influence the development timeframe. The preliminary timeline for the Project is as follows:

- Field Studies: Q3 2012 through Q3 2013
- Federal EA Process: Q1 2013 through Q4 2015
- Provincial EA Process: Q1 2013 through Q4 2015
- Permitting Approvals: Q4 2013 through Q1 2016
- Construction: Q2 2016 through Q4 2020

The duration of the key Project phases are as follows:

- Construction will be approximately 60 months for Phase 1 (Trains 1 and 2) and 42 months for Phase 2 (Train 3).
- Operational life is 30 years extendable up to another 30 years.
- De-commissioning the Site is expected to take 24 months and be completed within the applicable lease period.

2.15 Decommissioning Phase

Ridley Island is zoned for industrial use by the PRPA. It is anticipated that, at the end of the life of the Project, Site infrastructure would be removed or re-purposed to create space for another industrial development. Prior to decommissioning, a decommissioning plan will be developed in accordance with the applicable regulations.

Decommissioning activities will include dismantling the equipment and buildings, selling reusable equipment and materials, recycling scrap equipment and materials, demolishing concrete structures and disposing of the broken concrete, and generally preparing the Site for its next use in accordance with the decommissioning plan to be worked out with authorities at that time.

3. Project Location and Mapping

3.1 Project Location and Coordinates

The Project will be located on Ridley Island, BC, 17 km from the City of Prince Rupert and 15 km from Port Edward by road. The Site covers approximately 125 ha of land on the southwest part of Ridley Island. The edge of the Project footprint nearest to residences in Port Edward is approximately 850 m to the west.

The coordinates at the centre of the Site are 54.21601°N Latitude and 130.311584°W Longitude. In Universal Transverse Mercator (UTM) coordinates, the Site is located in Zone 9 at 414458 E and 6007473 N.

3.2 Land and Water Use

3.2.1 Current Land Ownership

Ridley Island is Federal Crown Land under administration of the PRPA. The Site is expected to be leased from the PRPA under a site lease agreement for at least 30 years, with an option to extend the lease for up to a further 30 years. The final location for the construction camp has not been determined; the southern end of Kaien Island along Ridley Island Road is currently being investigated for potential locations. Once the location of the construction camp is confirmed the appropriate land tenure agreements will be put in place.

3.2.2 Zoning Designations

The Port of Prince Rupert 2020 Land Use Management Plan defines the development objectives for PRPA land. The plan is consistent with use of the Site for an LNG facility. The plan underwent a comprehensive consultation program that included meetings with local community members, First Nations, the city of Prince Rupert and the town of Port Edward, port tenants and others. Input to the draft plan was obtained through an open house, and the final plan addressed a range of issues that were raised during the public consultation process.

Ridley Island is within the boundaries of the City of Prince Rupert and zoned under the City's Zoning Bylaw 3286 (2009) as "M3 – Waterfront Industrial Zone". The permitted uses within this zone include: "marine transportation use", "general industrial use" and "bulk commodity storage and terminal". These permitted uses are consistent with development of an LNG facility on the Site.

The City's Official Community Plan (OCP) supports long-term major industrial use for Ridley Island. The OCP also states that "*depending on land absorption at Ridley Island and the existing industrial park along Highway 16, the City will positively consider long term preservation of an industrial site in the southeast area of Kaien Island, accessible from the Ridley Island access*". The areas at the southern end of Kaien Island are currently zoned as "P1 – Public Facilities Zone", which does not explicitly include the development of camps. However, under description of the Long Range Land Uses the OCP indicates that the area may be used for business industrial development, including office and ancillary spaces. In light of these designations, a zoning amendment to allow camp construction will be sought if needed.

3.2.3 Crown Tenures and Permits

Crown tenures and permits in the Project area are summarized in Table 3.1.

Table 3.1. Crown Tenures and Permits

Trapline Holders	Licenced trapline area TR0614T020 covers all of Ridley Island plus a significantly larger area of the mainland around and south of Port Edward.
Guide Outfitters	There are no designated guide outfitters licenced areas on Ridley Island.
Mineral and Placer Tenures	A line of mineral tenures that stretches across the north end of Ridley Island (75.6 ha) are held by the same entity and expire May 2013. Another mineral tenure (18.91 ha) at the southern end of Ridley Island expires in September 2013.
Forest Harvest Authorizations/Forest Managed Licences	There are no active forest harvest authorizations on Ridley Island. One active Licence To Cut and two retired forestry tenures were identified near Ridley Island Road.
Active Land Act Leases, Licenses, Permissions and Permits	A Tenure and a Permit Application was identified off the southwestern coast of Ridley Island for an electric power line. A Notation of Interest for heavy industry was identified off the northwest coast of Ridley Island and on both sides of Ridley Island Road. A Licence of Occupation for quarrying was also identified along the north side of Ridley Island Road, west of Highway 16.

3.2.4 Marine Users

In 2008, there were 281 vessels calling at the Port of Prince Rupert. The PRPA expects that the number of vessel calls in 2013 will be more than 75% higher than in 2008. The combined total from the expanded Fairview Terminal, the expanded Ridley Island Inc. terminal, and the Canpotex facility will result in a total increase of 864 vessels per year by 2018. Combining this with the number of vessel calls in 2013, there would be a total of 1,357 vessels per year calling at the Port of Prince Rupert in 2018.

The Port Edward Harbour Authority maintains four separate marinas, with the closest to Ridley Island being the Porpoise Harbour Marina Complex, which can accommodate about 350 vessels. It is located in Porpoise Harbour on the western side of Port Edward.

3.2.5 Communities and Residents

Port Edward is the community closest to the Project, with the nearest residences about 850 m from the nearest edge of the project footprint on the opposite (east) side of Porpoise Harbour from Ridley Island. Prince Rupert is located north of Ridley Island and is over 10 km from the Site. The two closest First Nation reserves are Metlakatla and Lax Kwa'alaams. The population of the region has been declining recently.

3.2.6 Aboriginal Lands / Resource Involvement

The Tsimshian, or "People of the Skeena," are a group of linguistically and culturally related First Nations that occupy the northwest coast of BC and the southern tip of the Alaska Panhandle. The "Coast Tsimshian", a group that includes the Lax Kw'alaams and Metlakatla First Nations, have occupied the area along both the lower parts of the Skeena River and the nearby coast, and assert traditional territories in the Prince Rupert area that include the Site on Ridley Island and areas along related shipping routes.

The “Southern Tsimshian”, a group that includes the Gitxaala First Nation, also assert traditional use and territory that includes the Site. The “Canyon Tsimshian” includes the Kitselas and Kitsumkalum First Nations, occupying the upper Skeena River valley and having current and historic traditional use and territories that extend to the coast and to the Prince Rupert area and coastal waters. Information on traditional use of lands and resources by Aboriginal groups is described in Section 6.2 of the Project Description.

3.2.7 Reserve Lands

The only First Nations with reserves close to the Project site are Metlakatla and Lax Kw’alaams. The closest reserve lands are the community of Metlakatla located approximately 12 km from the Site.

4. Federal and Provincial Involvement and Regulatory Requirements

4.1 Federal Financial Support

There is no proposed or anticipated federal financial support associated with the Project.

4.2 Federal Lands Requirements

The Project will be located on Federal Crown Land under the administration of the PRPA. The land will be leased from the PRPA.

Some facilities, such as the construction camp, contractor storage areas, borrow areas, and warehouses, will be located offsite on Provincial Crown Land or Prince Rupert municipal lands.

4.3 Federal Legislative Requirements

Section 1.3 discussed the legislative provisions that identify the Project as a project requiring an EA under both the CEAA and the BCEAA. PRLNG has identified other federal permits, licences approvals and authorizations that may be required for the Project (Table 4.1).

Table 4.1. Federal Permits, Licences, Approvals and Agencies

Responsible Agency	Description of Federal Permits, Licences and Approvals	Activity
Environment Canada (EC)	Disposal at Sea Permit *Canadian Environmental Protection Act s. 125(1) (b)*	Disposal of marine sediments at an off shore disposal site. Dredging is required around the MOF and LNG jetty to achieve a safe navigation depth.
National Energy Board (NEB)	Export Licence *National Energy Board Act* s. 117	Exporting LNG outside of Canada to international markets.
Canadian Transportation Agency (CTA)	Approval *Canada Transportation Act* s.101	Crossing railway lines for infrastructure on Ridley.

Responsible Agency	Description of Federal Permits, Licences and Approvals	Activity
Transport Canada (TC)	Approval *Navigable Waters Protection Act*	Construction of temporary and permanent off-loading docks and the LNG berth.
	Certificates of Compliance *Marine Transport Security Act* *Marine Transportation Security Regulations*	Operation of the Facility, port and carrier.
Fisheries and Oceans Canada (DFO)	Authorization to create harmful alteration, disruption or destruction of fish habitat (HADD) *Fisheries Act* s. 35.2	Activities that may result in HADD include construction of: • facilities on the foreshore of Ridley Island. • temporary and permanent docks and the LNG berth. • temporary and permanent infrastructure in and around streams.
Natural Resources Canada (NRC)	Licences/permits for explosives *Explosives Act* s. 7(1) *Explosives Regulations*	Explosives will be used during construction. Activities that may require licences and permits related to the use of explosives include: • Transportation • Storage • Blend or manufacture for use

4.4 Provincial Regulatory Requirements

PRLNG has identified provincial permits, licences and approvals that may be required for the Project (Table 4.2), including the name of the approval, the activity it covers, applicable legislation and the granting agency.

Table 4.2. BC Permits, Licences, Approvals and Agencies

Responsible Agency	Authorization or Requirement and Applicable Statute	Activity
BC Oil and Gas Commission (BCOGC)	Facility Permit *Oil and Gas Activities Act* s. 21	Construction and operation of the Facility.
	Licence to Cut *Forest Act s. 47*	Removal of timber from Provincial Crown Land to clear sites for the construction camp and ancillary construction facilities (e.g., contractor lay down areas, warehouses etc.).
	Tenure on Provincial Crown Land *Land Act* ss. 39 and 40	Use of Provincial Crown Land for the construction camp and ancillary construction facilities.
	Waste Discharge Permit *Environmental Management Act* s. 6(5)	Facility air emissions, effluent discharges, and waste disposal. Waste incinerator for the construction camp.
BC Ministry of Environment (BCMOE), Water Stewardship Branch	Short Term Use of Water *Water Act* s. 8	Water may be needed for temporary construction facilities on Provincial Crown lands that may require diverting and using surface water for a period of <12 months.
	Long Term Water Licence *Water Act* s. 7	Water may be needed for construction facilities on Provincial Crown lands that may require diverting and using surface water for a period of >12 months.
BC Ministry Lands and Natural Resource, Archaeology Branch	Heritage Inspection Permit Heritage Investigation Permits *Heritage Conservation Act* s. 14	Archaeological surveys to support the environmental impact assessment on Provincial Crown Lands.
	Site alteration permit *Heritage Conservation Act* s. 12	Alteration of archaeological values (if any are found) that may be disrupted by construction of facilities on Provincial Crown Land.

Responsible Agency	Authorization or Requirement and Applicable Statute	Activity
BC Ministry of Environment (BCMOE), Environmental Protection Division	Authorization for Sewage facilities *Environmental Management* Act *Municipal Sewage Regulation* *Sewerage System Regulation*	Sewage facilities for the construction camp > 100 persons and registered with the Ministry of Environment at least 90 days prior to constructing the Facility.
BC Interior Health Authority (BCIHA)	Permit *Public Health Act s. 19* *Industrial Camp Regulation*	Construction and operation of the construction camp.

5. Project Setting and Potential Effects

Information for the Project setting has been collected from desktop studies conducted between 2011 and 2012 and fieldwork conducted in 2012. These studies were conducted as part of PRLNG's due diligence for the Project to determine project feasibility and assess project risks, and were also designed to support the EA.

5.1 Natural Environment

5.1.1 Climate

A baseline technical analysis of climate was conducted for the region. The baseline data for meteorology will focus on information for the City of Prince Rupert, and the District of Port Edward, and regional factors influencing local weather. The Prince Rupert Airport meteorological station is the closest reliable long-term EC weather station, and provided historical regional climate and wind data. In October, 2012, AECOM installed a dedicated climate station in Port Edward. This station measures temperature, wind speed and direction, barometric pressure and solar radiation. Ridley Island lies within the Pacific climatic region of Canada that extends less than 150 km inland. Because of the prevailing westerly circulation of mild, moist air off the Pacific, this climatic region is characterized by cool summers and mild winters**.** Mean monthly precipitation ranges between 114 mm and 379 mm, with the greatest monthly precipitation falling in October and the least in July.

Further work during the EA will focus on determining Project effects on GHG emissions. The emission of GHGs is one factor that has the potential to effect climate change. For the Project, there are expected to be emission sources and activities that have potential to lead to alterations of the GHG baseline levels. A number of mitigation measures will be considered where appropriate during project design, construction and operations to limit emissions of GHGs. GHG offset projects will also be considered and implemented as appropriate for the Facility.

5.1.2 Air Quality

PRLNG established an air quality monitoring station in the community of Port Edward at 800 Alder Avenue in August 2012 to acquire current data for CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$. These parameters are continuously monitored and logged on an hourly basis and are being monitored for a six-month period.

The monitoring data collected from this station between September and November 2012 serves as the current reference of existing air quality setting in the area. Monitoring data for each parameter were all

well below BC Air Quality Objectives and Standards (BCAQOS), and the National Ambient Air Quality Objectives (NAAQO).

The planned work program for climate and air quality includes continued ambient monitoring, development of emissions inventories and air dispersion modelling. A number of mitigation measures will be implemented during Project planning, construction and operations to limit emissions of CACs, where appropriate.

5.1.3 Sound

Sensitive areas for the acoustic environment include dwellings and public areas, such as schools, campgrounds, marinas, and parks. Receptors nearest to the Project are in Port Edward, where sound levels are currently affected by rail, road and industrial sources. Industrial sources of sound include the grain and coal terminals on Ridley Island, and a fish processing plant and associated coolers in Port Edward.

A seasonal baseline sound monitoring program has been initiated at Port Edward. The sound monitoring program commenced in August 2012 and will continue each quarter through to summer 2013. Only summer and fall 2012 data have been collected to date. Sound level meters (SLMs) with microphones mounted on tripods were installed at five locations in Port Edward, with the one nearest the project footprint about 800 m to the east. The data indicate that existing sound levels in Port Edward are higher than expected for a rural area and are more characteristic of an urban area. Baseline sound levels near the study area will increase before the Project begins construction due to other projects and higher rail traffic. The projected increase in transportation and industrial sources will be added to the existing baseline as part of a cumulative effects assessment for the acoustic environment. It is important to identify an appropriate future baseline condition that includes future projections of industrial and transportation sound emissions. This baseline will be important to gauging and assessing potential effects of the Project on the acoustic environment.

Planned work for the acoustic program includes continuing seasonal sound monitoring for one week in winter and one week in spring, and assessing Project effects through noise modelling.

Mitigation measures that may be appropriate during Project construction include notifying Port Edward residents of significant sound-causing activities, scheduling these activities for the least disruptive times, muffling internal combustion engines, use of acoustic screening and limiting louder activities to daytime.

During operations, sound mitigation measures that may be appropriate include berms and vegetation to function as sound barriers, insulating shielding on the LNG transfer line, containing loud equipment within shelters (where practical) and controlling ship idling time during unloading and loading. If deemed appropriate from the modelling assessment, mitigation of sound from buildings that house loud equipment (e.g., co-generator facility) will include wall sound transmission class (STC) of at least 50, minimal and non-operable windows, perimeter seals on metal insulated exterior doors and silencing elements on building ventilation equipment.

5.1.4 Groundwater

The upper metre of soil on most of Ridley Island is an organic veneer of peat, with smaller areas of glacial marine silt and clay deposits and bedrock outcrops. Organic peat materials common throughout the southern portion of Ridley Island are mainly associated with bog wetland ecosystems. Test pits and

borings completed on areas just north of the Site for other studies indicated that perched groundwater levels and seepage zones occur within lower portions of the peat or underlying sand layers. Below these relatively shallow, unconsolidated deposits is grey, foliated, metamorphic bedrock.

The bedrock is slowly permeable and does not form a productive aquifer. Groundwater flow from the Site is inferred to be toward the ocean. There are no groundwater supply wells onsite or within a 500 m radius, and there is no potential to develop groundwater supply wells due to the low permeability of the bedrock and the proximity to saline marine waters. Groundwater flow within the bedrock likely contributes little to stream base flows. Baseline groundwater quality will be evaluated during 2013 field investigations.
Geologic conditions for potential camp sites along Ridley Island Road are generally similar to those of Ridley Island, though surface grades are generally steeper and better drained.

Baseline groundwater assessment at the Site, including installation of monitoring wells and flow and quality measurements, will be conducted in 2013 to further identify potential effects. The camp area will be assessed once selected.

Clearing the Site of the shallow organic soils and wetlands to allow industrial development will tend to lower groundwater levels locally. This is unlikely to affect any aquatic receptors as groundwater base flow volumes discharging to local creeks are expected to be less than 10% of average flows.

During construction and operations, groundwater quality could be affected by spills of chemicals or fuels from mobile and stationary equipment and storage tanks onsite that, if allowed to seep into the soils, could enter the groundwater system. During construction, best management practices for fuel and chemical storage and handling will be used, including provision of secondary containment. Proper emergency response plans and rapid cleanup of any spills that do occur will reduce any potential impacts on groundwater quality. These procedures will be part of the Stormwater and the Emergency Response construction management plans for the Project.

5.1.5 Hydrology and Surface Water Quality

Surface water at the Site is associated with sphagnum bogs, and small streams draining to the foreshore. PRLNG has established a sampling program of streams and wetlands in the Project area and at three locations along Ridley Island Road to determine current water quality conditions. The water in most areas is acidic due to the sphagnum bogs that they drain. Preliminary results have confirmed the low pH of many of the small streams on the south end of Ridley Island. One stream on the northwest corner of the Site has more neutral pH. The streams along Ridley Island Road also have more neutral pH.

Water quantity data are being collected at the same time and at the same locations as water quality data. Water quantity investigations include flow measurements that will be used to determine whether flow and water chemistry are correlated. Hydrology data will also be used to correlate site-specific observations with regional data collected from the Kloiya River, the nearest station operated by Water Survey of Canada (WSC); the Kloiya River watershed is about 8.5 km northeast of the Project area. Water quality and quantity sampling will continue until June 2013, providing 12 months of data that will be summarized to characterize baseline conditions at the Facility and camp site.

During construction, run-off will be managed to control release of sediment laden water outside the Facility or construction camp. A construction Stormwater Management Plan will be developed to include best management practices for protecting the quality of runoff, including directing clean water away from construction areas, containment of contaminated water onsite as necessary, proper storage of

substances that can affect water quality, and emergency spill procedures. The stormwater systems will be designed to accommodate anticipated rain levels.

The stormwater system design for facility operations will be similar to that of the construction phase in that clean water will be diverted around the Facility and rainwater landing onsite will be directed to the stormwater collection system, that will include as oil/water separators and other appropriate containment and treatment systems to ensure that stormwater discharged into receiving waters meets all applicable water quality criteria. Spill containment equipment and emergency response plans will be in place to deal with accidents and malfunctions.

5.1.6 Freshwater Fish and Fish Habitat

Numerous small streams drain the Site and areas along Ridley Island Road. Coastal areas adjacent the Site on Ridley Island also provide fish habitat. Previous studies indicated that most streams within the Site area were non-fish bearing. The streams drain several sphagnum bogs in the center of the property, and the water has a very low pH, and is unsuitable for fish. Streams along the western half of Ridley Island Road have continuous water flow and suitable water quality and are known to support Dolly Varden and Cutthroat trout. Field surveys of an unnamed tributary, identified as Site 9, which drains the northwest corner of the property, revealed the presence of sculpins and threespine sticklebacks.

The habitat values along the shoreline of the PRPA area have been classified into high, medium and low value habitat in a 2011 World Wildlife Fund study. This study classed much of the western shore of the Site as having moderate value habitat. The small bay into which Site 9 Creek flows was rated as high value habitat due to the diversity of the shoreline (mix of bedrock, gravel and sand) and presence of small pockets of eelgrass. The southern shore of Ridley Island is also rated as high value habitat because of the diversity of habitat types and extensive marine vegetation (algae and grasses) present.

Future fisheries work includes a spring 2013 field visit to determine if the streams in the vicinity of the Project support spring spawning, as there is no available information on spawning habitat use of Site 9 Creek or creeks along Ridley Island Road. As the Project plan suggests that the project footprint will affect the intertidal area and Site 9 Creek, additional work will be required to identify elements of a fish habitat compensation plan.

The construction camp search area along Ridley Island Road includes a number of small, fish bearing streams that could be affected by camp construction. Other measures to mitigate any habitat effects could be accomplished through identifying opportunities for habitat improvement or enhancement at other sites in the vicinity of Ridley Island. As described in the water quality section, best management practices applied during construction will control impacts to fish and fish habitat outside the project footprint.

5.1.7 Marine Ecosystems

The Site includes both intertidal and subtidal areas. The intertidal has rocky areas covered by algae, isolated open spots with cobble and sand, larger pocket beaches, and eelgrass patches. There is distinct zonation correlated with tidal heights. Presence of potentially suitable habitat in the lower intertidal and shallow subtidal zones suggests that these areas may support the special-status northern abalone, although none were observed during surveys. The subtidal environment includes both soft substrates and hard, rocky substrates. In areas of soft sediment, most animals live within the substrate.

Marine Mammals – Surveys for marine mammals have been conducted using both vessels and passive listening devices (hydrophones). Fall 2012 surveys identified harbour porpoise, Dall's porpoise, harbour seals, Steller's sea lions, humpback whales, and transient killer whales. Additional surveys are planned for winter, spring and summer 2013.

Marine Birds – Use of the area by marine birds was studied using vessel-based transect surveys designed to identify species in the marine portion of the Project area, including Chatham Sound. Over 40 species were identified, including Alcid species, such as Marbled Murrelets, and gulls and waterfowl of numerous species. Raptors, such as Bald Eagles and Peregrine Falcons, were also observed, along with documentation of the southernmost colony of Black-legged Kittiwakes reported in the scientific literature. Three surveys were completed in 2012 representing summer residents, fall migrants, and overwintering birds. One additional survey will be completed in 2013 to assess spring migratory birds.

Marine Fishes and Crustaceans – Use of marine waters at the Site by marine fish and crustaceans is being determined by a combination of local sampling of non-commercial fish supplemented by analysis of commercial and recreational catch data for the area. Fish sampling methods included using a modified otter trawl, beach seine, and varying sizes of small meshed gillnets. Prawn/shrimp and crab traps were also used. Beach seining collected various fish species, with northern sculpin being the most abundant species caught. Small meshed gillnets set parallel and perpendicular to the shoreline also collected fish of various species, with surf smelt the most abundant. In the crab pots, mostly undersized female Dungeness crabs were caught as well as sunflower starfish. On a few occasions, fish were caught in the crab pots: halibut, starry flounder and rock sole. In the prawn/shrimp pots, coonstripe shrimp, spiny pink shrimp and spot prawns were caught along with a few fish. Generally the otter trawl yielded few usable fish data, reflecting the absence of smaller fish in the nearshore area. The fish survey was completed in late summer of 2012. It will be repeated in early spring 2013 to assess migratory species and again in early summer to assess resident fish.

Marine Habitats – Assessment of marine habitats at the Site included direct and indirect observations. Intertidal habitats were surveyed by on a series of low, low tides. Habitats included protected sandy beaches, eelgrass beds, and high-energy bedrock shoreline covered by kelp and red algae. The diversity of habitats related to the amount of exposure or protection. Submerged habitats consisted of isolated rock outcroppings within sandy or muddy flat areas. Due to high turbidity, the submerged habitat was defined using high-resolution bathymetry and side-scan sonar, which yielded composite renderings of the substrate. In areas where features suggested eelgrass or other transition zones, towed video transects recorded the bottom, and results were used to ground truth the benthic habitat characterization. Physical observations were supplemented by grab samples of soft sediments to assess benthic infauna.

The Project may result in potential effects to the marine environment. To accommodate the Facility and maintain an appropriate setback from the community of Port Edward, the project footprint will extend into the marine intertidal area. Based on a preliminary site layout this encroachment below the high water mark totals about 10 ha and will affect both high and medium value habitat along the foreshore. The Facility design will minimize the footprint to keep the effects as small as feasible. Substantial structures built into the intertidal area will be designed to limit the loss of fish habitat and partially mitigate habitat losses. Opportunities to offset the loss of fish habitat can include the design of the structures used to support the sections of the Facility that would extend into the intertidal area.

A fish habitat compensation plan will be developed. PRLNG will work with First Nations and key stakeholders to identify suitable candidate sites for habitat compensation and develop collaborative programs to restore or enhance habitat functions and values.

During construction of trestles and dredging of berthing areas and turning basins, deposition of materials into intertidal and subtidal zones may result in loss of habitat, increased turbidity, changes in types, intensities, and durations of sounds, and changes in animal behaviours and numbers.

During operations there will be a variety of effects, including waste water discharges, presence of large and small vessels, periodic disturbance of benthos from propeller wash and maintenance dredging, and new lighting sources.

During both construction and operations the Project will increase sound in the marine environment, which may affect the ability of marine mammals to communicate, forage, and orient themselves spatially. These changes could disrupt behaviour and reduce the use of the area by some individuals. Increased vessels traffic in the area could result in an increased potential for vessel strikes. Best management practices for runoff of stormwater and management of noise, air emissions, and lights will all be incorporated into the project design.

Mitigation measures that may be appropriate include minimizing the project footprint, incorporating rugosity and refuge areas into design of the shoreline, controlling lights shining into the water, controlling water withdrawals and discharges and designing infrastructure to maximize mixing with ambient water, collecting stormwater runoff and releasing it to the ocean after verification that it is free of contaminants, avoiding blasting or other noisy construction activities when marine mammals are in the area, limiting vessel speeds to reduce noise and limit the potential for vessel strikes, and employing effective measures during dredging to limit turbidity and localized sedimentation.

5.1.8 Terrestrial Ecosystems

Habitats in the study area will be classified by Terrestrial Ecosystem Mapping (TEM) in the context of the Biogeoclimatic Ecosystem Classification System for BC, which lists habitats as the Coastal Western Hemlock – Very Wet Hypermaritime Subzone – Central Variant (CWHvh2). Forests in this subzone are dominated by Western hemlock, Western red cedar, Sitka spruce and shore pine. Wetland vegetation is dominated by low-growing shore pine, yellow cedar, common juniper, and peat mosses. The climate of Ridley Island is hypermaritime, receiving more than 2,500 mm of precipitation each year (most of this falling as rain). Temperatures in summer and winter are relatively cool due to the high latitude and moderating influence of the Pacific Ocean. The Site and construction camp locations are near current mean sea level with subdued relief. The area is dominated by temperate rainforests and bog wetlands.

Field surveys for the Terrestrial Ecosystems Program fall into the following categories:

- **Landforms and Soils** – part of TEM surveys to ground-truth air photo interpretation.
- **Vegetation** – TEM surveys to ground-truth air photo interpretation and surveys for rare plants and ecological communities, with initial TEM surveys undertaken July 17 to 23, 2012, and further surveys planned for 2013.
- **Wildlife and Habitat** – including breeding bird, raptor, amphibian and wetland surveys conducted during summer 2012, with further surveys planned for 2013.

Landforms and Soils – Rock types on Kaien and Ridley Islands are mainly schist and gneiss consisting of relatively narrow alternating horizons of thinly fissile and more massive rocks. The contemporary landscape reflects both the geological origins and the glacial and post-glacial history of the region.

Bedrock along with Organic and Morainal deposits is expected to be the most common surficial material throughout the area due to its physiographic nature.

Vegetation – Based on general range, more than thirty listed species of plants have the potential to occur in the study area, including nine blue- and red-listed plant species, subspecies and varieties. The blue-listed, Alaska holly fern and Gmelin's sedge have been located along the western and southwestern shoreline of Ridley Island, and the latter is the only listed species that has been found within the project footprint. The study area is also within the ranges of 16 red- and blue-listed ecological communities, of which one red-listed and four blue-listed ecological communities have been recorded in the study area. One blue-listed ecological community has been found within the project footprint: Western redcedar – Sitka spruce / Skunk cabbage – CWHvh2/13 (Ws54).

Wildlife – Wildlife species of concern that have been recorded or potentially occur in the study area include the western toad and coastal tailed frog, both listed as Special Concern (SC) under the federal *Species at Risk Act* (SARA); the Queen Charlotte subspecies of the Northern Goshawk (aka. Queen Charlotte Goshawk), a SARA Threatened species; the Western Screech-owl and the Pacific subspecies of the Great Blue Heron, both of SARA Special Concern; and the little brown myotis bat, which has been recommended for the SARA endangered list by COSEWIC. Keen's long-eared myotis bat and the northern tightcoil snail are provincially red- and blue-listed respectively, but are not categorized under SARA. The western toad, Great Blue Heron, and little brown myotis were found in the study area during 2012 field surveys. The coastal tailed frog, Queen Charlotte Goshawk and Keen's long-eared myotis were not detected during preliminary surveys conducted in 2012 but, as the study area may offer suitable habitat, follow-up surveys will be undertaken in 2013. Surveys will also be conducted for the Western Screech-owl and northern tightcoil in 2013. Surveys in 2013 will include bats, raptors and owls, breeding birds, and wetlands. These surveys will be required for the baseline and to prepare and run models that will assess habitat suitability, including that for Marbled Murrelet, Northern Goshawk and black bear.

The Project and the associated temporary infrastructure will remove habitats from a portion of Ridley Island and the construction camp area. This removal will result in permanent loss of some occurrences of rare ecological communities and potential loss of some rare plants. Consideration will be given to relocating rare or listed plants. Potential effects of the Project on wildlife are being examined with respect both to potential effects on wildlife habitat and to potential effects on movements and mortality.

PRLNG will, in accordance with its Environmental Standard, work with First Nations and key stakeholders to identify opportunities to compensate for loss of biodiversity. Mitigation measures that may be appropriate include: relocate rare or listed plant species; limit tree-clearing or habitat-altering activities to time periods outside critical life stages; avoid habitat features important to wildlife where possible; use existing roads, clearings and watercourse crossings whenever possible; confine all Project traffic to designated access roads and construction sites; limit the size of the temporary workspace to the greatest extent possible; deactivate and remove unused roads and construction sites and revegetate with native vegetation; maintain habitat connectivity, wherever possible; practice zero tolerance on feeding of wildlife; and carefully manage all garbage.

5.2 Economic Environment

Prince Rupert is the largest city in the Skeena-Queen Charlotte Regional District and provides employment and commercial services for residents of the surrounding communities of Port Edward, Lax Kw'alaams, Metlakatla and beyond. Historically the economic drivers in these communities were the fishing and forestry industries, but these industries have faced significant economic challenges and have

declined in importance. More recently, the Port of Prince Rupert has seen expansion and job creation and Port facilities are a key local employer. The Port of Prince Rupert has plans to continue expansion, including the Road Rail Utility Corridor and Phase 2 of Fairview Container Terminal.

5.2.1 Employment

The Project will create local employment opportunities during construction and operations, including those directly employed by PRLNG (or affiliates), those employed by contractors to the Project, and those employed by companies supplying goods and services to contracted companies. The Project will also create spin-off employment in other sectors as wages are spent purchasing local goods and services. The area currently has relatively high unemployment rates compared to BC as a whole.

5.2.2 Skills and Training

The Project will require a range of labour, from highly skilled specialists, through skilled trade occupations, to general labour. Stakeholders and Aboriginal Groups have identified skills and training as being a barrier in achieving higher local employment in major projects.

5.2.3 Income

Workers taking employment at the Project will generally be doing so to receive higher wages or as an opportunity to move from unemployment or under-employment. This trend can be expected to lead to higher median wages in local communities. The high levels of capital expenditure and Project employment will also lead to higher levels of spending on local goods and services, which can lead to beneficial income effects in other sectors.

5.2.4 Commercial Resource Use

Harvest of marine resources by both the commercial and recreational fishery is recorded around Ridley Island and the surrounding area. Locations for guided recreational fishing and marine-based wildlife viewing are wide ranging in the Hecate Strait region and not centred on the area around Ridley Island. Though a registered trapline area covers the project footprint, public access is not currently permitted on Ridley Island.

The Project will create employment opportunities for people in the local communities, the broader region, and beyond. The level of local employment uptake will depend on availability of skilled labour. Project demand for skilled labour may lead to lower labour availability for other businesses and projects in the region; similarly, these projects will affect labour availability for the Project. Project expenditure and employment will generally lead to higher local incomes, and to higher spending for other goods and services.

The movement of LNG carriers will affect the free movement of marine traffic in the immediate vicinity of Ridley Island, and may create some inconvenience for commercial fishing, guided recreational fishing, and marine-based wildlife viewing operators. There may also be biophysical effects on marine resources. If such effects are anticipated, their implications for commercial use will be assessed.

Measures available for creating economic opportunities and mitigating any negative economic effects include: supporting local and regional skills, training and employment initiatives that aim to maximize

opportunities for local people; developing an employment and training strategy that aims to maximize employment opportunities for local and First Nations communities; engaging with the local business community and First Nations to communicate Project opportunities for contractors and identify mutually beneficial business opportunities; and providing navigation aids and communication for the benefit of other marine users.

5.3 Social Environment

During the construction workers will be accommodated in a camp, which will lead to a relatively large increase in the number of people living in the area, as well as a short term requirement for local services and a shift in local demographics to a higher population of young to middle-aged males. There are a range of measures available to mitigate social effects from the Project, including a camp management plan that is sensitive to local needs for worker movement and use of services, while creating opportunities for positive economic and social effects for the local community.

5.3.1 Infrastructure and Services

Labour demand for the Project will first be sourced from local communities and then from workers moving in from other areas. These workers will be either previous residents of Prince Rupert and the surrounding communities, or new residents. Population increase created by workers and their families can bring about positive effects as higher populations support higher levels of local services and community vitality. Negative effects may also occur as a result of higher demand for services, particularly in the short-term before service provision rises to meet demand.

5.3.2 Housing

The BC Northern Real Estate Board reported that, as of July 2012, the average home selling price in Prince Rupert declined from $193,534 in 2011 to $193,223, but, at 65 the number of homes sold during the first six months was the highest of any of the previous four years. In the rental market, the Canadian Housing and Mortgage Corporation (CMHC) reported that the vacancy rate for “Privately Initiated Rental Row and Apartment Structures of Three Units and Over” in Prince Rupert fell from 12.7% in April 2011 to 12.0% in April 2012. No housing statistics were available for Port Edward.

5.3.3 Health Services

The Prince Rupert Regional Hospital serves Prince Rupert, Port Edward, Lax Kw'alaams and Metlakatla. The hospital has 24 beds, including 20 acute care beds, 2 maternity beds and 2 intensive care beds and is staffed by in-house surgeons for general surgery, obstetrics-gynecology and orthopedics, and a range of permanent specialists and specialists who visit at least monthly. Other facilities include the Acropolis Manor, a modern residential care facility

5.3.4 Education

School District 52 (Prince Rupert) provides primary and secondary education to Prince Rupert, Port Edward, Metlakatla, Gitxaala, Hartley Bay, Lax Kw’alaams, Dodge Cove, and Gingolx (Kincolith). There are nine schools in Prince Rupert and Port Edward, seven of which are public. An independent school is listed in Lax Kw’alaams, but no enrollment data are available from the BC Ministry of Education. At the

post-secondary level, the major education provider in Prince Rupert is Northwest Community College (NWCC). The main campus of NWCC is based in Terrace where the majority of their training programs are offered. Other educational support, in the form of Grade 12 upgrade, essential skills, employment readiness, and employment services, is available in the area from the Hecate Strait Employment Development Society. In addition, the Metlakatla Development Corporation (First Nations Training and Development Centre) and the Native Education College offer Grade 12 upgrade.

5.3.5 Emergency Services

The Prince Rupert Fire Rescue Department currently consists of a Fire Chief, Deputy Chief, four shift Captains and 13 career Fire Fighters, and an Auxiliary Department is being organized. The Prince Rupert RCMP has 28 regular members, with the Rural Section serving communities stretching from Port Simpson to Hartley Bay.

5.3.6 Community Belonging and Crime

According to the 2012 Health Profile for the Northwest HSDA, at 76.6% the sense of community belonging was more than seven percent higher than the BC average. The Skeena-Queen Charlotte Regional District ranked sixth highest among 26 regional districts in the province for the Composite Index of Crime between 2008 and 2010, but third highest for serious violent crime and fourth highest for serious crime overall. According to the Crime Severity Index the Prince Rupert Municipal policing jurisdiction ranked 10th and Prince Rupert Provincial ranked 20th out of 170 jurisdictions in 2010, indicating relatively high levels of crime.

5.3.7 Recreation

There is currently no public access to Ridley Island and so no effects to recreational use are anticipated. The areas on south Kaien Island that may be used for a construction camp have been identified as having recreational value, including walking for local residents. Changes in land use may affect the accessibility or amenity values of this area for recreation. Ridley Island can be viewed from the residential areas of Port Edward, as well as by marine traffic to and from the Porpoise Harbour Marina Complex and around the Island. Development on Ridley Island will lead to a visual change for viewpoints from Port Edward and from the water surrounding Ridley Island.

5.4 Heritage

The Archaeological Overview Assessment (AOA) identified that there was potential for archaeological sites to be found. Field study will be used to determine the precise location of previously recorded sites and to identify any unrecorded sites that may be present in the project footprint. The development on Ridley Island will require the clearance of tree stands including culturally modified trees (CMTs), as well as any other archaeological sites identified during site fieldwork. This clearance will be done after consultation with First Nations and as directed by regulatory agencies.

5.5 Health

Baseline health data are available for the Northwest Health Service Delivery Area (HSDA), which includes Prince Rupert, Port Edward, Lax Kw'alaams, Metlakatla, and other communities in the northwest region.

Health indicators for the Northwest HSDA are generally below the BC average, including physical and mental health, injury rates, mortality from preventable and treatable causes, chronic disease, obesity, and hospitalization rates.

The Project has the potential to affect human health outcomes through the release of emissions, changes in availability of local health services in light of increased demand, and changes in the harvest availability and consumption patterns of land, shoreline and marine country foods. Injury and accident rates may be affected by an increased level of road traffic, and participation in different occupation types. Risks to human health will be evaluated through a quantitative human health risk assessment.

Mitigation measures that may be appropriate include safe work and occupational health plans and associated training, site access controls to minimize public safety risks, minimising and mitigating noise experienced by residents of Port Edward, provision of emergency response and general health services for workers, control technologies for reducing emissions and discharges, ongoing monitoring of emissions and discharges and minimising disruption of areas used for harvesting country foods or traditional medicines.

5.6 Potential Changes to the Environment – Related to Federal Legislation

5.6.1 Fish and Fish Habitat (*Fisheries Act, 1985*)

Almost the entire Site on Ridley Island will have to be modified to accommodate the Facility, which will include covering the fish bearing stream in the northwest corner of the property. Current information suggests that such activities will affect largely fish habitats that support populations of sculpin and stickleback. The project footprint will also extend into the marine intertidal area, affecting habitat of both high and medium value along the foreshore. Design of structures built into the intertidal area will take into consideration ways to limit the loss of fish habitat. An Authorization under the federal Fisheries Act will be required to allow for structures to be placed and construction activities in the intertidal and sub-tidal areas. As part of the Authorization a fish habitat compensation plan will be developed..

At this time PRLNG does not anticipate that siting of the construction camp will affect fish habitat. Many streams along Ridley Island Road are fish bearing but final layout should be able to provide adequate setbacks to protect instream and riparian habitat values.

5.6.2 Aquatic Species (*Species at Risk Act, 2002*)

Effects on aquatic species can occur as a result of the following activities:

- Increase in vessel traffic that may result in altering underwater acoustics and increasing the potential for vessel collision with marine mammals.
- Changes to the foreshore and near shore habitat as a result of the LNG facility and marine infrastructure such as the jetty and the MOF can result in effects to aquatic species including marine plants. Some examples include juvenile salmon, eulachon, dungeoness crab, eel grass and bull kelp.
- Noise and sedimentation from construction of the jetty and the MOF and dredging for the marine basin can result in changes to aquatic species including marine plants for example eel grass and bull kelp.

These activities have the potential to effect aquatic species as defined in SARA. Some aquatic species are also listed as species at risk, and are confirmed to occur in the Project area. These are listed in Table 5.1.

Table 5.1. Marine Aquatic Species at Risk – Confirmed / Potential to Occur in Project Area

Species	SARA Status
Marine Mammals	
Northern Resident Killer Whale (*Orcinus orca*)	Threatened (Nov. 2008); Schedule 1
Transient Killer Whale (West Coast Transients) (*Orcinus orca*)	Threatened (Nov. 2008); Schedule 1
Fin Whale (*Balaenoptera physalus*)	Threatened (May 2005); Schedule 1
Humpback Whale (*Megaptera novaeangliae*)	Threatened (May 2011); Schedule 1
Harbour Porpoise (*Phocoena phocoena*)	Special Concern (Nov. 2003); Schedule 1
Grey Whale (*Eschrichtius robustus*)	Special Concern (May 2004); Schedule 1
Steller Sea Lion (*Eumetopias jubatus*)	Special Concern (Nov. 2003); Schedule 1
Offshore Killer Whale (*Orcinus orca*)	Threatened (Nov. 2008); Schedule 1
Blue Whale (*Balaenoptera musculus*)	Endangered (May 2012); Schedule 1
Sei Whale (*Balaenoptera borealis*)	Endangered (May 2003); Schedule 1
Fish	
Green Sturgeon (*Acipenser medirostris*)	Special Concern (Nov. 2004); Schedule 1
Invertebrates	
Northern Abalone (*Haliotis kamtschatkana*)	Endangered (April 2009); Schedule 1
Olympia Oyster (*Ostrea lurida* formerly *Ostrea conchaphila*)	Special Concern (May 2011); Schedule 1

5.6.3 Migratory Birds (*Migratory Birds Convention Act, 1994*)

Project activities that have the potential to affect migratory birds include:

- clearing potential resting or nesting habitat in the area of the Project footprint.
- operation of the flares may alter the migratory route near the Project site for birds such as Marbled Murrelet.
- noise from construction may result in avoiding use of nearby habitat for birds like the American Bittern.
- light sources at the Facility and on vessels both while at dock and in transit could attract birds with a potential to result in injury.

5.7 Potential Changes to the Environment that Could Occur on Federal Land

The main footprint of the Project, with the exception of the proposed construction camp and some ancillary infrastructure, will be on Ridley Island, which is Federal Crown Land. Therefore, any potential environmental effects associated with construction and operation of the Project will occur on Federal Crown Land.

5.8 Potential Changes to the Environment of Transboundary Lands

There are no potential changes to the environment expected that would occur in a province other than BC or outside of Canada.

5.9 Potential Effects on Aboriginal Peoples from Changes to the Environment

Public access to Ridley Island is restricted by security gates and so existing land based activities by Aboriginal people on Ridley Island are limited. Therefore effects to Aboriginal land-based activities from changes in land use at the Facility are not expected. The proposed camp locations are adjacent to Highway 16 and/or the Ridley Island connector road, and in proximity to disturbed areas and existing industrial sites on Ridley Island and Watson Island. Marine harvest occurs in the area from Ridley Island out to Brown Passage, and shoreline harvest is also reported along the shorelines of this area.
Changes in the biophysical environment that may affect traditional activities of Aboriginal people include marine and terrestrial resources. Marine resources may be affected due to altered marine habitat, dredging and dredge disposal. Vegetation resources may be affected by deposition of contaminants from emissions, which has the potential to affect mammals harvested as food. Other traditional activities may be affected by reduced availability of lands used for hunting, trapping and gathering as a result of camp development. Aboriginal people involved in commercial fishing may be affected by decreased commercial fishing yield caused by changes to marine resources. The EIA will address mitigation measures for reducing potential effects on Aboriginal peoples and evaluate any residual and cumulative effects.

An AOA has been used to compile records of archaeological sites within an area that included all of Ridley Island and the southern part of Kaien Island as far as Highway 16. The AOA identified 46 previously recorded archaeological, cultural or heritage sites within 250 m of the area. The majority of these sites were CMTs, with other sites containing lithics, shell middens, a cabin, and one site of human remains. The sites recorded at or in close proximity to the development on Ridley Island are all CMT sites. Development on Ridley Island will require clearing of tree stands, including CMTs and any other archaeological sites identified during site fieldwork. Clearing will be done after consultation with First Nations to determine methods for extracting maximum archaeological value from the sites, and ensuring appropriate documentation and storage of any artifacts.

The Project will provide employment, contracting and other economic opportunities to Aboriginal people. Socio-economic effects of these opportunities on Aboriginal communities will be addressed as part of the EA.

The EA will examine effects on Aboriginal people from environmental changes, based on information to be gathered in Traditional Use Studies (TUS) that will be completed by First Nations. These studies will provide information about Aboriginal use of land and water, and help identify potential site-specific effects. In relation to the specific rights and interests of Aboriginal peoples, the EIA will address potential effects on: traditional fishing and marine harvest; harvesting at traditional hunting, trapping and gathering grounds that may be affected by camp development or deposition of emissions; potential human health risks from consumption of country foods; and sites of archaeological and cultural importance. The EIS will also assess archaeological and cultural importance.

5.10 Potential Changes to the Environment that Would Occur on Federal Land

The main footprint of the Project, with the exception of the proposed construction camp and some ancillary infrastructure, will be on Ridley Island, which is Federal Crown land. Therefore, any potential

environmental effects associated with the construction and operation of the Project will occur on Federal Crown land. The potential environmental effects and mitigation measures that may be appropriate are summarized in Table 5.2.

Table 5.2. Summary of Potential Environment Project Interactions

Biophysical or Human Environment Component	Potential Environment-Project Interactions	Project Component			Project Phase			High-Level Mitigation & Compensation Considerations
		Onshore Facilities	Marine Facilities	Marine Vessel Operation	Site Preparation & Construction	Operations	Closure	
Natural Environment								
Climate	Emissions of GHGs	x	x	x	x	x	x	• Minimization of vehicle idling and turning off equipment when not in use. • Use of electric driven APUs where appropriate. • Ensuring ground service vehicles are properly tuned and maintained. • Implementation of onsite speed limits. • Proper route selection to reduce travel distances for the delivery of construction and operational materials. • Development and implementation of a balanced earthwork management plan and keeping as much excavated earth onsite as possible to reduce offsite hauling and loss of natural GHG sinks. • Application of adaptive management to reduce air emissions. • Use of grid power during the construction phase. • Use of high efficiency gas turbine driven compressors. • Use of air coolers instead of a cooling water/sea water cooling system. • Provision on annual reports on GHG emissions after the operation commences. • Control of fugitive emissions, spills and unintentional releases of both LNG and natural gas. • During operations, implementation of preventative maintenance program that includes a leak LDAR program to control and prevent emission leaks within the facility's infrastructure.
Air Quality	Emissions of CACs (SO_2, NO_2, CO, PM_{10}, and $PM_{2.5}$)	x	x	x	x	x	x	• Minimization of vehicle idling and turning off equipment when not in use. • Use of electric driven APUs where appropriate. • Low NOx burners and SCR where appropriate. • Ensuring ground service vehicles are properly tuned and maintained. • Implementation of onsite speed limits. • Proper route selection to reduce travel distances for the delivery of construction and operational materials. • Performance of regular road sweeping during construction. • Watering down loose materials and exposed earth during construction. • Prevention of erosion to control the extent and duration of bare ground surface exposure. • Development and implementation of a balanced earthwork management plan and keeping as much excavated earth onsite as possible to reduce offsite hauling. • Application of adaptive management to reduce air emissions. • Use of grid power during the construction phase. • Use of high efficiency gas turbine driven compressors. • Use of air coolers instead of a cooling water/sea water cooling system. • Provision on annual reports on air emissions after the operation commences. • Control of fugitive emissions, spills and unintentional releases of both LNG and natural gas. • During operations, implementation of preventative maintenance program that includes a LDAR program to control and prevent emission leaks within the facility's infrastructure.
Sound	Increase in ambient noise	x	x	x	x	x	x	• Construction of berms and the planting of vegetation to provide increased foliage along the fence line, both of which would function as sound barriers. • Insulating shielding will be used on the LNG transfer line if required • Containing major noise generating equipment within shelters where practical. • Controlling ship idling times during unloading and loading phases of the operation. • Buildings that house equipment that generate substantial noise (e.g., co-generator facility) will consider the following mitigation measures: o Implementing wall sound transmission class (STC) of at least 50 o Minimizing the amount of windows o Implementing non-operable windows o Implementing perimeter seals on the exterior doors o Using metal insulated exterior doors for higher STC values o Using adequate building ventilation such that doors and windows do not need to be opened o Silencing elements on building ventilation equipment
Groundwater	Alteration of groundwater quality	x			x	x	x	• Emergency response plans in place with spill containment equipment to rapidly deal with cleanup of any spills. • Fuel and chemical storage facilities will be designed to prevent spills into the environment by using the following mitigative strategies: ensuring containment integrity, secondary containment, drainage and collection. • Development of a construction and operations Stormwater Management Plan to include best management practices for protecting the quality of stormwater runoff.
Hydrology & Surface Water Quality	Alteration of surface water quantity and quality	x	x	x	x	x	x	• Emergency response plans in place with spill containment equipment to rapidly deal with cleanup of any spills. • Fuel and chemical storage facilities will be designed to prevent spills into the environment by using the following mitigative strategies: ensuring containment integrity, secondary containment, drainage and collection. • Development of a construction and operations Stormwater Management Plan to include best management practices for protecting the quality of stormwater runoff.
Fresh Water Fish and Fish Habitat	Loss of fish habitat within the project footprint							• Establishment of appropriate setback from fish bearing stream. • Effective sediment and erosion control plan. • Development of a fish habitat compensation plan.
Marine Ecosystems	Loss of marine habitat within the project footprint							• Minimizing the footprint of the Project thereby limiting the loss of native habitat along the coast. • Incorporating rugosity and refuge areas into the design of the shoreline to allow fish and other organisms protection from predators. • Development of a fish habitat compensation plan.
	Alteration of marine water and sediment quality		x		x	x		• Employ effective measures during dredging to limit turbidity and localized sedimentation. • Controlling the amount of water withdrawn from and discharged back into the ocean and placing the intakes and discharge points in areas of maximum flow to yield maximum mixing with the ambient water. • Collecting stormwater runoff and allowing it to return to the ocean after verification that it is free of contaminants.
	Habitat alteration at dredge disposal sites		x		x			• Identify and use disposal sites with minimal habitat value; dispose of contaminated dredgeate at an approved land facility.
	Alteration of marine mammal behaviour and potential for vessel strikes		x	x	x	x	x	• Avoiding blasting or other noisy construction activities when marine mammals are in the area. • Controlling the lights shining into the water. • Limiting the speed of vessels in transit to/from the Project to reduce noise and limit the potential for vessel strikes.

Biophysical or Human Environment Component	Potential Environment-Project Interactions	Project Component			Project Phase			High-Level Mitigation & Compensation Considerations
		Onshore Facilities	Marine Facilities	Marine Vessel Operation	Site Preparation & Construction	Operations	Closure	
Terrestrial Ecosystems	Loss of vegetation within the project footprint	x			x			• Consider relocating rare or listed plant species. • Limit tree-clearing or habitat-altering activities to time periods outside of critical life stages (e.g., not during breeding season for birds or amphibians). • Avoid habitat features important to wildlife (e.g., wetlands, streams, ponds, etc.). • Use existing roads, clearings and water course crossings whenever possible. • Confine all project traffic to designated access roads and construction sites. • Limit the size of the temporary workspace to the greatest extent possible. • Deactivate and remove unused roads and construction sites and revegetate with native vegetation; reductions in traffic may reduce direct mortality on wildlife and increase habitat use. • Maintain habitat connectivity wherever possible. • Zero tolerance on the feeding of wildlife. • Careful management of all garbage.
	Loss of listed plant species and some occurrences of rare ecological communities	x			x			
	Loss of wildlife habitat within the project footprint	x			x			
	Alteration of wildlife movements and mortality	x			x	x		
	Loss of wildlife of listed species	x			x			
Economic Environment	Economic opportunities	x	x	x	x	x	x	• Support to local and regional skills, training and employment initiatives that aim to maximize opportunities for local people. • Develop an employment and training strategy that aims to maximize employment opportunities for local people, including those from First Nation communities. • Engagement with the local business community to communicate project opportunities for contractors and identify mutually beneficial business opportunities.
	Disruption to other marine users by LNG carrier movement			x		x		• Navigation aids and communication to control disruption to other marine users as a result of LNG carrier movement.
Social Environment	Higher population levels							• Develop a camp management plan that is sensitive to local needs around worker movement and use of services, while creating opportunities for positive economic and social effects for the local community. • Identify and make best use of temporary accommodation options, including hotel and rental capacity. • Develop transportation management plans to control disruption from the movement of workers and materials on local residents.
	Changes to view points							• Mitigate visual impact through layout of project components and screening where possible.
Heritage	Potential for disturbance of archaeological sites within the project footprint	x			x			• Field study to determine the precise location of previously recorded sites and to identify any unrecorded sites that may be present in the project footprint. • Consultation with First Nations to determine methods for extracting maximum archeological value from any sites identified during field work, and ensuring appropriate documentation and storage of any artifacts.
Health	Potential effects on human health.	X	X	X	X	X	X	• Safe work and occupational health plans and associated training during all project phases. • Public access controls on the project site to minimize public safety risks. • Minimising and mitigating noise experienced from the Project by residents of Port Edward. • Provision of health services for workers during the construction phase, both in terms of emergency response and general health services. • Control technologies for reducing emissions and discharges. • Ongoing monitoring of emissions and discharges. • Minimising any disruption to areas used for the harvest of country foods or traditional medicines.

6. Engagement and Consultation with Aboriginal Groups

The Aboriginal component of the Aboriginal and Public Engagement and Consultation (APEC) Plan focusses on working with Aboriginal Groups to build constructive long-term relationships that facilitate meaningful dialogue.

6.1 Potentially Affected and Interested Aboriginal Groups

PRLNG believes it has identified Aboriginal Groups that that may have an interest in the Project and their key contacts (Table 6.1), but this list may not be exhaustive.

Table 6.1. Aboriginal Contact Information

Aboriginal Group	Location	Contact
Lax Kw'alaams First Nation	The Lax Kw'alaams community's main reserve at Port Simpson, on the Tsimshian peninsula, within the Lax Kw'alaams 1 Indian reserve.	Wayne Drury, General Manager **Address**: 206 Shashaak Street, Lax Kw'alaams, BC V0V 1H0 **Ph**: (250) 625-3293 **Fax**: (250) 625-3246 **E-mail**: waynedrury48@hotmail.com
Metlakatla First Nation	The Metlakatla community and main reserve is located on Prospect Hill, within the S1/2 Tsimpsean 2 Indian Reserve, on the west coast of the Tsimshian peninsula, the north end of Digby Island, and on the east shore of Chatman Sound.	Ryan Leighton, Director of Operations **Address**: PO Box 224, Prince Rupert, BC V8J 3P6 **Ph**: (250) 622 8067 **Fax**: (250) 628 9205 **E-mail**: northland@citytel.net
Gitxaala Nation	The Gitxaala's main reserve is located at Kitkatla, on Dolphin Island, a small island adjacent to Porcher Island off the coast of northern BC.	Mark Ignas, Manager Albert J. Hudec, Farris LLP **Address**: 2500–700 W. Georgia Street, Vancouver, BC V7Y 1B3 **Ph**: (604) 661-9356 **Fax**: (604) 661-9349 **E-mail**: ahudec@farris.com
Kitselas Indian Band	Kitselas Band's main reserve (Kitselas Indian Reserve No. 1) is located at a constriction of the Skeena River slightly upriver from the confluence of Kleanza Creek.	Chief Judy Gerow **Address**: 2225 Gitaus Road, Terrace, BC V8G 0A9 **Ph**: (250) 635-8882 **Fax**: (250) 635-5335 **E-mail**: jgerow@kitselas.com
Kitsumkalum Band	The Kitsumkalum's main reserve is located just west of Terrace, where the Kitsumkalum River and Skeena River meet.	Chief Donald T. Roberts **Address**: PO Box 544, Terrace, BC V8J 4B5 **Ph**: (250) 635-6177 **Fax**: (250) 635-4622 **E-mail**: droberts@kitsumkalum.bc.ca
Council of the Haida Nation	The Haida Nation consists of two member bands: Old Masset Village Council or Haida Village, located 5 km NW of Masset; and Skidegate Mission, located on the SE corner of Graham Island on Haida Gwaii.	Secretariat of the Haida Nation **Address**: 504 Naanii Street Old Massett, PO Box 589 Masset, Haida Gwaii, BC V0T 1M0 **Ph**: (250) 626-5252 **Fax**: (250) 626-3404 **E-mail**: chn_hts@haidanation.ca

6.2 Aboriginal Traditional Use of Lands and Resources

The Tsimshian are primarily located on the northcoast between the Nass and Skeena rivers, while the territory of the Haida Nation includes all of Haida Gwaii, the surrounding waters (Dixon Entrance and half of the Hecate Strait).

The Coast Tsimshian, which includes Lax Kw'alaams and Metlakatla, had permanent winter villages on the lower Skeena River below its canyon. In the Prince Rupert harbour area alone there is evidence of 5,000 years of occupation. In 1831, the Hudson's Bay Company established a post at Fort Simpson, north of Prince Rupert, and the Coast Tsimshian moved their winter villages to remain close to the Fort while retaining access to traditional food supplies. Traditional harvest activity between February and April included eulachon fishing on the Nass River, which were either dried or processed into an oil or grease. In early summer, temporary fishing camps would support harvesting of salmon, halibut and herring spawn, as well as supplies for basket and artifact weaving, and seaweed for drying. Also during summer, women harvested berries, beginning with salmonberries and continuing with wild crabapples and high bush cranberries. In fall, chum salmon were caught and hunting activities would begin. Hunted and trapped species included bear, beaver, deer, elk, fox, lynx, marmots, marten, mink, moose, mountain goats, otter, porcupines, raccoons, sea lions, seals, sheep, squirrel, waterfowl, weasel, and wolf. Shellfish were gathered primarily during the winter (except abalone), including cockles, clams, and mussels. Harvesting, managing, processing, consuming and trading fish and seafood was and remains an important part of Tsimshian life and culture.

The archaeological record in the Haida territory dates back over 10,500 years. Between the early and late 1800s, much of the Haida Nation relocated from ancestral villages scattered throughout the islands to population centres at Skidegate and Old Massett, where they continue to exist today. The Haida harvested marine resources throughout the year and included most intertidal shellfish, groundfish, herring roe-on-kelp, shrimp, prawn and Dungeness crab. In the spring, the Haida would traditionally move to outlying areas to harvest salmon, halibut, shellfish, seaweed and seagull eggs. In the summer, the harvest would focus on pink and coho salmon, snapper, lingcod, shrimp, prawns, urchins, chitons, sea cucumbers, Dungeness crab and octopus. In the fall, hunting would occur and the harvest of marine species included coho and chum salmon, trout, Dolly Varden char and steelhead. In the winter, the Haida would either return to the main villages or set up winter camps for trapping. Seal hunting became more prominent in the winter, with the harvest of groundfish and shellfish occurring during shorter trips from the villages. The Haida continue to live off the land, with fishing and gathering concentrated around Old Masset Village and Skidegate, but occurring throughout Haida Gwaii.

6.3 Overview of Aboriginal Engagement or Consultation Activities to Date

BG Canada initiated engagement with Aboriginal Groups in the Prince Rupert area on behalf of PRLNG and the Project in October 2011 during the preliminary feasibility stage of the Project. Engagement with other First Nations was initiated in mid-2012 once the Project had moved beyond the early preliminary feasibility stage. Engagement has included meetings with Aboriginal community leaders, participation and presentations at community meetings, telephone conversations, and written correspondence. Consultations were also held with staff representative of Coastal First Nations Great Bear Initiative. An overview of engagement with Aboriginal Groups from the start of the Project in 2011 until January 2013 is provided (Table 6.2).

It should be noted that the record of engagement includes meetings held in 2011 and 2012 with the leadership of Lax Kw'alaams and Metlakatla First Nations, who at that time had chosen to engage with

the PRLNG jointly. During later discussions in March 2012 and by correspondence, the representatives and leadership of Lax Kw'alaams and Metlakatla conveyed their mutual decision to continue further discussions with PRLNG independently of one another. Subsequent records of engagement reflect independent discussions between BG Canada (on behalf of PRLNG and the Project) and Lax Kw'alaams and Metlakatla.

Table 6.2. Aboriginal Engagement Records

Date	Activity
Lax Kw'alaams and Metlakatla	
October 2011	Introductory meeting between BG Canada and Coast Tsimshian.
November 2011	Follow-up introductory meeting and correspondence to introduce and outline feasibility phase of the Project.
December 2011	Follow-up correspondence regarding the establishment of a communication process between BG Canada and Coast Tsimshian.
January-February 2012	Further discussions regarding engagement process between BG Canada and Coast Tsimshian.
March 2012	Update discussions regarding feasibility phase of the Project.
Lax Kw'alaams	
March 2012 – April 2012	Discussions and correspondence regarding potential Framework Agreement for engagement.
May 2012	Discussions regarding potential business opportunities related to the Project and interests of Lax Kw'alaams.
June 2012	Continued discussions and correspondence regarding status of the Project, participation of Lax Kw'alaams in feasibility environmental field studies, and potential business and contracting opportunities.
July 2012	Discussions regarding participation of Lax Kw'alaams in environmental feasibility field studies.
August 2012	Discussions regarding feasibility work of the Project – including preliminary archaeological work – and Lax Kw'alaams' participation in that work; continued discussions regarding relationship issues.
September 2012	Discussions regarding engagement processes including capacity, and broad discussion on environmental issues including TUS.
October 2012	Updates regarding feasibility work, particularly planned archaeological studies and proposed TUS.
November 2012 – December 2012	Meetings and correspondence regarding engagement process and capacity requirements.
Metlakatla	
April – May 2012	Correspondence and meeting to provide update on the Project.
June 2012	Detailed discussions regarding Metlakatla participation in feasibility environmental field studies.
July 2012 – August 2012	Discussions regarding feasibility work of the Project – including preliminary archaeological work – and Metlakatla participation in that work.
September 2012	Coordination of Metlakatla participation in environmental feasibility studies.
October 2012	Discussions regarding engagement process including capacity requirements and Metlakatla's interests in the Project; broad discussion on environmental issues including TUS and planned archaeological studies.
November 2012	Presentation to Metlakatla Development Corporation and discussion of project opportunities.
December 2012	Discussions and coordination of Metlakatla participation in environmental feasibility studies.
January 2013	Discussions regarding TUS.

Date	Activity
Gitxaala	
January 2012	Initial meeting to introduce PRLNG and the Project.
February 2012	Correspondence and discussions regarding engagement during feasibility phase of the Project.
June 2012	Meeting to provide update status of the Project.
August 2012 – October 2012	Correspondence providing update information on Project including archaeological work planned during feasibility phase and potential TUS.
January 2013	Correspondence to establish next steps in engagement process.
Kitselas	
August 2012	Correspondence to introduce BG Group and Project to Kitselas and to provide information on archaeological work planned during feasibility phase.
November 2012 – December 2012	Correspondence to meet to discuss next steps in engagement process.
Kitsumkalum	
August 2012	Correspondence to introduce BG Group and the Project to Kitsumkalum and to provide information on archaeological work planned during feasibility phase.
October 2012	Introductory meeting with Kitsumkalum.
November 2012	Discussions regarding archaeological feasibility field work and environmental studies.
Coastal First Nations Great Bear Initiative	
December 2011	Introductory meeting to discuss the Project and particular interests around shipping and energy.
May 2012	Update discussions on the Project.
June 2012	Meeting to discuss project update and interests on marine issues and shipping.
September 2012	Discussions regarding shipping and potential impacts from proposed LNG projects on the coast.
October 2012 – December 2012	Correspondence regarding interest in shipping and marine issues.
January 2013	Presentation on shipping and marine issues.

6.4 Key Comments and Concerns by Aboriginal Groups

Table 6.3 summarizes the issues that have been heard to date during the engagement process.

Table 6.3. Key Comments and Concerns by Aboriginal Groups

Issue	Actions Taken and Proposed
Requirement for habitat compensation if there were any effects on marine habitat.	Habitat compensation is an important and standard part of regulatory approvals. BG Group has a biodiversity policy that includes provision for habitat compensation, and this policy will be applied if any effects are expected to occur. Studies are being undertaken to assess the potential effects on marine habitat. PRLNG will work with First Nations to develop appropriate measures.
Development of marine infrastructure from Canpotex and PRLNG will affect the ability of small craft to navigate along the near shore around Ridley Island, making transit difficult, particularly in bad weather.	PRLNG will consult with First Nations, other developers at the Port, the PRPA and the Port Edward Harbour Authority to identify strategies to provide safe and effective navigation for small craft.

Issue	Actions Taken and Proposed
Importance of marine environment for First Nations on the coast.	PRLNG has Environmental Standards that require company operations to control and mitigate where possible effects to the marine environment. PRLNG is undertaking robust studies into marine mammals and fish and will work with First Nations to develop appropriate design and mitigation measures.
Importance of employment opportunities from the Project.	PRLNG will develop an employment and training strategy to maximize opportunities for local people and businesses, including those from First Nation communities. The development of this strategy will include consultation with First Nations and stakeholders.
Effect on salmon migration along the shoreline as a result of the development of marine infrastructure.	As part of the design of infrastructure in the marine environment and along the near shore and foreshore, PRLNG will review potential alternatives to control effects on salmon migration. Environmental studies and discussions with First Nations will help determine any potential effect on salmon migration.
The area offshore of Ridley Island is a ceremonial fishing area.	PRLNG will work with First Nations to understand traditional use of the water around Ridley Island, and will use this understanding to inform design and mitigation planning.
Potential effects on shellfish, salmon and oolichan from disposal at sea of dredge material.	PRLNG will undertake siting studies to identify the most appropriate option for dredge disposal and will work with First Nations and local communities to develop appropriate measures. A dredge disposal site has not been selected.
Effects of development on wildlife populations on Ridley Island. Identified presence of species including deer, wolf, frogs and toads on Ridley Island.	The Project, as well as other existing or proposed projects on Ridley Island, will have an impact on wildlife populations on Ridley Island. PRLNG had been made aware of the presence of species of frogs and toads through earlier EA work on Ridley Island and wildlife surveys are part of the field work that has been conducted to date. PRLNG will work with First Nations to identify viable mitigation measures.
Overlap in proposed construction periods between PRLNG and Canpotex. This may create implications for labour requirements and cumulative noise effects.	There is potentially some overlap between the construction periods of the two projects on Ridley Island. PRLNG's employment and training strategy for the Project will be based on an understanding of the other demands for labour within the region and beyond. If required, mitigation measures for managing noise effects will be designed with recognition of other noise sources from current and reasonably foreseeable activities within the local area.
Effects of anchorage on drift fisheries, and effect of light from anchored vessels on people using nearby islands to camp.	Anchorage of LNG carriers would not ordinarily occur. PRLNG will consult with the community of Port Edward and First Nations develop to mitigation measures that are appropriate and practicable to control lighting effects.
Issues arising from proximity of proposed Canpotex project and the Project.	PRLNG is aware of other proposed projects in proximity of the Project. PRLNG's Site design and management planning includes recognition of other projects that may be undertaken in the local area. Design and management plans will be based on a solid understanding of local projects, developed through discussion with First Nations, local communities, PRPA and individual proponents.

7. Consultation with the Public and Other Parties

The BG Group Business Principles and Social Performance Standard commit all BG Group operations to consult with identified interested and affected stakeholders throughout the life of their presence in a particular location. Consultation is to be transparent, inclusive, culturally appropriate and publicly defensible, with the intention of developing broad community support for BG Group's presence.

Stakeholders are defined by BG Group as interested and affected parties (organisation/s, governmental entity/entities or individual/s), who have either real or perceived stakes (both financial and non-financial) in the Project. Stakeholders involved in the Project to date include those with a direct interest in the Project and those who have been consulted for advice and information related to social, environmental and regulatory context of the Project. Table 7.1 is a preliminary list of Stakeholders.

Table 7.1. List of Stakeholders

Stakeholder	Consulted
Federal Government	
Aboriginal Affairs and Northern Development Canada (AANDC)	Yes
Canadian Environmental Assessment Agency (CEA Agency)	Yes
Environment Canada (EC)	Yes
Fisheries and Oceans Canada (DFO)	Yes
Health Canada (HC)	No
Major Projects Management Office	Yes
Natural Resources Canada (NRCan)	Yes
Transport Canada	Yes
PRPA	Yes
Provincial Government	
BC Ministry of Aboriginal Relations and Reconciliation (BC MARR)	Yes
BC Ministry of Energy, Mines and Natural Gas and Responsible for Housing (BC MEMNG)	Yes
BC Ministry of Environment (BC MOE)	Yes
BC Ministry of Forests, Lands and Natural Resource Operations (BC MFLNRO)	No
BC Ministry of Jobs, Tourism and Innovation (BC MJTI)	Yes
BC Ministry of Transportation and Infrastructure (BC MOTI)	No
British Columbia Environmental Assessment Office (BCEAO)	Yes
BC Oil and Gas Commission	Yes
Northern Health Authority	No
MLA North Coast	Yes
NDP Minister, Energy Critic	Yes
Local Government	
City of Prince Rupert (Mayor and Council)	Yes
City of Prince Rupert staff (planning public works, recreation and community services)	Yes
DFO Marine Communications and Traffic Services in Seal Cove	Yes
District of Port Edward (Mayor and Council)	Yes
Royal Canadian Mounted Police (RCMP)	No
School District 52	Yes
Skeena Queen Charlottes Regional District	Yes
Landowners and Land / Resource Users	
Prince Rupert Port Authority	Yes
Rikki Dickens (Trapline holder)	No
Other Stakeholder	
Local residents	Yes
Northern Health	Yes
Chatham Sound Charter Boat Association	No

Stakeholder	Consulted
Community Futures of Pacific Northwest	Yes
Hecate Strait Employment Development Society	Yes
North Coast Forest District	No
Northwest Community College	No
Port Edward Harbour Authority	Yes
Prince Rupert & Port Edward Economic Development Corporation	Yes
Prince Rupert Chamber of Commerce	Yes
School District	Yes
T. Buck Suzuki Environmental Foundation	Yes
Tourism operators (various)	No
Tourism Prince Rupert	Yes
United Fisherman and Allied Workers Union	Yes

7.1 Overview of Stakeholder Consultation Activities to Date

Stakeholder and community engagement started in August of 2011 and is ongoing. Consultation records through the end of January 2013 are provided in Table 7.2.

Table 7.2. Stakeholder Consultation Records

Date	Event	Description
Federal Government		
12/13/2011	Meeting with Kristine Burr (Assistant Deputy Minister TC)	Introduction to BG Group and Project. Federal transportation issues relevant to the Project.
01/17/2012	Meeting with Mike Henderson (TC)	Introduction to Project. Explore transportation issues and policy related to the Project.
05/31/2012	Meeting with Joy Hillier (DFO), Ian Bergsma (DFO), and Darren Chow (DFO)	Discuss marine issue areas to be surveyed, potential dredgate disposal areas and potential compensation areas.
06/14/2012	Meeting with Chris Barlow and Lisa Poier (CEA Agency)	Introduction to BG Group and Project.
08/29/2012	Meeting with Andrew Mayer (PRPA), Lorne Keller (PRPA), Katherine Beavis, (TC), Mike Henderson (TC), and Lori Young (TC)	Discussion of previous Port processes and the TERMPOL process.
09/11/2012	Meeting with Art Statham (DFO Marine Communications and Traffic Services in Seal Cove)	Initial meeting with DFO Marine Communications and Traffic Services in Seal Cove to discuss issues that should be considered as part of socio-economic research, and specifically to check data availability for ship movements.
09/13/2012	Meeting with Jim Clarke, Stefan Skocylas and Marco Presutti (MPMO)	Discuss the role of the MPMO and introduce the Project.
09/14/2012	Meeting with Director General Sylvain Ouellet (CEA Agency)	To discuss the CEAA 2012 changes with the CEA Agency.
09/25/2012	Meeting with Jack Smith (CEA Agency), Lisa Poier (CEA Agency) and David Riddell (BCEAO)	Meeting to discuss the project description.
09/26/2012	Meeting with Stefan Skocylas (MPMO)	In person introduction of BG Group and the Project.

Date	Event	Description
09/27/2012	Meeting with Vanessa Schneider (TC, Director, Stakeholder Relations and Strategic Planning) and Andre Hannoush (TC, Advisor, Marine Policy)	Briefing TC on the Project.
09/27/2012	Meeting with Tim Norris (Director of Policy for the Ministry of Natural Resources Canada)	Introduction of Project and associated pipeline. Discussion included training and safety.
09/27/2012	Meeting with John Duncan (Minister of Aboriginal Affairs and Northern Development) and Laura Smith (Policy and Regional Affairs Advisor - BC)	Briefed the Minister on the Project and associated pipeline.
11/8/2012	Meeting with Kristie Trainor (EC), Scott Lewis (EC), Garth Mullins (EC), Lisa Poier (CEA Agency) and Jack Smith (CEA Agency)	Meeting with EC to discuss issues of dredge disposal for the Project. Kristie Trainor (EC) also invited CEA Agency representatives on the basis that they have an interest in dredge disposal.
11/29/2012	Meeting Joe Oliver (Minister or Natural Resources) and LNG proponents, Colin Metcalfe (Regional Affairs), Rob Seely, (Shell), Garry Weilinger (Spectra), Sarah McCullough (Spectra) and David Calvert (Apache/Kitimat LNG)	Meeting between LNG proponents and federal Minister Joe Oliver. Minister Oliver suggested a general discussion on the new EA process and how “one project – one process” was going.
12/05/2012	Meeting with Peter Delaney (DFO)	Meeting with DFO to discuss issues of compensation and loss of habitat around Ridley Island.
12/11/2012	Meeting with Ian Chatwell (TC), Charles Hansen (TC) and Colin Parkinson (TC)	Meeting with TC to discuss the TERMPOL process, and the navigable waters approval process.
01/31/2013	Meeting with senior regulators in Ottawa, organized by MPMO	Meeting to introduce the Project and BG Group and areas of federal involvement.
Provincial Government		
08/10/2011	Meeting with Steve Carr (Deputy Minister of Energy and Mines and Responsible Housing)	Introduction to Project and BG Group 's interest in BC.
01/20/2012	Meeting with Terry Lake (Minister of Environment)	Introduction to Project and BG Group. Discussion of environmental issues and provincial policy related to the Project.
01/31/2012	Meeting with Rich Coleman (Minister of Energy and Mines and Minister Responsible for Housing)	Introduction to Project and BG Group. Discussion of energy issues and policy related to the Project.
02/20/2012	Meeting with Mary Polak (Minister of Aboriginal Relations and Reconciliation) and Pat Bell (Minister of Jobs, Tourism and Innovation)	Introduction to Project and BG Group. Discussion of Aboriginal issues related to the Project.
06/14/2012	Meeting with John Horgan (NDP Minister, Energy Critic)	Introduce BG Group and Project.
07/04/2012	Meeting with Rachel Shaw (BCEAO)	Meeting to introduce BG Group and the Project.
08/17/2012	Meeting with Rachel Shaw (BCEAO)	Discuss the role of the BCEAO in the EA and Permitting process.
10/04/2012	Phone call discussion with Dan Baker (Area Manager, Roads/ Acting Operations Manager, Ministry of Transportation)	To discuss traffic data availability for use in the EA traffic assessment, such as traffic related issues along the Highway, such as accident rates and closures due to avalanche.
10/9/2012	Meeting with Derek Sturko (BCEAO), Archie Riddel (BCEAO), Michelle Carr (BCEAO), and John Mazure (BCEAO)	Meeting with BCEAO to discuss process for EA of the Project.
Local and Regional Government		
02/08/2012	Meeting with Dave MacDonald (Mayor of Port Edward)	Introduction of BG Group and Project to the Mayor of Port Edward.

Date	Event	Description
06/13/2012	Meeting with Mayor Jack Mussallem (City of Prince Rupert), Councillor Judy Carlick-Pearson(City of Prince Rupert), Councillor Gina Garron (City of Prince Rupert), Councillor Jennifer Rice (City of Prince Rupert) and Derek Baker (Economic Development Co-ordinator, City of Prince Rupert)	Provide more information on the Project and its current status.
08/24/2012	Telephone call with Polly Pereira (Deputy Director of Corporate Administrative Services, District of Port Edward)	Call discussing the public notices on the air and sound monitoring equipment to be deployed in Port Edward. The discussion was to receive approval of posting the notice at the municipal office in Port Edward. The call discussed community's concern with existing noise.
09/11/2012	Meeting with Ron Bedard (CAO, District of Port Edward)	Initial socio-economics research meeting with Port Edward District staff to scope potential socio-economic issues related to the Project.
09/11/2012	Meeting with Zeno Krekic (Prince Rupert City Planner), Gord Howie (Prince Rupert City Manager), Garin Gardiner (Prince Rupert Operations Manager, Public Works Department) and Dan Rodin, (Prince Rupert Finance)	Initial meeting to discuss issues that should be considered as part of socio-economic research.
09/12/2012	Joan Merrick (Skeena Queen Charlottes Regional District)	Initial meeting with the Skeena Queen Charlottes Regional District, to discuss issues that should be considered as part of socio-economic research.
09/28/2012	Phone call with Richard Pucci and Bill Horne (Public Works, City of Prince Rupert)	To identify sources of traffic data that may be useful for traffic assessment.
10/09/2012	Meeting with Joy Thorkelson (Prince Rupert Councillor and UFAWU member)	An introductory meeting to discuss the Project and identify and understand concerns and information needs.
10/10/12	Meeting with Ron Bedard (District of Port Edward)	Discussion on current engagement plan and organize upcoming events.
10/30/2012	Meeting with Zeno Krekic (Prince Rupert, City Planner)	To gather information on land use issues in Prince Rupert, and issues related to any camp infrastructure.
11/13/2012	Presentation to Prince Rupert Mayor and Council	Further discussion on the Project.
Prince Rupert Port Authority		
08/09/2011	Meeting with Prince Rupert Port Authority (PRPA), Shaun Stevenson (PRPA), Andrew Mayer (PRPA), Lorne Keller(PRPA), Mike Graham (PRPA), Gary Paulson (PRPA), Andy Cook (PRPA), Travis Bernhardt (PRPA)	Introductory consultants meeting and Site visit and survey of Ridley Island with the PRPA.
05/08/2012	Meeting with Prince Rupert Port Authority, Lorne Keller (PRPA), Mike Graham (PRPA), Gary Paulson (PRPA) and Andy Cook (PRPA)	Technical meeting reporting the results of BG Group's early feasibility work on Ridley Island Site D to the PRPA.
05/14/2012	Teleconference with Lorne Keller (PRPA)	Conference call to discuss issues and logistics around AECOM's upcoming EA field studies for BG Group on Ridley Island and the surrounding local study area.
09/10/2012	Meeting with Lorne Keller (PRPA) and Andy Cook (PRPA)	To share expectations about archaeological work on Ridley Island, specifically about permitting and the availability of TUS / archaeological data.
12/18/2012	Meeting with Lorne Keller (PRPA), Gary Paulson (PRPA), and Zoher Meratla (CDS Research)	Meeting with the PRPA to discuss integrated Site development planning.
Port Edward Harbour Authority		
09/11/2012	Meeting with Rick Hill (Port Edward Harbour Authority)	Initial meeting with the Port Edward Port Harbour Authority, to discuss and scope potential issues that should be considered as part of socio-economic research.

Date	Event	Description
10/10/2012	Meeting with Kerry Weick (Port Edward Harbour Authority) and Rick Hill (Port Edward Harbour Authority)	An introductory meeting to discuss the Project and identify and understand concerns and information needs.
11/1/2012	Meeting with Dwayne Nielson (Port Edward Harbour Authority)	Informal discussion to gather any information on vessel movements around Ridley Island, as part of socio-economic research.
Other Individuals and Organizations		
08/31/2012	Thank you letters to various residents	Thank you letter to residents that have participated in 2012 season's sound monitoring program.
09/10/2012	Meeting with Prince Rupert Chamber of Commerce	Initial meeting with Prince Rupert Chamber of Commerce, to discuss issues that should be considered as part of socio-economic research.
09/12/2012	Meeting with Joy Thorkelson (Prince Rupert Councillor and Northern Representative, United Fishermen and Allied Workers Union)	Meeting to discuss issues that should be considered as part of socio-economic research.
09/12/2012	Meeting with Community Futures of Pacific Northwest & Prince Rupert & Port Edward Economic Development Corporation	Initial meeting with the Prince Rupert Economic Development Manager and Community Futures, to discuss issues that should be considered as part of socio-economic research.
10/09/2012	Presentation to Prince Rupert Seniors Centre	Introduce Project to senior community and gain a better understanding of community concerns and issues. Presentation was to discuss upcoming Open House in Prince Rupert.
10/10/12	Presentation to Prince Rupert Chamber of Commerce Board	Meeting to introduce Project to board members, meet the business community, understand concerns and information needs as well as "advertise" upcoming Prince Rupert Open House.
10/31/2012	Meeting with Cam McIntyre (School District Secretary-Treasurer)	Gather information on K to 12 education, including available resources, educational attainment and student enrolment projections, with purpose of helping to scope issues for socio-economic research.
10/31/2012	Meeting with Kathy Bedard (Executive Director, Hecate Strait Employment Development Society)	Gather information on issues and barriers to employment in Prince Rupert, as well as employment and training programs available, with purpose of helping to scope socio-economic work.
10/30/2012	Meeting with Rudy Kelly (Director of Recreation & Community Services)	Gather information on the capacity and quality of existing recreational infrastructure, as well as the availability of recreational programs, with purpose of helping to scope issues for socio-economic research.
11/01/2012	Meeting with Jane Wylde (Director of Care, Northern Health)	Gather information on health care provision and issues in Prince Rupert and the outlying areas, with purpose of helping to scope issues for socio-economic research.
01/21/2013	Email from the Prince Rupert Chamber of Commerce	Email to inform BG Group has been nominated for a Prince Rupert and District Chamber of Commerce Business Excellence Award. Email also extended an invitation to the Business Excellence Awards Gala held on February 23, 2013.
Public Communication		
09/30/2012	Newsletter – Prince Rupert and Port Edward.	Distributed to all residents of Port Edward and Prince Rupert.
11/19/2012	Open house – Port Edward	Open to all residents of Port Edward and Prince Rupert.
11/20/2012	Open house – Prince Rupert	Open to all residents of Port Edward and Prince Rupert.

7.2 Key Comments and Concerns by Stakeholders

Detailed records have been kept from the engagement undertaken with local government and the public. Issues identified as a result of feedback received during engagement to date are summarized in Table 7.3.

Table 7.3. Key Comments and Concerns by Stakeholders

Issue	Response
Worker accommodation during the construction phase, and related opportunities for local businesses and possible effects to the local community, including provision of policing.	In order to control safety risks and disruption caused by the movement of workers, PRLNG is planning to use worker accommodation close to Ridley Island during the construction phase. PRLNG will develop a worker accommodation plan that satisfies the need to provide safe accommodation and transportation for workers, as well as seeking to generate opportunities for local businesses and benefits for the local economy. Additional policing is a consideration that will be addressed as part of this plan. The development of this plan will be done in consultation with First Nations, local communities, and stakeholders.
Visual, odour and noise effects to Port Edward during operations, and night time noise effects from construction.	PRLNG recognizes that noise is a significant concern. PRLNG is conducting noise monitoring studies in Port Edward and Ridley Island in order to better understand current sound level and create a basis for any Project-related mitigation. If noise effects are determined to occur from the Project, PRLNG will work with the District of Port Edward and residents to identify reasonable options to mitigate noise issues. The Facility will not produce any odour effects during operations.
Effects to Port Edward marina from noise, dust, perceived safety risk or odour.	PRLNG will consult with Port Edward Harbour Authority to understand concerns and develop mitigation measures that are appropriate and practicable. The actions described above for noise at Port Edward also apply for the Port Edward marina.
Development of marine infrastructure from Canpotex and PRLNG will affect the ability of small craft to navigate along the near shore around Ridley Island, making transit difficult, particularly in bad weather.	PRLNG will work with First Nations, other developers at the Port, the PRPA and the Port Edward Port Authority to identify strategies to provide safe and effective navigation for small craft. The effect on marine users in this area will be assessed as part of the EA.
Limited availability of skilled local labour, and community expectation that the Project should provide local employment and training opportunities, including those tailored for Aboriginal people.	PRLNG's goal is to employ qualified local residents first. The Project employment and training strategy will be developed in consultation with First Nations, government agencies, and local training and employment service providers. The strategy will recognize the future high demand for local skilled workers, and the need for partnerships to create training programs that meet the needs of local people.