Canadian Environmental Assessment Agency | Agence canadienne d'évaluation environnementale

Black Point Quarry Project

Draft Environmental Assessment Report

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Executive Summary

Black Point Aggregates Inc. (the proponent) is proposing the construction, operation, decommissioning and abandonment of a hard rock quarry and marine terminal. The Black Point Quarry Project (the Project) would be located at Black Point in Guysborough County, Nova Scotia. Quarried rock would be crushed, screened, washed and stockpiled on-site. The product would be loaded into bulk carrier ships for transport to markets along the eastern and Gulf coast markets of the United States. The average annual production rate would exceed 1 million tonnes over a span of approximately 50 years.

The Project is subject to the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) because it involves activities that are designated in the *Regulations Designating Physical Activities*. The Project includes the construction, operation and decommissioning and abandonment of a new stone quarry and marine terminal as described in items 24(c) and 16(g) of the Schedule to the *Regulations Designating Physical Activities*.

The Project was also subject to an environmental assessment under the *Environmental Assessment Regulations* of Nova Scotia's *Environment Act*. The Canadian Environmental Assessment Agency (the Agency) and Nova Scotia Environment conducted their environmental assessments pursuant to the *Black Point Quarry Project Federal-Provincial Environmental Assessment Agreement*. The agreement allowed for collaboration during the technical review of the proponent's Environmental Impact Statement and coordinated public and Aboriginal consultation.

The Agency conducted a federal environmental assessment of the Project in accordance with CEAA 2012 and evaluated the potential environmental effects of the Project. Environment Canada, Fisheries and Oceans Canada, Health Canada, Natural Resources Canada, and Transport Canada supported the Agency during the environmental assessment by participating in the technical review of the proponent's Environmental Impact Statement and providing expert advice during the preparation of this environmental assessment Report.

The Agency's environmental assessment considered the potential for the Project to cause significant adverse effects on valued components, which are notable features of the natural and human environment that may be affected by a Project. The valued components selected for this environmental assessment were migratory birds, freshwater fish and fish habitat, marine species and habitat, species at risk, physical and cultural heritage, commercial fisheries, tourism and recreation, and the current use of lands and resources for traditional purposes by the Nova Scotia Mi'kmaq.

The Agency's evaluation was completed taking into consideration the proponent's Environmental Impact Statement, additional information obtained from the proponent after reviewing the Environmental Impact Statement, advice from federal and other experts, and comments provided by Aboriginal groups and the public. The majority of comments received from Aboriginal groups related to effects on fish and fish habitat, effects on fishing for communal commercial and food, social or ceremonial purposes, effects on water quality, effects on mainland moose, wetland compensation, and disturbance of archaeological resources. Key areas of public concern included effects on fish and fish habitat, heritage resources, and tourism.

The Project's main potential environmental effects in areas of federal jurisdiction are:

- effects on marine fish from loss of habitat, and physical injury or mortality;
- disturbance of marine mammals from blasting and underwater noise;
- disturbance of migratory birds and species at risk, their eggs and their nests;
- removal of habitat for migratory birds and terrestrial species at risk;
- reduced access to commercial fishing activities; and
- effects on Aboriginal use of lands and resources.

The proponent's project plan and design incorporates mitigation measures to eliminate, reduce or control the adverse effects of the Project. Key measures identified by the Agency to mitigate effects considered in this environmental assessment include:

- conducting work in accordance with timing windows for migratory birds and marine aquatic species, or identifying additional mitigation measures outside of preferred timing windows;
- implementing measures to mitigate noise and light disturbance to migratory birds, marine aquatic species and humans;
- implementing a fisheries offsetting plan; and
- establishing measures to handle and manage archaeological and historical resources.

The Agency identified several potential or established Aboriginal or Treaty rights that could potentially be affected by the Project, including: fishing, hunting, trapping, and plant harvesting. The Agency believes that the mitigation measures outlined in this report would accommodate these potential impacts.

Key mitigation and follow-up measures are recommended as potential conditions for inclusion in the Minister of the Environment's Environmental Assessment Decision Statement. Conditions accepted by the Minister will become legally binding on the proponent if the Minister ultimately issues a decision statement indicating that the Project may proceed.

The Agency concludes that the Black Point Quarry Project is not likely to cause significant adverse environmental effects, taking into account the implementation of the recommended mitigation measures. This Draft Environmental Assessment Report will be finalized following public and Aboriginal consultation and submitted to the Minister of the Environment for consideration in formulating her environmental assessment decisions.

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List of Short Forms and Abbreviations

Abbreviation, Acronym or Short Form	Definition
Agency	Canadian Environmental Assessment Agency
CEAA 2012	*Canadian Environmental Assessment Act, 2012*
Project	Black Point Quarry Project
proponent	Black Point Aggregates Inc.

1 Introduction

1.1 Purpose of the Environmental Assessment Report

The purpose of this Environmental Assessment Report is to summarize the information and analysis considered by the Canadian Environmental Assessment Agency (the Agency) in reaching its conclusion on whether or not the Black Point Quarry Project (the Project) is likely to cause significant adverse environmental effects, after taking into account the proposed mitigation measures. The Minister of the Environment considers the Environmental Assessment Report and comments received from Aboriginal groups and the public on a draft version of the report before making the environmental assessment decisions and establishing conditions.

Black Point Aggregates Inc., a subsidiary of Vulcan Materials Company (the proponent), proposes the construction, operation, decommissioning, and abandonment of a hard rock quarry and marine terminal at Black Point in Guysborough County, Nova Scotia. Quarried rock would be crushed, screened, washed and stockpiled on-site. The product would be loaded into bulk carrier ships for transport to markets along the eastern and Gulf coast markets of the United States. The average annual production rate would exceed 1 million tonnes over a span of approximately 50 years.

1.2 Scope of Environmental Assessment

1.2.1 *Environmental assessment requirements*

The Project is subject to the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) because it involves activities that are designated by the *Regulations Designating Physical Activities*. The Project includes the construction, operation and decommissioning and abandonment of a new stone quarry and marine terminal as described in items 24(c) and 16(g) of the Schedule to the *Regulations Designating Physical Activities*.

The proponent submitted a project description on February 28, 2014. The Agency conducted a 45-day screening to determine if a federal environmental assessment of the Project should be required. The screening included a 20-day period for the public to provide comments on the Project and its potential environmental effects. On April 25, 2014, the Agency determined that an environmental assessment was required and subsequently commenced the environmental assessment on April 28, 2014.

In addition to being subject to an environmental assessment under CEAA 2012, the Project also required an environmental assessment under the *Environmental Assessment Regulations* of the *Nova Scotia Environment Act*. The Agency and Nova Scotia Environment cooperated on the conduct of the environmental assessments to the extent possible, pursuant to the *Black Point Quarry Project Federal-Provincial Environmental Assessment Agreement,* to avoid unnecessary duplication. For this environmental assessment, the federal and provincial governments collaborated during the technical review of the Environmental Impact Statement and jointly conducted public and Aboriginal consultation.

1.2.2 *Factors considered in the environmental assessment*

Pursuant to subsection 19(1) of CEAA 2012, the federal environmental assessment considered:

- the environmental effects of the Project, including the environmental effects of malfunctions or accidents that may occur in connection with the Project and any cumulative environmental effects that are likely to result from the Project in combination with other physical activities that have been or would be carried out;
- the significance of the effects;
- comments from the public;
- mitigation measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the Project;
- the requirements of the follow-up program in respect of the Project;
- the purpose of the Project;
- alternative means of carrying out the Project that are technically and economically feasible and the environmental effects of any such alternative means;
- any change to the Project that may be caused by the environment; and
- effects on species listed under the *Species at Risk Act*.

In addition to public comments, the Agency considered comments from Aboriginal groups, as well as local and Aboriginal traditional knowledge, during its assessment.

1.2.3 *Selection of valued components*

Valued components are selected to provide a focus for the evaluation of environmental effects. As the name implies, valued components have environmental or social value. The starting point for selection of valued components in a federal environmental assessment is section 5 of CEAA 2012 which requires that a federal environmental assessment take into account a Project's potential adverse effects on components within federal jurisdiction. For this environmental assessment, the following valued components were considered:

- freshwater fish and fish habitat;
- marine aquatic species and their habitat (e.g. fish, marine mammals, sea turtles);
- migratory birds;
- Aboriginal peoples' current use of land and resources for traditional purposes;
- health and socio-economic conditions of Aboriginal peoples; and
- physical and cultural heritage of Aboriginal peoples.

Aboriginal health was not chosen as a valued component. The Project is not near human receptor locations such as residences and schools where people would regularly be found.

Therefore, the most likely pathway for human health effects would be inhalation of dust from crushing, quarrying and other project activities, and noise associated with these activities, while in the area for recreational and/or other temporary use. However, the Mi'kmaq Ecological Knowledge Study conducted by the proponent revealed that there is little use of the area by Aboriginal peoples. In addition, the proponent plans to carry out the Project such that dust levels of total particulate matter (dust) at the property boundary would meet all applicable standards.

Some migratory bird and marine aquatic species that could be affected by the Project are protected by the *Species at Risk Act*, or have been assessed by the Committee on the Status of Endangered Wildlife in Canada as being endangered, threatened or of special concern. The Rusty Blackbird, a terrestrial species under provincial jurisdiction and listed on Schedule 1 of the *Species at Risk Act*, could also be affected by the Project. Species listed by the *Species at Risk Act* were considered in this environmental assessment in accordance with section 79(2) of that Act.

The marine terminal for the Project would require approval under the *Navigation Protection Act* and authorization under the *Fisheries Act*. Therefore, in accordance with subsection 5(2) of CEAA 2012, the federal environmental assessment also considered the changes to the environment resulting from the marine terminal on socio-economic conditions (i.e. commercial fishing, tourism and recreation). It also considered the changes to the environment resulting from the marine terminal on non-Aboriginal physical and cultural heritage including historical structures. Although air emissions from the marine terminal are a potential source of environmental effects pursuant to subsection 5(2) of CEAA 2012, no associated valued component (e.g. air quality) was selected due to the relatively limited magnitude of the emissions associated with the marine terminal.

The Agency focused its environmental assessment on the valued components presented in Table 1.

Table 1 Valued components selected by the Agency

Valued Component	Rationale
Valued Components identified pursuant to potential effects under subsection 5(1) of CEAA 2012	
Freshwater fish and fish habitat	Changes to water quantity and quality could adversely affect freshwater fish and fish habitat.
Marine species and habitat	Changes to water quality and habitat could adversely affect fish and other aquatic species.
Migratory birds	Higher noise levels, the presence of lights and removal or disturbance of marine or terrestrial habitat could adversely affect migratory birds.
Current use of lands and resources for traditional purposes by the Mi'kmaq	Disturbance of marine and terrestrial areas, including habitat loss and reduced access, could cause adverse effects on the use of lands and resources for traditional purposes.
Physical and cultural heritage	Disturbance of terrestrial habitat could adversely affect heritage and cultural resources of Aboriginal peoples.
Valued components identified pursuant to potential effects under subsection 5(2) of CEAA 2012	

Valued Component	Rationale
Commercial Fisheries	Reduction of available fishing area and interference with navigation due to the construction and operation of the marine terminal could adversely affect commercial fisheries.
Tourism and Recreation	The marine terminal could adversely affect tourism and recreation.
Physical and cultural heritage	Disturbance of habitat from marine terminal construction could affect heritage resources of non-Aboriginal people.
Valued Components identified pursuant to potential effects under subsection 5(1) of CEAA 2012 and/or pursuant to subsection 79(2) of the *Species at Risk Act*	
Species at risk	Disturbance of marine and terrestrial habitat could adversely affect aquatic or bird species that are listed under the *Species at Risk Act*. These are treated as a distinct valued component, in recognition of requirements pursuant to the *Species at Risk Act*.

Other effects of the Project were assessed by the Province of Nova Scotia through its environmental assessment process (e.g. impacts of the quarry on non-Aboriginal heritage resources).

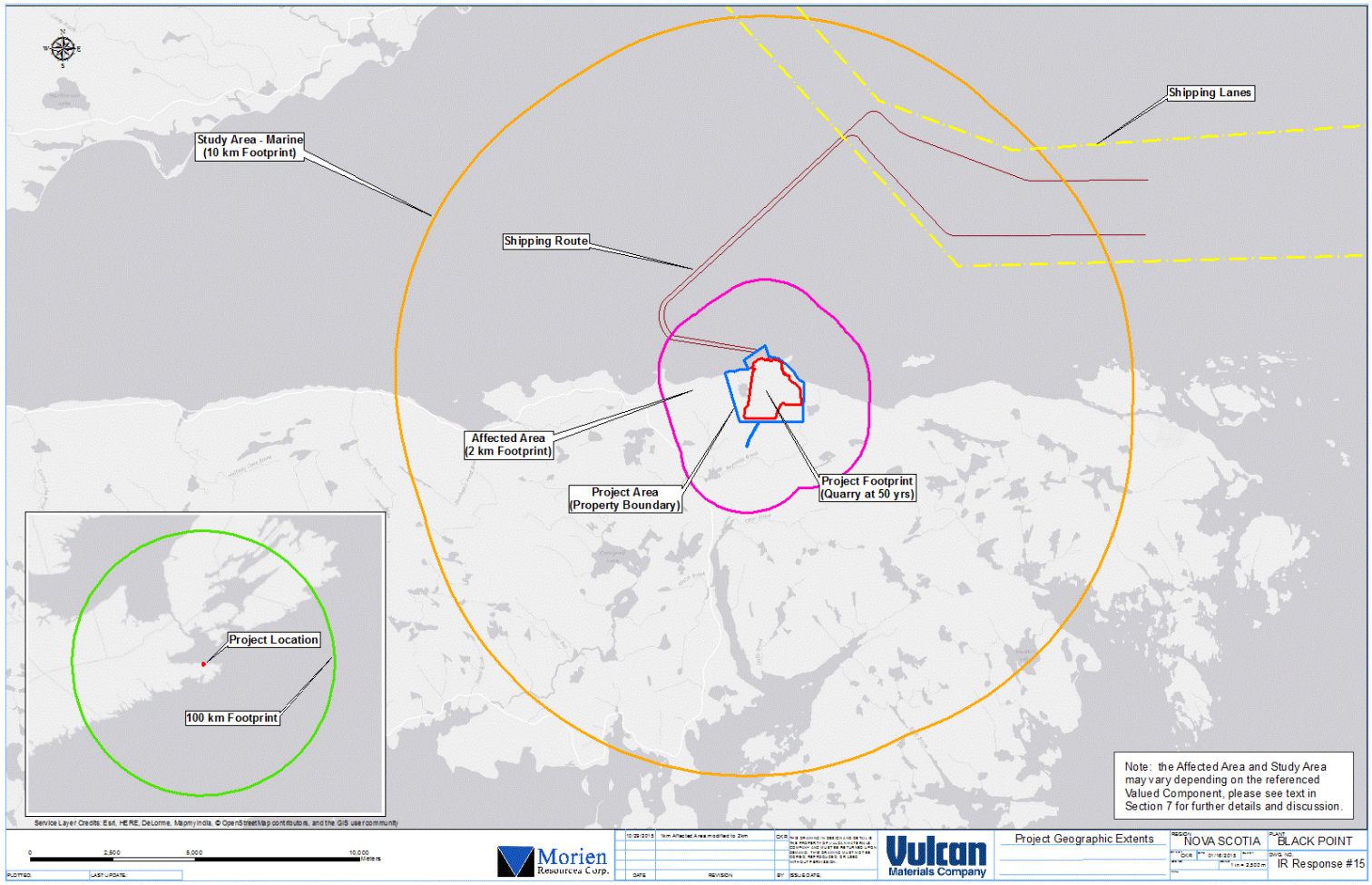
1.2.4 *Spatial and temporal boundaries*

Spatial boundaries are the geographic limits that help define the scale and range of the interactions between the Project and each valued component. The spatial boundaries depend on and are characterized by the nature of the environmental effects and related biological and physical considerations. The spatial boundaries include geographical regions within which interactions between the environment and the Project are predictable, potentially noticeable, and can be analyzed. The spatial boundaries can vary for different valued components depending on these conditions. Even for the same valued component, the Project would interact with the environment in various ways that are defined differently based on scale and range. Therefore, the proponent used three distinct spatial boundaries to conduct their effects assessment of each valued component: the Project Area, the Affected Area, and the Study Area. These boundaries are defined below in general terms and the boundaries for the Project, as defined by the proponent, are shown in Figure 1:

1. The **Project Area** was confined to all territory within the limits of the project property boundary;
2. The **Affected Area** was the area which could potentially be affected by project components or activities immediately beyond the project area. For most valued components the Affected Area was generally within two kilometres of the project property limit; and
3. The **Study Area** was defined by considering all project-environment interactions, including diffuse or longer range effects.

The temporal boundaries set the time period within which potential adverse environmental effects of the Project are considered. Temporal boundaries for this environmental assessment comprise the entire life of the Project, from construction through to decommissioning and site remediation.

Figure 1 Spatial Boundaries for the Environmental Assessment



Source: Black Point Quarry Information Request (IR) Responses

1.2.5 *Method and approach*

The Agency reviewed the proponent's environmental impact statement, additional information requested, public and Aboriginal comments received, and the views of government experts. The potential environmental effects of project activities and components were then assessed using a standard framework to facilitate the individual assessment of each valued component. The analysis began with ranking potential project-valued component interactions and effects. The assessment focused on those interactions that may result in an effect of concern. Evaluation tables and matrices were utilized to analyze these interactions. Residual project-related environmental effects (i.e. those environmental effects that remain after mitigation measures have been applied) were characterized for each valued component based on the following criteria set out in the Agency's *Reference Guide: Determining Whether a Project is Likely to Cause Significant Adverse Environmental Effects*:

- magnitude: relative importance of the consequences of a project-related effect on the structure or function of a valued component;
- extent: geographic area that would be affected, or proportion of people who would be affected;
- duration: time period during which the activity would affect the valued component;
- reversibility: whether or not an affected valued component would be able to return to its original state (prior to the environmental effect);
- ecological or social context: the existing levels of human activity and associated disturbance*;* and
- frequency: how often an effect would occur within a given time period.

The significance of each residual project-related environmental effect was then determined based on pre-defined standards or thresholds. Appendix A summarizes the residual effects assessment for all valued components, for routine operations.

The Agency's analysis and conclusions on the significance of environmental effects on the selected valued components are presented in section 6.

The Agency's assessment included both direct effects from the Project and those effects that may result from predicted changes to the environment. Environmental effects associated with the following were also assessed:

- accidents and malfunctions (potential events that could result in adverse environmental effects - section 7.1);
- effects of the environment on the Project (potential changes to the Project that may result from interactions with the environment or natural events - section 7.2); and
- cumulative environmental effects (the potential for the residual environmental effects of the Project to interact cumulatively with the residual environmental effects of other physical activities that have been or would be carried out - section 7.3).

2 Project Overview

2.1 Project Location

The Project is located at Black Point, Guysborough County, Nova Scotia (Figure 2).

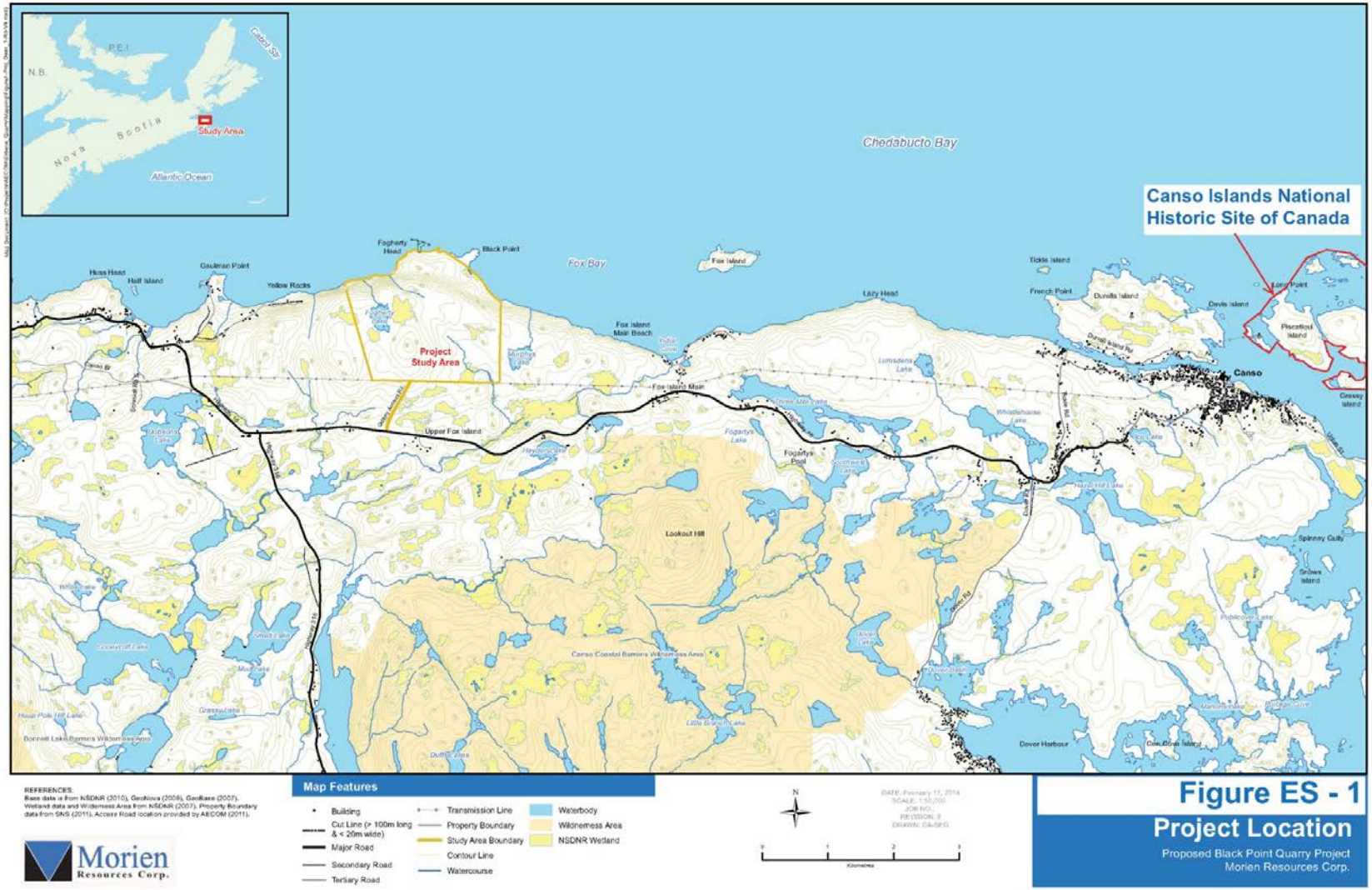
2.2 Project Components

The primary components of the Project are:

- a 180-hectare open-pit quarry and primary crushing area;
- a mobile processing plant to be used for producing material required for initial site development (Phases 1 and 2 of operations);
- a processing (finishing) plant consisting of secondary and tertiary processing (crushing and washing) and a stockpile laydown area comprising approximately the western half of the plant area (to support phases 3, 4 and 5 of operations). The plant would also include a number of conveyors for moving material within the plant and to the shiploader, two sedimentation ponds, each sized to hold about 6100 cubic metres, water management features, diesel generators, and fuel storage;
- a 160-metre long marine terminal and load-out facility;
- an 800-metre unpaved access road from provincial Route 16 to the quarry;
- a 2.5-kilometre single-pole transmission line connecting the existing transmission line along Route 16 to the Black Point processing plant near the shore of Chedabucto Bay; and
- modular buildings comprising an administration complex.

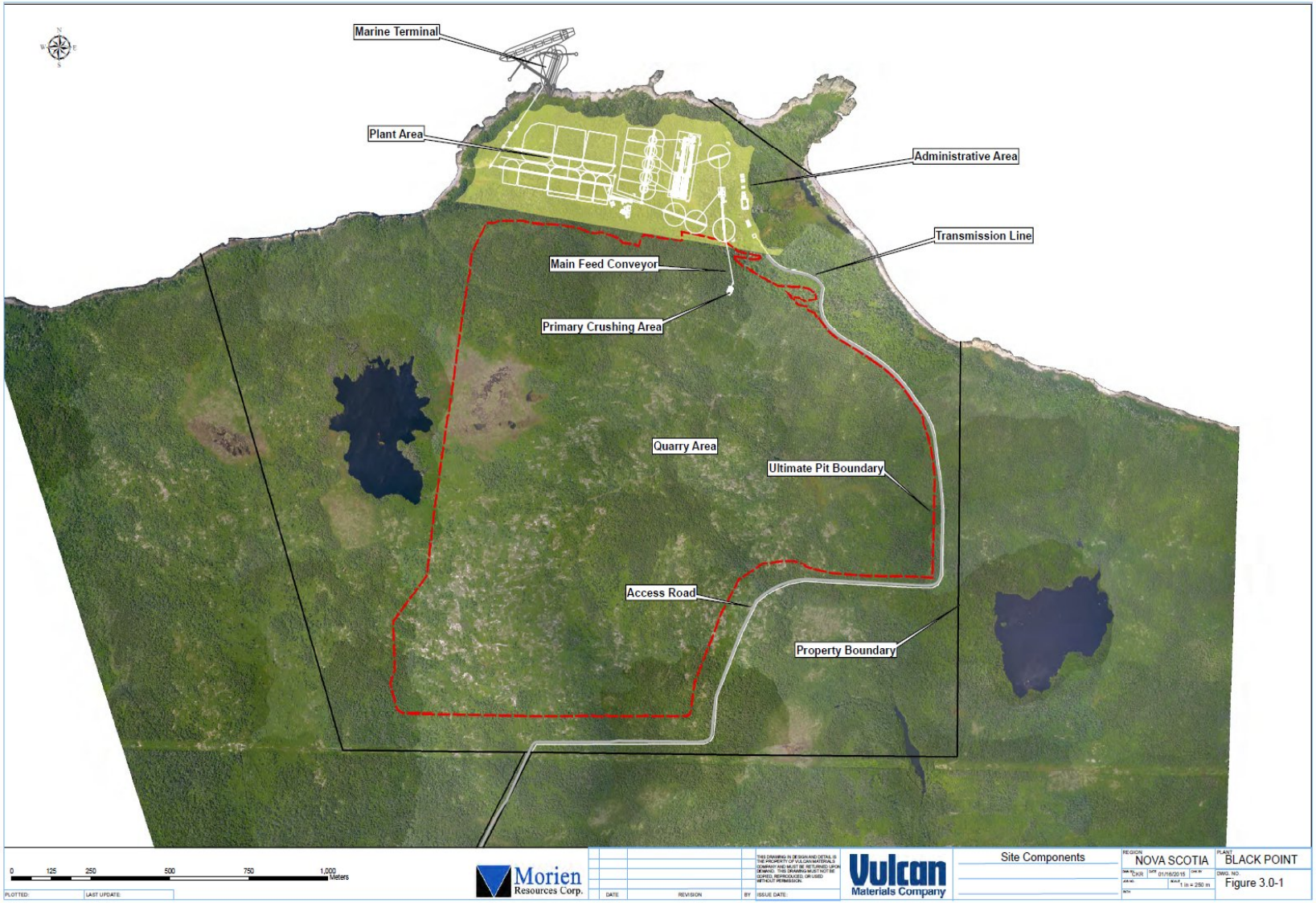
The project components and site layout are depicted in Figure 3.

Figure 2 Project Location



Source: Black Point Quarry Environmental Impact Statement, SLR Consulting (Canada) Inc.

Figure 3 Primary Project Components



Source: Black Point Quarry Environmental Impact Statement, SLR Consulting (Canada) Inc.

2.3 Project Activities

The main activities associated with the construction, operation and decommissioning of the Project are:

- site preparation;
- marine terminal construction;
- quarrying;
- processing plant development and operation;
- ship loading; and
- decommissioning and abandonment.

Site Preparation

Site preparation would begin with clearing of vegetation and removal and stockpiling of organic material and overburden on the 28-hectare processing plant site and administrative area. Following this, a cut or excavation of approximately 600 000 cubic metres and a fill of 835 000 cubic metres would be needed to level the area prior to installation of the processing plant. The plant and administrative area would be designed with one metre of cross slope drainage to direct all storm water to two sedimentation ponds that would be constructed at the west side of the plant area. Preparation and construction of the plant site and administrative area are anticipated to take approximately three years.

Marine Terminal Construction

The marine terminal would be constructed from shore using fill and rock (i.e. rip-rap) sourced from the site. Typical construction support includes cranes to lift in reinforcing steel, concrete trucks and pumps and lights for night time activity. The completion of each caisson, once sunk, would take approximately one month. The slewing rail piers, which would support the slewing rail that allows the shiploader to move in an arc, would be supported by piles installed from a barge. There would be approximately eleven piers with four piles each.

The piles would be installed using pile-driving hammers and churn drills and would be anchored in the bedrock. No dredging would be required. All marine construction would be completed using conventional techniques.

Prefabricated steel for the slewing rail and the shiploader would be delivered to the site via barge. Installation would be by cranes and work barges. The loadout conveyor (equipped with aggregate spill containment) would extend from the onshore loadout system to the shiploader. Any piles required for the loadout conveyor in the nearshore area would be located in the rubble fill.

Quarrying

The site would be developed as an open-pit quarry using conventional surface mining methods. The mining cycle would consist of:

- loosening and stockpiling vegetation, overburden, and loose rock by bulldozer or track hoe equipment;
- drilling and blasting to establish benches, haul roads, and sumps for stormwater management;
- loading loosened rock into haul trucks by track-mounted or rubber tired loading equipment; and

- transporting the quarried rock by haul trucks to a discharge point at the edge of the quarry for feed to the primary crusher.

It is anticipated that blasting would initially occur 30 days per year and increase to a maximum of about 200 days per year at full operation. A typical production shot (i.e. blast) would have up to 100 drill holes, each approximately 15 to 17 metres deep. The depth of shot holes utilized for quarry development such as haul roads and sumps would vary from three to ten metres. All blasting would occur more than 900 metres away from any residential structures.

Freshly mined rock would be transported to and reduced in size by a primary crusher located on a bench on the east side of the quarry. The crushed material would then be transported to the processing plant via the main feed conveyor.

Quarry development would progress through the following stages:

- development of an access road and plant pad;
- establishment of a haul ramp from plant pad to an elevation of 52 metres above sea level (primary dump elevation);
- location of the primary crushing station;
- construction of a temporary sump with a capacity of up to 66 000 cubic metres;
- establishment of a haul ramp down to an elevation of 22 metres above sea level to prepare for the construction of the main pit sump; and
- construction of a permanent sump with a capacity of up to 386 000 cubic metres.

The quarry would not occupy the entire property; quarrying would stop 95 metres inside the eastern property boundary, 125 metres inside the southern property boundary and 225 metres inside the western property boundary.

Processing Plant Development and Operation

Based on preliminary design, the processing plant would be developed in five phases, beginning with an initial portable circuit utilized for site development and progressing to a larger fixed plant capable of an anticipated peak annual production of 7.5 million tonnes. The five phases are described below:

- **Phase 1 (2018-2019):** Blasted material would be trucked to a mobile plant with a capacity of 1000 tonnes per hour and dumped adjacent to it. The material would be loaded onto a conveyor that would feed the material into the plant for crushing to produce coarse fill material for site development needs (e.g. access road construction). The resulting coarse fill material would be stockpiled beside the conveyor. The product would remain on-site during this phase;
- **Phase 2 (2019-2020):** In this phase, two additional track-mounted crushing modules would be added to the Phase 1 equipment. The plant would produce a fine-grade fill material for final site development needs. The fine-graded fill material would be stockpiled by the conveyor. No aggregate washing would occur during Phases 1 or 2. Marine terminal construction is expected to begin during Phase 2;

- **Phase 3 (2020-2022):** After the processing plant site has been developed, additional mobile units would be added to meet initial sales demand. Full-scale operations using the marine terminal would begin during Phase 3. Various products would be stockpiled at the plant via conveyor and trucked to the marine terminal. The conveyor feeding the ship loader would include a loadout hopper that can be filled with a plant loader.

- **Phase 4 (2021-2026):** In this phase, blasted material would be trucked to the primary crusher where it would be dumped into the primary hopper. There it would be crushed and conveyed to a primary surge pile from where it would be fed into the plant. As the material is further crushed and screened, it would be conveyed to product piles that are located over reclaim tunnels (tunnels equipped with product conveyor systems). Products could then be reclaimed at the wash tower for rinsing or bypassed around it. Material would then be stockpiled over the loadout reclaim tunnels that would convey product to the marine terminal; and

- **Phase 5 (2026-2030):** In this phase, a parallel tertiary processing circuit will be installed as the production rates approach the limit of the initial fixed plant from phase 4. Production through the finishing plant would be increased to 2800 tonnes per hour. Processing and loadout of the material would be identical to the Phase 4 plant but with a higher capacity. The parallel circuit would be identical to the original tertiary portion to minimize design time and costs.

Ship Loading

Ship loading would commence in Phase 3 of the plant development. Aggregate would be loaded into the holds of ships (up to 70 000 tonnes) and barges (for coastal deliveries) that would transport the material to end markets. Aggregate would be loaded by conveyors at up to 5000 tonnes per hour once the full load-out system is completed. Average loading rates would vary and it is estimated that it would take approximately 18 to 24 hours to load the largest ships. Approximately 90 to 100 ships would be loaded per year once the plant reaches peak production.

Decommissioning and Abandonment

The proponent would lease the property from the Municipality of the District of Guysborough for the life of the quarry, estimated to end sometime after 2070. The land would be returned to the Municipality following the completion of operations, equipment decommissioning, removal of plant and marine terminal infrastructure, and the acceptance of plans for site decommissioning activities, including reclamation and rehabilitation.

In accordance with the requirements of the *Nova Scotia Pit and Quarry Guidelines* (NSEL 1999), the proponent would prepare a rehabilitation plan as part of the provincial Industrial Approval application. This plan is a written document approved by Nova Scotia Environment Department to provide for partial or total abandonment of the pit or quarry and may include an initial rehabilitation plan, progressive rehabilitation or a final rehabilitation plan. The proponent would also post interim and final security bonds for the quarry, as required by the *Nova Scotia Pit and Quarry Guidelines* and the Approval and Notification Procedure Regulations. Before the expiry of the interim security, the Proponent must submit a rehabilitation plan. This rehabilitation plan must include the estimated total cost for labour, equipment, supplies and services to undertake the following activities: (i) surface contouring, (ii) establishing proper drainage, (iii) revegetation work, and (iv) any work necessary to reclaim the pit or quarry.

All equipment and related infrastructure including the processing plant, machinery and equipment would be removed from the site, unless the Municipality requests keeping certain infrastructure on-site. The plant site and administrative areas would be graded to allow for future commercial, industrial, recreational, or residential land use, or to allow for restoration of the area to existing conditions to provide wildlife habitat. The pit would be allowed to fill with fresh water to an elevation near sea level.

To avoid disturbance of the marine environment and to allow for potential future use, the rubble mound, mooring dolphins, caissons, slewing rails, and buoys would likely be left in place. The shiploader arm and ancillary mechanical equipment including suspended conveyors, dust collectors and drive belts would be removed.

Subject to the necessary regulatory approvals, authorizations, and permits, construction could start as soon as 2018. The proponent's proposed project schedule is outlined in Table 2.

Table 2 Project Schedule

Year	Activity Anticipated
2016	Permits and approvals
2018-2021	Construction and equipment testing (limited production) - plant phases 1 through 3
2021	Commence full scale operations – plant phases 3 through 5
2070+	Closure and decommissioning

Source: Black Point Quarry Environmental Impact Statement, SLR Consulting (Canada) Inc.

3 Purpose of Project and Alternative Means

3.1 Purpose of Project

The proponent stated that the purpose of the Project is to supply construction aggregates to markets predominantly on the eastern and Gulf coasts of the United States of America and possibly in eastern and central Canada. Construction aggregates have numerous end uses, but the main one is the production of concrete and asphalt.

3.2 Alternative Means of Carrying Out the Project

CEAA 2012 requires that every environmental assessment of a designated project identify and consider the environmental effects of technically- and economically-feasible alternative means of carrying out the project. The Agency's Operational Policy Statement *Addressing "Purpose of" and "Alternative Means" under the Canadian Environmental Assessment Act, 2012* (CEAA, 2013) sets out the general requirements and approach to address the alternative means of carrying out the designated project under CEAA 2012. In accordance with the Operational Policy Statement, the proponent undertook the following steps to assess alternative means of carrying out the Project:

1. Consider the technical feasibility of alternative means of carrying out the Project;
2. Consider the economic feasibility of alternative means of carrying out the Project;
3. Consider the environmental and socio-economic effects of the identified technically and economically feasible alternatives of carrying out the Project; and
4. Select the preferred means of carrying out the Project based on the relative potential effects of the alternatives that are technically and economically feasible.

The proponent evaluated alternative means for the following aspects of the Project:

- quarry locations;
- rock extraction methods;
- quarry development and transportation;
- marine terminal locations;
- marine terminal construction methods;
- stockpile locations;
- waste management facilities; and
- electrical supply.

Appendix B contains further details of the proponent's alternative means analysis for the Project.

3.2.1 *Views expressed*

Public

The Sierra Club (Atlantic Canada Chapter) commented that there was insufficient analysis to identify alternative ways to undertake the Project; for example, the feasibility of using alternative renewable energy sources for generating electricity on-site was not considered. Similarly, septic waste management responsibility is offloaded by transportation of waste to an offsite location. Due to the long-term operation of the site, the Sierra Club stated that it is important to consider innovation of this sector during planning. The proponent responded that a large volume holding tank may be utilized; however, it would also consider a raised bed septic system as a possible alternative to a collection tank with follow up transport and treatment at the Canso municipal waste water treatment facility.

Local fishers recommended that the marine terminal be located as far west as possible, to increase the sheltering effect from wind and strong currents off Black Point. The proponent noted that waters to the west are not sufficiently deep for the terminal. Following discussions with the local fishers, the originally-selected location for the marine terminal was determined to be preferable in minimizing impacts on fishing. However, based on advice from fishers, the proponent altered its shipping route to avoid preferred shrimping grounds between the established shipping lanes and the marine terminal (section 6.5).

3.2.2 *Agency Analysis and conclusion*

The proponent considered technically and economically feasible alternative means of carrying out the project, including alternative means of quarry development and marine terminal construction. The Agency is satisfied that the proponent's assessment of the alternative means of carrying out the Project is in accordance with Agency guidance.

4 Consultation Activities and Advice Received

4.1 Public Consultation

The Agency provided three formal opportunities for the public to participate in the screening and subsequent environmental assessment process:

- an opportunity to comment on the project description;
- an opportunity to comment on the draft Environmental Impact Statement Guidelines; and
- an opportunity to comment on the summary of the proponent's Environmental Impact Statement.

In addition, the public is now invited to comment on this Draft Environmental Assessment Report.

4.1.1 *Public participation led by the Agency*

Notices of public consultation opportunities were posted on the Canadian Environmental Assessment Registry Internet Site, and advertised through local media. Individuals and groups who had expressed an interest in the Project during the screening were notified directly of consultation opportunities. Table 3 provides the dates and duration of the comment periods. For the fourth public consultation opportunity, the Agency invites the public to provide comments on the content, conclusions and recommendations set out in this Draft Environmental Assessment Report. After taking into consideration the comments received from the public, the Agency will finalize the Environmental Assessment Report and submit it to the Minister of the Environment for consideration when making the environmental assessment decisions.

Table 3 Public comment opportunities during the Environmental Assessment

Consultation Document	Dates
Summary of the project description	March 11 to 31, 2014 (20 days)
Draft Environmental Impact Statement Guidelines (and draft consultation plans for Aboriginal groups)	April 28 to May 28, 2014 (30 days)
Environmental Impact Statement and associated summary	March 4 to April 3, 2015 (30 days)
Draft Environmental Assessment report and Potential Conditions	January 4, 2015 to February 3, 2016 (30 days)

Participants in the environmental assessment to date have included environmental organizations, industry organizations, municipal governments and individuals. Specifically, comments have been received from: the Sierra Club (Atlantic Canada Chapter), Canso and Area Development Association, Chedabucto Aggregates, Ecology Action Centre, Fogarty Family, Guysborough County Community Business Development Corporation Ltd., Guysborough County Inshore Fishermen's Association, International Union of Operating Engineers, Little

Dover Development Association, Melford International Terminal Inc., Mining Association of Nova Scotia, Nova Scotia Community College Strait Area Campus, Strait Engineering Ltd., and individuals.

The issues raised during the public consultations include potential effects on:

- water quality and quantity;
- local fisheries;
- heritage resources; and
- tourism.

In addition, comments were received on matters considered within the Nova Scotia environmental assessment process including effects on drinking water and archaeology, as well as support of economic development. Additional discussion of public comments is included in sections 6 and 7.

The Agency supported public participation in the federal environmental assessment through its Participant Funding Program. A total of $20,902 was allocated to the Sierra Club (Atlantic Canada Chapter) and Frank Fogarty to participate in the environmental assessment of this Project.

4.1.2 *Public participation activities by the proponent*

The proponent implemented a consultation program to:

- identify issues and concerns of interest to affected communities, stakeholder groups, and residents;
- assist in judging the nature and intensity of project benefits or impacts;
- solicit local information and expert opinions; and
- fulfil regulatory requirements.

The proponent informed stakeholders about the Project, explained the planning and regulatory processes, advertised consultation and engagement opportunities, and solicited input on the Project Description and the Environmental Impact Statement. Engagement tools and techniques employed as part of the proponent's public consultation program included:

- a project-specific website – www.blackpointquarry.ca;
- a stakeholder database including e-mail and mailing lists used for e-mail outreach to interested residents and others;
- two open house events (2014 and 2015), public information sessions and public presentations;
- establishment of the Community Liaison Committee in 2014;
- public notices regarding key milestones and Community Liaison Committee membership;
- interviews with provincial and local media outlets;
- a project newsletter distributed via mail drops, newspaper inserts, and e-mail; and
- other stakeholder group meetings and door-to-door introductions to residents.

The proponent committed to continue to engage parties throughout the planning process and operational stages of the Project.

4.2 Aboriginal Consultation

4.2.1 *Aboriginal consultation led by the Agency*

The Crown has a duty to consult Aboriginal groups, and, where appropriate, to accommodate, when its proposed conduct might adversely impact an established or potential Aboriginal or Treaty right. Aboriginal consultation is also undertaken more broadly as an important part of good governance, sound policy development and appropriate decision making. For the purposes of the environmental assessment, the Agency's role as federal Crown Consultation Coordinator was to facilitate a federal whole-of-government approach to consultation. The Province of Nova Scotia, led by Nova Scotia Environment, also conducted consultation according to the *Mi'kmaq-Nova Scotia-Canada Consultation Terms of Reference*. Federal and provincial Aboriginal and public consultation was coordinated to the extent possible.

The Agency consulted the Nova Scotia Mi'kmaq First Nations with respect to potential impacts on potential or established Aboriginal or Treaty rights. The Mi'kmaq of Nova Scotia assert Aboriginal and Treaty rights and Title over the province of Nova Scotia. Nova Scotia First Nations are signatories to Peace and Friendship Treaties from which the right to a moderate livelihood, such as from fishing, flows. The Mi'kmaq of Nova Scotia assert rights to the marine environment and its resources and believe that any potential effects on the marine environment, fish and fish habitat, and any obstruction affecting the Mi'kmaq from accessing these would impact their rights. During consultation for this environmental assessment, 12 of the 13 Nova Scotia Mi'kmaq First Nations were represented by the Kwilmu'kw Maw-klusuaqn Negotiation Office, while the Sipekne'katik First Nation represented itself.

In order to fulfill Crown consultation obligations, the Agency integrated Aboriginal consultation into the environmental assessment process. As per the *Black Point Quarry Project Federal-Provincial Environmental Assessment Agreement,* the Agency and Nova Scotia Environment consulted the Aboriginal groups in accordance with the *Mi'kmaq-Nova Scotia-Canada Consultation Terms of Reference*, as appropriate. The Agency also developed and provided a draft plan to the Kwilmu'kw Maw-klusuaqn Negotiation Office and Sipekne'katik First Nation, to guide the consultation process. The draft consultation plans were provided to them at the same time as the Draft Environmental Impact Statement Guidelines were provided for comment. No comments were received on the draft consultation plans.

A total of $105,438 from the Agency's Participant Funding Program was allocated to the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation. The funding is intended to support Aboriginal groups' participation in the consultation opportunities related to the Environmental Impact Statement, the Draft Environmental Assessment Report, and potential conditions.

In addition to inviting Aboriginal groups to comment during the public comment periods identified in Table 3, the Agency also conducted direction consultations. The Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation each made written submissions during the environmental assessment process. The Agency considered the written submissions and met with the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation, as needed, to discuss the environmental assessment and Aboriginal consultation processes and to ensure their concerns were understood. Meetings were held with the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation in May and June 2014, respectively, to discuss the

environmental assessment process, roles of the proponent and government, and the proponent's engagement activities. In May 2015, the Agency chaired a technical working session, with participation from Fisheries and Oceans Canada, the Province of Nova Scotia, and the proponent, to discuss the Kwilmu'kw Maw-klusuagn Negotiation Office's comments on the Environmental Impact Statement. In summer and fall of 2015, the Agency met with the Kwilmu'kw Maw-klusuagn Negotiation Office to discuss current Mi'kmaq use of fisheries resources. The Agency maintained contact with the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation throughout the environmental assessment to ensure that they remained abreast of the process as it advanced and to respond to any questions.

Key issues raised during consultation were linked to potential effects on:

- fish and fish habitat;
- fishing for communal commercial and food, social or ceremonial purposes;
- water quality;
- mainland moose;
- wetlands; and
- archaeological resources.

Appendix F presents concerns raised by the Aboriginal groups during the environmental assessment process, along with the proponent's and Agency's responses. The concerns raised are also discussed in the context of individual valued component throughout section 6. Potential effects of the Project on the current use of lands and resources for Aboriginal traditional purposes are described in section 6.6, while potential effects on potential or established Aboriginal or Treaty rights are discussed in section 8.

4.2.2 *Aboriginal consultation and engagement activities by the proponent*

The proponent (at that time, Morien Resources Corp.) first contacted the Nova Scotia Mi'kmaq First Nations in 2010. Over the next two years, meetings were held with the Chief of Paq'tnkek, the Band Manager of the Millbrook First Nation, and representatives of the Kwilmu'kw Maw-klusuagn Negotiation Office to introduce and discuss the Project.

The proponent continued to engage the Nova Scotia Mi'kmaq First Nations , meeting with Mi'kmaq groups including the Kwilmu'kw Maw-klusuagn Negotiation Office and the Sipekne'katik First Nation. The proponent conducted three field visits to the project site, during which Mi'kmaq representatives were in attendance. The proponent also invited the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation to participate in the Community Liaison Committee.

On behalf of the proponent, an archaeological consultant, Davis MacIntyre & Associates Limited conducted archaeological resource impact assessments in 2011 and 2014. Mi'kma'ki All Points Services conducted a Mi'kmaq Ecological Knowledge Study in 2013 to support the Environmental Impact Statement. In October 2014 Kerry Prosper, an elder from the Paq'tnkek Mi'kmaq Nation, was contracted to assist non-Aboriginal biologists from AMEC Environmental to conduct a fall moose survey.

In March 2014, the proponent initiated benefits agreement discussions with the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation. Efforts to date include meetings, telephone conversations, e-mails and exchange of draft Memoranda of Understanding with the Kwilmu'kw Maw-klusuagn Negotiation

Office. To date, no Memorandum of Understanding has been finalized with either the Kwilmu'kw Maw-klusuagn Negotiation Office or Sipekne'katik First Nation. In 2015, the proponent engaged the Mi'Kmaw Conservation Group to provide additional information on First Nation fishing activities by conducting a Mi'kmaq Fisheries Study.

4.3 Participation of Federal and Other Experts

The following federal departments contributed expert information or knowledge to the environmental assessment, including during the review of the proponent's Environmental Impact Statement and the preparation of this report:

- Environment Canada;
- Fisheries and Oceans Canada;
- Health Canada;
- Transport Canada; and
- Natural Resources Canada.

As part of the coordinated federal-provincial environmental assessment process, a number of Nova Scotia provincial government agencies conducted a technical review of the proponent's Environmental Impact Statement and provided advice to the Agency, including:

- Nova Scotia Environment;
- Nova Scotia Natural Resources;
- Nova Scotia Health and Wellness, Agriculture, Transportation & Infrastructure Renewal;
- Nova Scotia Office of Aboriginal Affairs; and
- Nova Scotia Communities, Culture and Heritage.

5 Geographical Setting

The proposed quarry location is a 354.5-hectare property located at Black Point on the south shore of Chedabucto Bay in Guysborough County, Nova Scotia. The Project site is bounded to the north by Chedabucto Bay and to the south by a 69-kilovolt electrical transmission line. No federal lands would be used for this Project. The nearest federal lands are located at the Canso Islands National Historic Site (which includes the Grassy Island Forts site), approximately ten kilometres east of Black Point.

The project site is on an undulating granite hill with minimal soil cover and overburden. The hill has a maximum elevation of approximately 96 metres above sea level and slopes down to where a cliff is present. The site then levels off at approximately 22 metres above sea level where it gradually grades to a rocky coast. The regional geology consists of Ordovician age metamorphosed sediments of the Halifax and Goldenville formations, intruded by Devonian age granites. The granite is the rock that would be quarried and crushed to produce aggregate.

5.1 Biophysical Environment

The 354.5-hectare property measures approximately 2.75 kilometres from east to west and is generally less than two kilometres wide from north to south. Much of the terrain at higher elevations consists of exposed bedrock interspersed with thin, patchy vegetation and stunted trees. Vegetation and tree cover thicken at lower elevations on the flanks of the exposed granite dome. The massive granite rock limits infiltration of rainwater and snowmelt, resulting in a number of wetlands distributed across the property at lower elevations. In these areas (e.g. around Fogherty Lake) and extending north to the coast, wetlands mixed with mature black and red spruce forest dominate the landscape. There are three unnamed watercourses on the site, including the outflow from Fogherty Lake, the only lake on the Black Point property. The watercourses are narrow, shallow and do not contain fish. One stream is ephemeral. Fogherty Lake has a surface area of approximately 6.8 hectares and is relatively shallow and strongly acidic (pH 2.9 to 3.4). Water in the lake is dark brown and visibility is limited. Nearby Murphys Lake (six hectares in area) located east of the Black Point Property is also acidic and is surrounded by wetlands.

A number of habitat types are encountered within the project site. Most of the area is covered by a mosaic of barren vegetation, tall shrub barren, and some coniferous forest. There are also patches of mixed forest, and wetlands such as treed bog, open bog, fen, and swamp scattered throughout the project site. A variety of other habitat types are also present, including beaches, coastal barren headlands, coastal cliffs, regenerating forests, and lakes.

5.2 Human Environment

Lands immediately surrounding the project area are largely undeveloped and have a low population. In 2011 Guysborough County had a population of approximately 8100. Residential development in the vicinity of the Project is relatively sparse; there are no residential structures within 500 metres of the site boundary, 11 within one kilometre, and fewer than 50 within two kilometres. The nearest residence is located 700 metres from the property boundary on the coast at the east end of Half Island Cove Road. Provincial Route 16 (Marine Drive) runs parallel to the southern boundary of the project site and is located approximately 750 metres south of the

site. The nearby communities of Half Island Cove, Fox Island Main and Upper Fox Island along Route 16 are rural communities with a low population density. The nearest residence on Route 16 is approximately 750 metres from the property boundary. There are no hospitals, retirement hospices, schools or day care centres within 5 kilometres of the site.

The property is owned by the Municipality of the District of Guysborough and is relatively inaccessible, although all-terrain vehicle trails and the transmission line provide access to the granite highlands. Access to the lower coastal platform is more difficult but can be gained through footpaths or boats. An overgrown all-terrain vehicle trail provides access from the east. Local residents report visiting the beaches east and west of Black Point. The property has also been used for trapping and hunting in the relatively recent past.

The project area and surrounding lands were settled by Europeans in the early nineteenth century. Historical records and oral history recount that Black Point became a vibrant settlement toward the end of that century. Several historical artifacts were identified in the project area during a 2014 Archaeological Resource Assessment including six probable house foundations, stone piles, apple trees, and the remnants of an iron stove.

The nearest mainland First Nation community is Paq'tnkek First Nation (in Afton, Nova Scotia). It is located approximately 75 kilometres northwest of the project site.

6 Predicted Effects on Valued Components

6.1 Freshwater Fish and Fish Habitat

6.1.1 *Proponent's assessment of environmental effects*

The freshwater environment within the project's property boundary consists of one water body (Fogherty Lake), and three watercourses (Figure 4). Field work conducted by the proponent revealed that no freshwater fish or fish habitat are present within the property boundary due to naturally-occurring acidity (pH 2.9 to 3.4). Although these water bodies do not support fish, the proponent stated that it would implement standard mitigation measures to prevent eroded sediment from reaching these water bodies. However, other waterbodies near the site, which may support fish, may be affected by changes in flow patterns that are caused by the Project.

Potential Effects on Water Quality

Project activities would remove some freshwater environment and may affect water quality and quantity. For example, the Project could increase the amount of sediment released into the freshwater environment during construction. Construction of roads may require watercourse crossings and culvert installations which could result in a loss of habitat. Water quality may be affected by construction altering drainage patterns, the operation and maintenance of roads, surface water discharges, and blasting residue. Removal of rock would alter surface and groundwater flow patterns, including reducing Reynolds Brook inflows and may reduce surface flows and water quality further downstream.

The proponent's analysis indicated that the primary effect of the quarry on freshwater habitat would be due to changes in drainage patterns. The proponent indicated that drawdown from the completed quarry would potentially occur up to 400 metres from the quarry face. Altered flow would occur slowly over time as the quarry develops. For example, Watercourse Two would not be affected until sometime after year five of pit development. The proponent committed to installing monitoring wells which would establish baseline conditions and any changes in water table. While primarily intended to verify the prediction that water levels in nearby domestic wells would not be lowered, the wells would also detect changes that could lead to drawdown of surface waters.

Potential Effects on Fish and Fish Habitat

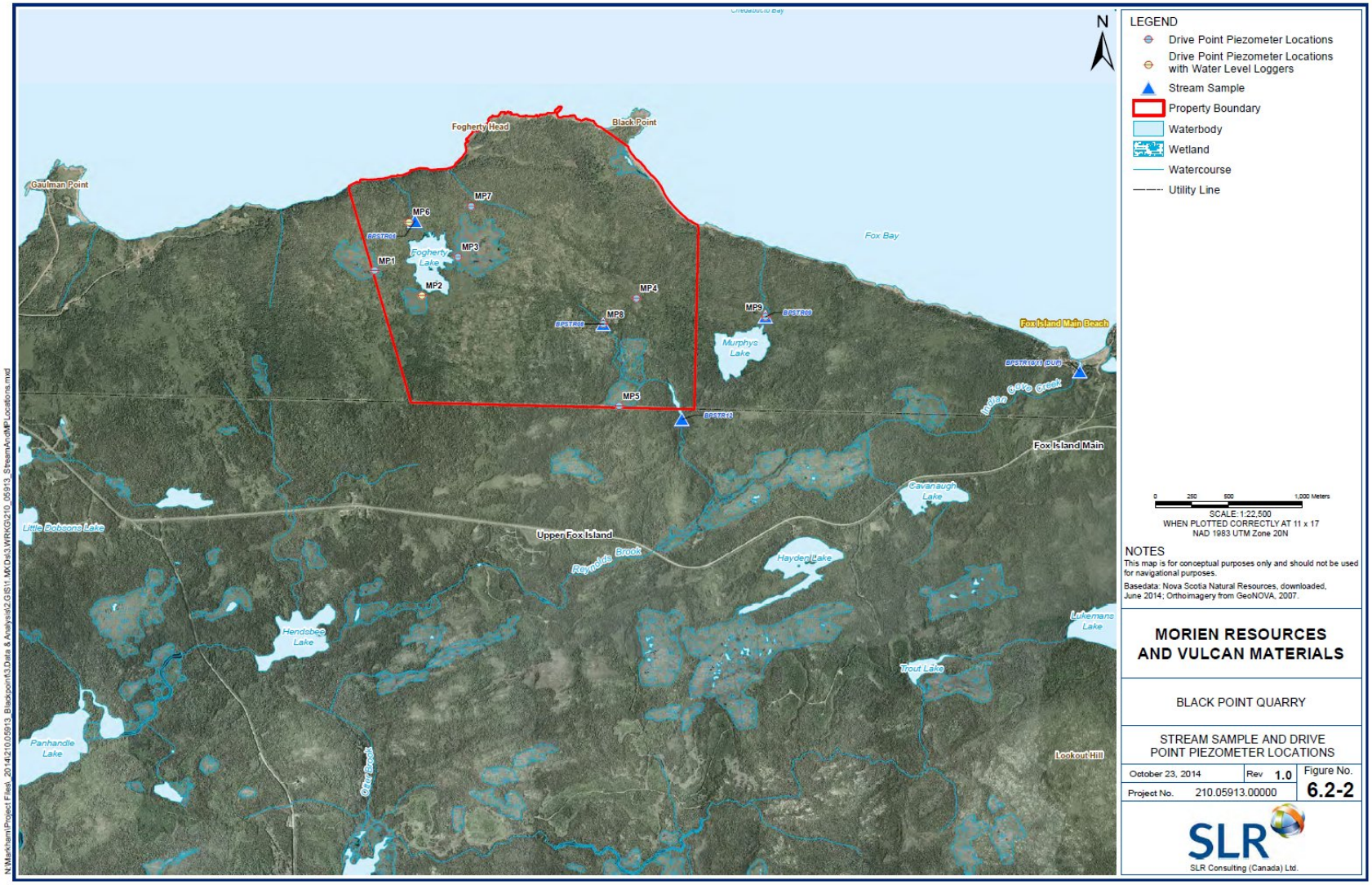
Reynolds Brook, which is located just south of the property boundary and receives fresh water drainage from within the property boundary, would be indirectly affected by the Project. As rock is removed through quarrying, surface and groundwater flow would be directed away from current freshwater habitats and into the pit. The proponent assumed that Reynolds Brook supports fish at some point between the headwaters wetland to the east and downstream to Hendsbee Lake located approximately three kilometres to the west. At full quarry build-out after (around year 50 of operations), an estimated 106 hectares of the property which currently drain south to Reynolds Brook would be diverted into the quarry pit for ultimate discharge north into Chedabucto Bay. This would represent approximately 18 percent of the Reynolds Brook catchment above Hendsbee Lake, which totals 578.5 hectares at the lake inflow. The proponent predicted that this eventual permanent reduction in flow in Reynolds Brook could potentially adversely affect fish and fish habitat in the Brook, particularly during dry periods.

The proponent proposed to conduct a fish habitat assessment and a survey to determine if fish are present in Reynolds Brook. If fish are present in this reach, the proponent would implement an environmental effects monitoring program when quarry development begins to divert water away from its natural drainage to the south. The proponent expects this would occur around year ten of quarry development.

The proponent predicted that once project activities cease, the quarry pit would naturally fill with water to create a new 30-hectare water body. Since this new water body would be primarily fed by surface precipitation and groundwater seepage, rather than by the discharge of acidic wetlands, it may support fish and fish habitat.

The proponent's assessment of effects on fish and fish habitat, including consideration of factors such as magnitude, extent, duration and reversibility, is summarized in Appendix A and the mitigation measures, monitoring, and follow-up activities to which it has committed are listed Appendix C. The proponent predicted that the residual environmental effects of the Project on fish and fish habitat would be: low in magnitude, greater than 72 months in duration, and irreversible, and are not likely to be significant.

Figure 4 Waterbodies Within and Near the Project Site



Source: Black Point Quarry Environmental Impact Statement, SLR Consulting (Canada) Inc.

6.1.2 *Views expressed*

Government

Fisheries and Oceans Canada recommended that the fish habitat assessment and a survey be conducted in Reynolds Brook prior to quarry development, to establish a baseline against which the effects of quarry development could be compared. The proponent agreed to do this, and also to establishing water level and flow baselines if fish or fish habitat are found to be present. Fisheries and Oceans Canada has advised the Agency that the proposed mitigation measures and follow-up would adequately address the potential effects on freshwater fish and fish habitat.

The Province of Nova Scotia questioned whether, the quarry pit might fill with brackish water as opposed to freshwater at the end of the Project life, in which case, it may not support freshwater fish and fish habitat. It requested an assessment of the saltwater-freshwater interface to better understand the potential for saltwater intrusion into the water table. The proponent provided further analysis predicting that saltwater would be prevented from moving landward by freshwater moving toward the ocean. The Province noted that without sufficient data demonstrating otherwise, it could not conclude that saltwater intrusion would not occur. The proponent proposed to undertake groundwater monitoring to verify the accuracy of its prediction.

Aboriginal

The Kwilmu'kw Maw-klusuagn Negotiation Office requested additional information about the direction and nature of on-site surface water runoff. The proponent provided further analysis and a figure depicting the surface water flow direction away from Chedabucto Bay toward proposed storm-water retention ponds. The proponent indicated that the combination of retention ponds, quarry sump, and land sloping would contain events larger than a 100-year 24-hour storm event.

The Kwilmu'kw Maw-klusuagn Negotiation Office also requested that if fish habitat is confirmed to exist in Reynolds Brook, the proponent be required to determine the flow rate required to maintain downstream fish habitat in the brook. The proponent committed to determining baseline flow and water levels prior to construction if fish are found to be present in Reynolds Brook.

Public

Public concerns focused on effects on surface water quality. The proponent committed to implementing a surface-water-quality monitoring program to prevent discharge of sediment-laden, low-pH water into any surface waters, including Chedabucto Bay, and to ensure compliance with discharge water quality objectives, as specified in the *Nova Scotia Pit and Quarry Guidelines* or any project specific approvals.

6.1.3 *Agency analysis and conclusion*

The Agency notes the lack of freshwater fish and fish habitat within the property boundary, but that fish and fish habitat could potentially occur in Reynolds Brook which may experience decreased flow levels over the life of the Project.

The Agency accepts the proponent's evaluation that the magnitude and geographic extent of effects on freshwater fish and fish habitat would be low, although some could extend through the life of the Project or may not be reversible (e.g. permanent inflow reduction to Reynold's Brook).

After considering the proponent's analysis of effects, expert advice from government authorities, and comments received from the Mi'kmaq and the public, the Agency has identified the following necessary measures to mitigate impacts on freshwater fish and fish habitat:

- conduct a pre-construction fish habitat assessment and survey, to the satisfaction of Fisheries and Oceans Canada, to determine whether or not fish are present in Reynolds Brook. If fish or fish habitat is present, the proponent shall also:
    - determine baseline flows and water levels prior to construction (including seasonal variations); and
    - calculate flow rate and water levels required to maintain fish habitat.

If fish are found, the Agency recommends, as an element of a follow-up program, that the proponent periodically monitor to determine if flow reduction to any fish-bearing waters would result in impacts on fish and fish habitat and the need for additional mitigation measures to the satisfaction of Fisheries and Oceans Canada.

The Agency also notes that if fish are present, the proponent must comply with Section 36(3) of the *Fisheries Act*, which prohibits the deposit of a deleterious substance into water frequented by fish or in an area from where it may enter water frequented by fish.

The Agency concludes that the Project is not likely to cause significant adverse effects on freshwater fish and fish habitat.

6.2 Marine Species and Habitats

6.2.1 *Proponent's assessment of environmental effects*

Chedabucto Bay is an intermediate pelagic bay with a drainage area of 2148 square kilometres. Substrate type varies throughout the bay, but within the area of potential project impact, the marine substrate is dominated by coarse materials including cobble, rock, and large boulders. The Bay supports more than 50 species of fish, a number of which live within the Bay while others migrate from nearby water bodies, such as the Strait of Canso and St. Georges Bay, to feed or potentially spawn. Up to 18 species of marine mammal and three species of marine turtles may be present in Chedabucto Bay and surrounding waters, although certain species would be rarely present. Marine mammals typically associated with the Bay include seals, whales, and porpoises. Whale and porpoise species found in the Bay may include dolphins (a toothed whale), Fin and Minke whales, and Harbour Porpoise. Chedabucto Bay also provides habitat for a multitude of marine plants, including Irish moss, rockweed, eelgrass, kelp, fucoid species (e.g. *Fucus vesiculosus*, *F. evanescens*, *Ascophyllum nodosum*), toothed wrack, and bladder wrack.

The proponent examined the potential effects on these species and their habitat. Potential environmental effects of the Project on commercial fisheries are described in section 6.8 and potential environmental effects on marine species at risk are described in section 6.4.

Potential effects of the Project on marine species and habitat include:

- Habitat loss from construction of the marine terminal;
- Reduced habitat quality and function due to runoff from land-based activities during construction and operations (e.g. altered water and sediment quality from sediments introduced to the marine environment);
- Fish mortality due to the use of explosives within the pit;
- Behavioural changes in fish, crustaceans, and other marine species due to noise and vibrations associated with explosives used during quarrying operations;
- Impacts on marine species from marine terminal construction (e.g. noise from pile driving, re-suspension of sediment);
- Disturbance of marine flora and fauna and reduced habitat quality and function for marine species due to noise and vessel movement from increased ship traffic; and
- Invasive species that may be introduced through the illegal discharge of ballast water.

Effects of Construction

Construction of the marine terminal would remove sea bed habitat even as new habitat is created by the terminal rubble mound foundations. The proponent predicted that the total seafloor habitat lost would be approximately 1.1 hectares. The proponent would develop and implement a fisheries offsetting plan in accordance with any *Fisheries Act* authorization required for the Project to mitigate the loss of habitat. Fisheries and Oceans Canada advised that the fisheries offsetting plan must conform with Fisheries and Oceans Canada's *Fisheries Productivity Investment Policy*, which provides for offsetting measures such as: habitat restoration and enhancement; habitat creation; chemical or biological manipulations; and complementary measures. The offsetting measures are meant to counterbalance the loss of productivity of fisheries resources. The proponent stated that the fisheries offsetting plan would be prepared in consultation with Fisheries and Oceans Canada, local commercial fishers, and the Nova Scotia Mi'kmaq First Nations.

Construction of the terminal could also cause re-suspension of bottom sediment, which could adversely affect marine species and habitats. This may affect marine plants and cause reduced habitat quality leading to mortality of less mobile invertebrates. The proponent predicted that fish would likely re-locate to adjacent areas to avoid the disturbance and that the coarse-grained nature of the substrate presents low potential for sediment resuspension.

The construction of the marine terminal has the potential to affect marine receptors such as marine mammals due to underwater noise and vibrations. The proponent referred to the *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters*, which recommend a peak underwater overpressure of 100 kilopascals. While this limit is defined to manage blasting impacts, it may also be used as an indication of the extent of impacts due to piling. The proponent estimated that the 100-kilopascal threshold could be exceeded during pile driving in an area around the pile locations extending seaward up to ten metres. It stated that behavioural modification could occur at greater distances, for the duration of the construction. However, the proponent predicted that these effects would be of short duration, low in magnitude, and confined to the immediate construction area.

Effects of Operation

The proponent reported that the detonation of explosives onshore could injure or kill marine fish and mammals in the immediate nearshore area. To mitigate these effects, it stated that the blasting charge size must be

reduced when blasting near the water's edge. For large blasts – in the order of 100 kilograms per hole – Fisheries and Oceans Canada *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters* stipulate a setback of 150.9 metres. The proponent committed to carrying out field observations before commencing full blasting to characterize the effects of vibrations on fish habitat. It proposed to implement a site-specific standard to protect fish if effects from vibrations exceed thresholds specified in the guidelines. This site-specific standard could include modified blasting protocols or avoiding blasting near the marine environment during sensitive periods.

Noise produced by ships could adversely affect the behaviour of marine species near the ship-loading area and in Chedabucto Bay during vessel transit. The proponent reported that fish or marine mammals may avoid the area, change migratory routes, or alter feeding habits. Despite this possible avoidance behaviour, there remains a possibility that project vessels may strike marine species. Turbulence caused by ships' propellers (i.e. propeller wash) could re-suspend sediment, affecting marine plants and relatively immobile marine fauna in relatively shallow areas, although the proponent reported that substrates in the vicinity of the marine terminal are generally coarse and not likely susceptible to re-suspension.

The proponent has indicated that it intends to ship the product to markets along the eastern and Gulf coast markets of the United States. The proponent indicated that ballast water, if brought into Chedabucto Bay and released untreated, could introduce invasive species into the local environment and threaten local species. In Nova Scotia, introduction of invasive species could include green crab, several species of sea squirts (tunicates), Dead Man's Fingers (*Codium fragile*) and sea-mat or lacy crust bryozoan (*Membranipora menbranacea*). The *Ballast Water Control and Management Regulations*, pursuant to the *Canada Shipping Act, 2001*, regulate the release of ballast water in Canadian waters. The proponent indicated that all ships entering Canadian waters must exchange ballast water outside of the Exclusive Economic Zone (200 nautical miles (370 kilometres) from shore), treat it, discharge it into a reception facility, or retain it on board the ship.

In addition to the provisions of the *Ballast Water Control and Management Regulations*, an international convention regarding ballast water has been adopted by the International Maritime Organization. Under International Maritime Organization's *International Convention for the Control and Management of Ships' Ballast Water and Sediments*, all vessels are required to report and treat ballast water using an International Maritime Organization approved method. This convention will further limit the opportunities for illegal ballast dumping.

The proponent has committed to operating in accordance with ballast water management regulatory requirements and to implementing terrestrial erosion and sediment control measures during construction and operations to prevent terrestrial run-off that could affect marine water quality. Furthermore, it stated that any discharge into Chedabucto Bay would be required to meet water quality standards listed in the *Nova Scotia Pit and Quarry Guidelines* as well as any additional water quality criteria stipulated in operating permits and authorisations. These criteria would include, for example, limits for total dissolved solids, pH, oil and grease, and nitrates. In addition, the proponent committed to locating overburden stockpiles, fuel, chemical storage facilities and construction equipment a minimum of 30 metres from all waterbodies, including Chedabucto Bay. It stated that it would carry out monitoring to verify predicted effects and the effectiveness of mitigation, including:

- monitoring effluent water to ensure that it meets the *Nova Scotia Pit and Quarry Guidelines*, criteria of operating permits, and all applicable authorizations prior to discharge into the receiving environment;
- testing the water quality of storm-water discharges;
- monitoring the condition and location of erosion and sediment control intended to protect water features during soil stripping, grading, and construction; and
- monitoring the location and condition of fencing to protect sensitive features (e.g. water bodies), natural substrates, and vegetation contributing to habitat and bank stability.

The proponent's assessment of effects on marine species and habitat, including consideration of factors such as magnitude, extent, duration and reversibility, is summarized in Appendix A and the mitigation measures, monitoring, and follow-up activities to which it has committed are listed Appendix C. The proponent predicted that with the implementation of mitigation measures, the Project's effects on the marine environment would be: low in magnitude, varied in duration, and reversible and are not likely to be significant.

6.2.2 *Views expressed*

Government

As the expert authority, Fisheries and Oceans Canada has advised that it is satisfied that with the implementation of mitigation measures, impacts on marine species and habitats are unlikely to be significant. Government comments related to marine species at risk can be found in section 6.4.2.

Aboriginal

The Kwilmu'kw Maw-klusuagn Negotiation Office asked to participate in the development and implementation of the fisheries offsetting plan. The proponent committed to involve the Kwilmu'kw Maw-klusuagn Negotiation Office in the development of this plan.

Public

Local fishers raised concerns about the use of explosives, specifically whether noise and vibrations would affect lobster and mackerel behaviour. The proponent indicated it would prevent these effects by remaining within the thresholds specified in Fisheries and Oceans Canada's *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters*.

The Sierra Club (Atlantic Canada Chapter) recommended that the proponent consult local experts to obtain the latest information on the distribution of marine mammals and sea turtles in Chedabucto Bay and along the transect ships would travel when they leave the shipping lane to approach Black Point. It also noted a lack of information about the distribution of marine mammals and sea turtles in the area and recommended that, as part of adaptive management and monitoring, the proponent commit to a monitoring program for those species. The Sierra Club also requested that the proponent use scientific information and advice about the area (i.e. information used by Fisheries and Oceans Canada in identifying the area as ecologically significant) to evaluate impacts on the marine environment. Additional information, including mitigation and follow-up measures related to species at risk, is provided in section 6.4.

The possibility of invasive species being introduced to the area by shipping was raised in several comments. The Sierra Club (Atlantic Canada Chapter) proposed that monitoring for invasive species be required. It further

proposed that the proponent be required to provide a plan for how it would respond if invasive species are detected. The proponent indicated that no ballast water would be released as a result of the Project, except as permitted under the *Ballast Water Control and Management Regulations* and requirements of the *International Convention for the Control and Management of Ship's Ballast Water and Sediments*.

6.2.3 *Agency analysis and conclusion*

The Agency reviewed the proponent's analysis and agrees that the main sources of environmental effects from the construction and normal operations are blasting, erosion and sedimentation, direct habitat loss within the marine terminal footprint, and increased vessel activity and associated underwater noise. The Agency recognizes the potential for introduction of non-native marine organisms (i.e. invasive species) that may be contained in non-compliant discharged ballast waters.

Effects cannot be reduced to zero but they can be managed through standard mitigation measures. Adherence to existing regulatory standards or guidelines for acceptable suspended solid levels in settling pond discharges and acceptable blasting procedures would mitigate associated potential effects. Serious harm for which a *Fisheries Act* authorization would be required would be offset with an appropriately-designed and reviewed fisheries offsetting plan. Compliance with subsection 36(3) of the *Fisheries Act*, which prohibits the discharge of a deleterious substance into waters frequented by fish or in an area from where it may enter such waters, would protect fish. The Agency is aware that the effects of certain activities (e.g. blasting) would continue throughout the life of the Project. Overall, the Agency agrees with the proponent's evaluation that the magnitude and geographic extent of these effects on marine species and habitat would be low.

Shipping typically involves taking on ballast water to increase the draft, change the trim, regulate stability or maintain stress loads within acceptable limits. Safety, weather conditions, the ship's load, and the route taken are the primary factors that determine how much ballast water is taken on board a vessel. Transport Canada also provides a companion document to the *Ballast Water Control and Management Regulations*, the *Guidelines for the Control of Ballast Water Discharge from Ships in Waters under Canadian Jurisdiction*, TP 13617.

With respect to ballast exchange for non-transoceanic navigation, as anticipated for this Project, the *Ballast Water Control and Management Regulations* indicate that ballast water must be managed prior to entering Canadian waters exchange is one of the methods of management. If exchange is selected, for non-transoceanic trips, it must be carried out in an area at least 50 nautical miles (93 kilometres) from shore where the water depth is at least 500 metres. The figures quoted by the proponent refer to transoceanic navigation. The *Ballast Water Control and Management Regulations* further clarify that if the requirements cannot be met because doing so is unfeasible or for safety, an exchange may be conducted in waters under Canadian jurisdiction on the east coast of Canada in an approved area that has a water depth of at least 1 000 metres. Furthermore, a ballast water exchange must achieve at least 95 percent volumetric exchange; and a ballast water salinity of at least 30 parts per thousand. In the case of a vessel that exchanges ballast water through flow-through exchange process, pumping through three times the volume of each ballast tank is considered sufficient. Ballast water that is treated must attain a viable organism and indicator microbe content less than the specified concentrations outlined in the *Ballast Water Control and Management Regulations*.

The *Ballast Water Control and Management Regulations* also describe documentation and reporting requirements. Ships must have a ballast-water management plan on board that meets the requirements of the

Ballast Water Control and Management Regulations. Canadian vessels must also submit a copy to the Minister of Transport. If a vessel is bound for a port, offshore terminal or anchorage area in Canada, it must submit to the Minister of Transport a completed Ballast Water Reporting Form as soon as possible after a management process is implemented.

According to Transport Canada, in 2004, the International Maritime Organization finalized the *International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004*. This Convention introduced a performance standard for ballast water treatment and called for the eventual phasing out of ballast water exchange. However, as indicated by the proponent, it is not yet in force.

The Agency recognizes the scale of potential effects resulting from release of non-compliant ballast water depends on the origin of the organisms and the location of the point of discharge. The *Ballast Water Control and Management Regulations* specifically govern these potential environmental effects. The Agency is of the view that the proponent acting in accordance with Transport Canada's Regulations would effectively mitigate potential effects and the likelihood of those effects, resulting from the release of non-compliant ballast water associated with the Project.

The Agency considered the mitigation measures proposed by the proponent, expert advice from government authorities and comments received from Aboriginal groups and the public in identifying the following key mitigation measures:

- Implement a marine fisheries offsetting plan, developed in consultation with Fisheries and Oceans Canada, local commercial fishers, and the Nova Scotia Mi'kmaq;
- Conduct blasting in accordance with Fisheries and Oceans Canada's *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters* (Wright and Hopky 1998) and the *Nova Scotia Pit and Quarry Guidelines* (NSEL 1999). If effects thresholds are exceeded, develop and implement site-specific mitigation standards to the satisfaction of Fisheries and Oceans Canada to protect fish, turtles and marine mammals, such as timing blasts to minimize effects, or increasing setback distances;
- Ensure discharges into Chedabucto Bay do not exceed discharge water quality objectives, including those specified in the *Nova Scotia Pit and Quarry Guidelines*, project-specific limits set by Nova Scotia, and are in compliance with Section 36(3) of the *Fisheries Act*;
- Design and implement an erosion and sediment control plan to protect surface water, wetlands; and Chedabucto Bay. The plan should include measures to limit run-off, as well as facilities to capture and treat run-off and be approved by the Province of Nova Scotia; and
- Ensure that overburden stockpiles, fuel and chemical storage facilities, and construction equipment are at least 30 metres from any water body.

A follow-up program that includes the measures specified below is required to verify the accuracy of the environmental assessment and the effectiveness of mitigation measures:

- Monitor the effectiveness of the offsetting measures according to the timelines described in the offsetting plan approved by Fisheries and Oceans Canada;

- Submit a monitoring plan prior to blasting for review and approval by Fisheries and Oceans Canada that would be used to determine adherence to the Fisheries and Oceans Canada *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters* thresholds or any site-specific mitigation standards developed in consultation with Fisheries and Oceans Canada to protect fish, such as timing blasting to minimize effects. The plan should include pre-blast observations for whales, Harbour Porpoise or sea turtles so that no blasting is conducted when these species are observed in the vicinity;
- Conduct observations for whales, Harbour Porpoise and sea turtles during vessel transits; between shipping lanes and Project; and
- Develop and implement a Surface-Water Monitoring Program, developed in consultation with Environment Canada and the Province of Nova Scotia, to test all discharges and to verify the effectiveness of treatment. If results indicate that discharge limits are being exceeded, remedial action should be undertaken.

The Agency concludes that, after taking into account the implementation of the mitigation measures, the Project is not likely to cause significant adverse effects on marine species and habitats.

6.3 Migratory Birds

6.3.1 *Proponent's assessment of environmental effects*

The project's effects on migratory birds include potential effects caused by habitat loss, noise, light, and marine activity (i.e. traffic and spills). Migratory birds at the project site include landbirds, shorebirds, seabirds, and waterfowl. During surveys at the project site conducted in 2010 and 2011, the proponent observed 68 different bird species; 56 of which were migratory species. In addition, 20 species not observed during field surveys may also be present in the project area based on information and results from other sources and surveys (e.g. Second Maritimes Breeding Bird Atlas, Audubon Christmas Bird Count). Seabirds, such as Roseate terns (*Species at Risk Act*, endangered) and Leach's storm-petrel, nest on a number of offshore islands and other inaccessible coastal areas, notably the Country Island Complex Important Bird Area, located 13 kilometres from the Project. Other islands which support bird colonies include Half Island and Fox Island, 3.6 kilometres and four kilometres from the Project, respectively.

Habitat loss

The proponent reported that up to 213 hectares of terrestrial bird habitat would be lost as a result of the Project. Habitat within the project area consists mostly of barren vegetation, tall shrub barren, and some coniferous forest, with patches of mixed forest and wetlands. Twenty-two wetlands totaling approximately 57 hectares were delineated within and adjacent to the project site. Changes in hydrology of Fogherty Lake could alter or destroy shorebird habitat.

Vegetation clearing and grubbing conducted within the breeding season (i.e. early April to end of August) could destroy nests, nestlings, and eggs. In addition, habitat loss or alteration could cause birds to move from the project area to less desirable habitat. The proponent stated it would likely clear outside of the breeding season for most birds (April 1 to September 1). If some clearing were necessary during the breeding season, the proponent stated that it would assess if work could be conducted without contravention of the *Migratory Birds Convention Act* and would develop a contingency plan in consultation with Environment Canada.

The proponent reported that increased human activity could result in an increase in species adapted to human environments; these species would compete for habitat and resources with native species. The presence of sedimentation ponds on the site may provide some marginal habitat for shorebirds, waterfowl, and seabirds; however, the proponent stated that the level of human activity renders it unlikely that these ponds would be utilized extensively.

Noise

The proponent reported that blasting noise differs from continuous noise in its physiological and behavioural effects on wildlife. It can interfere with bird behaviours such as feeding, migrating, and breeding, particularly for terrestrial birds. Blasting noise can flush nesting birds, resulting in increased nest predation and stress to adult birds. The proponent predicted that noise from the Project would have minor impacts on shorebirds, depending on when activities take place. It stated that no evidence of breeding shorebirds was reported during field surveys. In addition, the proponent committed to installing noise suppression equipment on mobile equipment and committed to minimizing noise disturbance.

Because the nearest point of the Country Island Complex to the project site is 13 kilometres away, the proponent predicted that the Project would not disturb the colony. However, it stated that minor disturbance of foraging terns might happen as a result of blasting and other construction noise. Large gulls and Common and Arctic Terns nesting on Fox Island and Half Island, approximately three kilometres away, could also be disturbed by blasting.

Light

Ambient light conditions in the project area are currently low as the site is undeveloped. With the Project, artificial light would be introduced in the form of work-area illumination, lights installed on the marine terminal, and vehicle headlights. Changes to ambient light conditions could negatively affect wildlife, including migratory birds. For example, the proponent reports that lights could disorient and attract migrating birds, particularly on foggy and overcast nights, and could result in collisions, exhaustion, and mortality. Patterns of light and darkness are used to regulate natural cycles and control the behavior of diurnal (day), nocturnal (night) and crepuscular (dusk, dawn) animals. The proponent proposed a number of measures to mitigate the effects of light including using the minimum amount of pilot warning and obstruction avoidance lighting on tall structures. It also committed to turning off high intensity lights, at night outside of working hours, if possible.

Marine traffic

The proponent predicted that increased shipping associated with the Project could disturb seabirds and waterfowl near the project site and along shipping routes. This could result in behavioural changes (e.g. avoidance, stress response) and the loss of suitable feeding habitat. The proponent committed to maintaining ships at least 300 metres from any colony or island occupied by seabirds and waterbirds. Spills and releases from marine traffic associated with the quarry are discussed in section 7.1.

The proponent's assessment of effects (e.g. of noise, light, traffic) on migratory birds, including consideration of factors such as magnitude, extent, duration and reversibility, is summarized in Appendix A and the mitigation measures, monitoring, and follow-up activities to which it has committed are listed Appendix C. The proponent predicted that the residual environmental effects of the Project on migratory birds would be: low in magnitude;

varied in duration; and may be reversible or irreversible (depending on the effect). Overall, the proponent predicted that effects on migratory birds are not likely to be significant.

6.3.2 *Views expressed*

Government

Environment Canada asked the proponent to assess potential seabird attraction to lights because night-flying seabirds are one of the bird groups most at risk of this type of interaction. The proponent provided the requested information on light effects on night-flying seabirds and nocturnal migrants, and identified measures to mitigate potential adverse effects. It concluded that bird collisions with project lighting and subsequent mortality are expected to be rare and that any such collisions were not likely have significant effects on migrating bird populations. Nonetheless, the proponent stated that lighting design would aim to mitigate light trespass from the site and minimise the increase in ambient lighting.

Environment Canada asked the proponent to specify measures for ensuring compliance with the *Migratory Birds Convention Act* should clearing or grubbing occur during the breeding season. It recommended against active nest searches because there is a low probability of locating all nests (i.e. nests are cryptic, birds avoid nest areas if there are perceived threats) and because searches would likely disturb nesting birds. It recommended the proponent conduct monitoring from a distance with a spotting scope, with steps taken to minimize disturbance of this activity. The proponent confirmed that clearing and grubbing during the breeding season would be an exception and that, if the construction schedule indicated a need to conduct such activities during the breeding season, it would develop a contingency plan and monitoring protocol in consultation with Environment Canada.

The Province of Nova Scotia stated that the effects of blasting on nesting seabird colonies are not well understood and recommended that the proponent consider monitoring colonies within five kilometres of the Project for the first three years of operations. The proponent argued that the proposed monitoring is unwarranted and would yield no significant results. The proponent noted that the nearest bird colonies at Half Island and Fox Island are 3.6 kilometres and four kilometres, respectively, from the Project, compared the one-kilometre buffer recommended by Environment Canada for high-disturbance (e.g. drilling, blasting) activities. Instead, the proponent proposed to monitor any future on-site seabird colonies, if found. The Province of Nova Scotia stated that a management plan for blasting should be developed to optimize blasting in relation to nesting seabirds and other wildlife during specific seasons. For example, the timing of blasting could be sequenced to early morning during the nesting season so that displaced birds would have time to find food and feed young with reduced distress.

The Province of Nova Scotia recommended that wetlands be avoided whenever possible and that if wetlands cannot be avoided, compensation be required through a wetlands-alteration approval consistent with the *Nova Scotia Wetland Conservation Policy*. The proponent stated the quarry layout had been designed to minimize the impact on wetlands where possible; however, several wetlands would be directly impacted and others may be indirectly affected. The proponent met with the Province of Nova Scotia to discuss a phased-in compensation approach that would align with the 50-year phased development of the quarry. The Province of Nova Scotia informed the proponent wetland compensation plan details would need to be worked out well in advance of any wetland alteration application.

Environment Canada asked the proponent to provide additional information on potential avian collisions with transmission lines and associated mitigation and follow-up measures. Potential adverse effects include direct mortality, or injuries that could lead to infection, shock, long term handicap or other damage. The proponent acknowledged the potential for bird collisions with the 2.5-kilometre transmission line and noted that due to the large number of variables involved in determining collision risk, reported injury and mortality rates are highly variable. The proponent referred to studies indicating that collisions by individuals within a healthy population are unlikely to significantly affect the overall viability of a species. The proponent noted that certain mitigation measures applied elsewhere (e.g. relocating the line, planting screening trees that would exceed the height of the line) would not be feasible for the Project due to its short route and fixed endpoints, the desire to follow the existing access road, and the poor suitability of the thin, rocky soil for trees. It concluded that the most effective mitigation measure would be to maximize the visibility of the line through the use of line-marking devices (e.g. aerial marker spheres, spirals, suspended devices). The proponent stated that it does not believe that site-specific collision monitoring or statistical estimates of mortality rates are warranted, given the short length of the transmission line and low risk of harm to local bird populations. Rather, it proposed to conduct routine inspections, likely consisting of periodic visits along the transmission line to document evidence of bird mortality. It stated that inspectors would also report problem nests on the power line itself and observe bird activity along the transmission line and access road. The Province of Nova Scotia recommended that follow-up be conducted for potential effects of the transmission line and of lighting on birds.

Overall, Environment Canada has advised that is it satisfied that the proposed mitigation and follow-up would address effects of the Project on migratory birds.

The Province of Nova Scotia recommended establishing a 75-metre terrestrial buffer between the coast and project components to reduce impacts on habitat and its suitability for species (e.g. migratory birds), especially during winter and migration. The proponent provided information, including engineering design constraints, to justify the establishment of a minimum 30-metre buffer from the high water mark, as per the *Nova Scotia Pit and Quarry Guidelines*. It further noted that 88 percent of the plant footprint would conform to a 75-metre buffer. The Province of Nova Scotia indicated that, based on the additional information received, it supports the proponent's proposed approach to sizing the coastal buffer. Specifically, the Province clarified that the buffer should be a minimum of 30 metres in the plant operations area and 75 metres in other areas with the exception of the marine terminal and ship loading conveyor. It also recommended that native vegetation be maintained within buffer areas.

Aboriginal

The Kwilmu'kw Maw-klusuagn Negotiation Office recommended that the proponent avoid wetlands to the extent possible during the construction of the Project, and asked to participate in the development and implementation of any wetland habitat compensation plans developed for the Project. The Kwilmu'kw Maw-klusuagn Negotiation Office did not specify that this recommendation was to serve as mitigation for migratory birds; however, wetlands may provide migratory bird habitat. The proponent committed to provide the Kwilmu'kw Maw-klusuagn Negotiation Office with an opportunity to review a draft wetland compensation plan and to identify alternatives.

Public

The Sierra Club (Atlantic Canada Chapter) commented that the proponent did not fully describe how the site is being used as an area frequented by migratory birds, or specific impacts on nesting or migrating birds.

6.3.3 *Agency analysis and conclusion*

The key potential effects of the Project on migratory birds include habitat loss, interference with breeding, and impacts of lights and noise. The Agency acknowledges that the proponent agreed to compensate for wetland habitat function that would be lost as a result of the Project and maintain a buffer between the coast and project infrastructure of at least 30 metres (75 metres in other areas). These measures would partially mitigate the effects of habitat loss on migratory birds. In addition, the proponent stated that it intends to perform activities that could harm migratory birds, such as site clearing and structure disassembly, outside the migratory bird breeding season in order to minimize the potential for any effects. In the event that the proponent finds it necessary to work during breeding season, the proponent committed to developing a contingency plan in consultation with Environment Canada.

Migratory birds may be attracted to lights, leading to collisions, exhaustion or mortality. This is particularly a concern for nocturnal migrants and night-flying species such as storm petrels. The Agency is of the view that the proponent should implement mitigation, designed to minimize these interactions, and to monitor the effectiveness of the proposed mitigation measures. This would include restricting lighting to areas necessary to carry out work, without compromising safety, and the development of an avian management plan minimize potential effects. If birds are found stranded on vessels, the proponent should follow the protocol described in the document *Best practices for stranded birds encountered offshore Atlantic Canada* (Environment Canada 2015).

The Agency has considered the mitigation measures proposed by the proponent, expert advice from government authorities, and comments received from the Mi'kmaq and the public in identifying the following key mitigation measures as necessary to ensure that significant adverse environmental effects on migratory birds are unlikely to occur. Mitigation related to blasting is discussed in section 6.2.

- Carry out all phases of the Project in a manner that protects and avoids harming, killing or disturbing migratory birds, loss of habitat, or destroying or taking their nests or eggs. In doing so, the proponent shall take into account the Avoidance Guidelines (2014) by Environment Canada. The proponent's actions in applying the Avoidance Guidelines shall be in compliance with the *Migratory Birds Convention Act*, 1994 and with the *Species at Risk Act*.
- Consult Environment Canada prior to any site clearing or dismantling of structures activities during the breeding season. In the event of clearing during the breeding season, develop and implement a contingency plan and monitoring protocol in consultation with Environment Canada.
- Restrict lighting to areas necessary to carry out work, without compromising safety. Develop and implement an avian management plan in consultation with Environment Canada to minimize potential effects of lighting on migratory birds and to verify the effectiveness of proposed measures.
- Develop and implement a seasonally-sensitive blasting management plan to be approved by the Province of Nova Scotia to minimize impacts of blasting on seabirds.

- Develop and implement a wetland compensation plan for approval by Nova Scotia Environment. Provide the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation with an opportunity to review a draft wetland compensation plan and to identify alternatives.
- Maximize visibility of the transmission line, through the use of line marking devices (e.g. aerial marker spheres, spirals, and suspended devices, bird strike diverters).
- Maximize the coastal buffer (i.e. between the coastal shore side of the project and the project components). The buffer shall be a minimum of 30 metres in the plant operations areas and 75 metres in all other areas with the exception of the marine terminal and ship loading conveyor. Native vegetation within the coastal buffer shall not be disturbed.
- Follow the protocol described in the document *Best practices for stranded birds encountered offshore Atlantic Canada* (Environment Canada 2015) if stranded birds are observed on vessels.

A follow-up program that includes the measures specified below is required to verify the accuracy of the environmental assessment and the effectiveness of mitigation measures. Protocols for all follow-up work related to migratory birds should be developed in consultation with Environment Canada.

- Implement a program to monitor the impact of the Project on migratory birds to assess the effectiveness of the mitigation measures used to avoid harm to migratory birds, their eggs and nests. The proponent shall conduct this monitoring from the start of the operations until the end of the decommissioning phase. Documentation shall be provided indicating the results of any monitoring. The documentation shall demonstrate whether the mitigation measures have proven effective and if additional measures were required.
- Verify the effectiveness of mitigation measures related to light for a minimum of two years and, based on the outcomes and advice from the Province of Nova Scotia and Environment Canada, implement adaptive measures, if appropriate.
- Monitor impacts on blasting on any future on-site seabird colonies.
- Monitor known nests around stockpiles and exposed areas from a distance with a spotting scope or binoculars to verify the effectiveness of the buffer until the nests are inactive.
- Conduct routine inspections of the transmission line to seek and document evidence of bird collisions.
- Notify Environment Canada within 24 hours in the event of the mortality or injury of ten or more migratory birds in a single event or in the event of the mortality or injury of a migratory bird species at risk.

With the implementation of the above mitigation, the Agency believes that the magnitude of effects from the Project on migratory birds would be low in magnitude. The Agency concludes that, after taking into account the implementation of the mitigation measures, the Project is not likely to cause significant adverse environmental effects on migratory birds.

6.4 Species at Risk

Under section 79 of the *Species at Risk Act*, the Agency, as the responsible authority for the environmental assessment, must identify the Project's likely adverse effects on wildlife species, and their critical habitats, listed in Schedule 1 of the *Species at Risk Act*.

Measures must also be taken to avoid or lessen those effects and that monitoring of the effects occurs if the Project is carried out. The measures must be consistent with any applicable recovery strategy and action plans identified in the *Species at Risk Act*, such as those developed for the North Atlantic Right Whale and the Leatherback Turtle.

For the purpose of this environmental assessment the Agency considered not only species that are listed in Schedule 1 of the *Species at Risk Act*, but also those that have been assessed as endangered, threatened or special concern by the Committee on the Status of Endangered Wildlife in Canada. Mainland moose, a species that is protected in Nova Scotia under provincial legislation is considered in section 6.6.

No critical habitat, as defined in the *Species at Risk Act*, has been designated within the project footprint. The closest critical habitat to the Project is for the Roseate Tern is located approximately 40 kilometres from the Project, on Country Island.

6.4.1 *Proponent's assessment of environmental effects*

There are seven bird, ten marine fish, three marine mammal, and one reptile species at risk that may be affected by the Project (Table 4). Potential impacts of the Project on species at risk include habitat loss, noise, light, collisions, and general activity within the project footprint.

Table 4 Federally-Identified Species at Risk Potentially Affected by the Project

Species	Status		
	***Species at Risk Act* Schedule 1**	**Committee on the Status of Endangered Wildlife in Canada Assessment**	***Nova Scotia Endangered Species Act*[1]**
Birds			
Rusty Blackbird (*Euphagus carolinus*)	Special concern	Special concern	Endangered
Harlequin Duck (*Histrionicus histrionicus*) Eastern population	Special concern	Special concern	Endangered
Common Nighthawk (*Chordeiles minor*)	Threatened	Threatened	Threatened
Barrow's Goldeneye (*Bucephala islandica)*	Special concern	Special concern	Not listed
Canada Warbler (*Cardellina (syn. Wilsonia) canadensis)*	Endangered	Threatened	Endangered
Olive-sided Flycatcher (*Contopus*	Threatened	Threatened	Threatened

[1] This column is intended to place the species in the context of the *Nova Scotia Endangered Species Act* and is not intended to be a complete list of species protected under that Act.

Species	Status		
	***Species at Risk Act* Schedule 1**	**Committee on the Status of Endangered Wildlife in Canada Assessment**	***Nova Scotia Endangered Species Act*[1]**
cooperi)			
Eastern Wood Peewee (*Contopus virens)*	Not listed	Special concern	Vulnerable
Marine Fish			
Atlantic Sturgeon (*Acipenser oxyrinchus*) – maritimes populations	Not listed	Threatened	Not listed
American Eel (Anguilla rostrata)	Not listed	Threatened	Not listed
Atlantic Cod (*Gadus morhua*) – southern population	Not listed	Endangered	Not listed
American Plaice (*Hippoglossoides platessoides*) – Maritime population	Not listed	Threatened	Not listed
Porbeagle shark (*Lamna nasus*)	Not listed	Endangered	Not listed
Atlantic Salmon (*Salmo salar*)– Eastern Cape Breton population	Not listed	Endangered	Not listed
White Shark (*Carcharodon carcharias*) Atlantic population	Endangered	Endangered	Not listed
Spiny Dogfish (*Squalus acanthias*)	Not listed	Special concern	Not listed
Atlantic Bluefin Tuna (*Thunnus thynnus*)	Not listed	Endangered	Not listed
White Hake (*Urophycis tenuis*) - Atlantic and Northern Gulf of St. Lawrence population	Not listed	Threatened	Not listed
Marine Mammals			
Harbour Porpoise (*Phocoena phocoena*) – Northwest Atlantic population	Not listed	Special concern	Not listed
Fin Whale (*Balaenoptera physalus*) - Atlantic population	Special concern	Special concern	Not listed
North Atlantic Right Whale (*Eubalaena glacialis)*	Endangered	Endangered	Not listed
Reptiles			
Leatherback Sea Turtle (*Dermochelys coriacea*) - Atlantic	Endangered	Endangered	Not listed

Species	Status		
	***Species at Risk Act* Schedule 1**	**Committee on the Status of Endangered Wildlife in Canada Assessment**	***Nova Scotia Endangered Species Act*[1]**
population			

Birds

Land clearing during construction of the quarry would remove 213 hectares of terrestrial habitat. Creation of the proposed 800-metre access road would fragment the habitat in the region. For most terrestrial fauna species at risk, the proponent predicted that potential effects would be similar to those for terrestrial fauna as a whole, and would comprise:

- loss of habitat (foraging, nesting);
- habitat fragmentation;
- disturbance from construction noise (including blasting); and
- exposure to runoff from hazardous materials and contaminated soils.

The Rusty Blackbird was the only listed bird species confirmed by the proponent to be present on site. The proponent predicted that measures to mitigate effects on terrestrial birds would also mitigate potential effects on Rusty Blackbirds and that no additional measures are necessary.

Common Nighthawk is a migratory Species at Risk which has the potential to occur on the Project site, Nighthawks are often not detected during standard breeding bird point count surveys due to their nocturnal nature. Evening surveys to determine the presence of this crepuscular/nocturnal species were not conducted on the Project site. As a precautionary measure, the Proponent made the assumption that the Common Nighthawk may be seasonally present. To mitigate effects on Common Nighthawk, the proponent committed to:

- ensuring that any exposed soils and soil stockpiles would be adequately covered or vegetated to deter Common Nighthawks from nesting on them; and
- in the event that breeding activity occurs on stockpiles or exposed areas, establishing a 20-metre buffer zone around the nest and contacting Environment Canada for further advice. Periodic monitoring of the nests would be undertaken until the chicks have fledged and left the area.

The proponent committed to developing specific management actions for species at risk (e.g. ground- or burrow-nesting species) in consultation with Environment Canada.

Marine Fish, Mammal and Reptiles

A total of 1.1 hectares of marine habitat would be lost during the construction of the marine terminal. While no marine fish, mammal, and reptile species at risk have been reported in the marine portion of the project site during site surveys, they may be present. The proponent committed to developing and implementing a fisheries offsetting plan to counterbalance the loss of productivity of fisheries resources within the project footprint in accordance with any *Fisheries Act* authorization required for the Project. Additional effects on marine species at

risk would be similar to those for marine fauna as a whole (section 6.2), and include effects of ships (e.g. increased sedimentation and turbidity, noise, potential collisions) and disturbance from pile driving, shore blasting, and other construction activities. The proponent predicted that mitigation measures for marine species and habitat (as discussed in section 6.2) would also effectively mitigate potential effects on marine fish, mammals, and reptile species at risk that may occur in the affected marine environment.

The proponent's assessment of effects on species at risk (e.g. birds, marine fish, marine mammals, marine reptiles) including consideration of factors such as magnitude, extent, duration and reversibility, is summarized in Appendix A and the mitigation measures, monitoring, and follow-up activities to which it has committed are listed Appendix C. The proponent predicted that the residual environmental effects of the Project on species at risk would be: low to medium in magnitude, permanent during the lifetime of the Project, and reversible or irreversible (depending on the effect). Overall, the proponent predicted that effects on species at risk are not likely to be significant.

6.4.2 *Views expressed*

Government

Environment Canada requested that the proponent clearly identify measures to avoid or minimize effects of the Project on the Rusty Blackbird and develop a follow-up program to verify the accuracy of predictions and efficacy of mitigation measures. The proponent noted that a breeding bird survey was undertaken using Canadian Wildlife Service protocols during which a possibly breeding Rusty Blackbird was observed on one occasion in June 2010. It further noted that the species does not overwinter in Canada; breeding habitat is not limited in Nova Scotia (i.e. the Project does not threaten critical habitat); and that the main threat to the species appears to be loss of wintering grounds along the Mississippi Valley flood plain. The proponent proposed, as the primary mitigation, to avoid clearing and decommissioning during the breeding bird season, to the greatest extent possible. The proponent asserted that if this can be achieved, then no monitoring plan would be needed because birds would find suitable nesting habitat elsewhere. The proponent would implement, if clearing is required during the breeding bird season, a "construction phase migratory bird inspection protocol" prior to construction, as discussed in section 6.3. In addition, the proponent committed to developing a contingency plan, in consultation with Environment Canada, in the event of clearing during the breeding season.

Environment Canada stated that the proponent's proposed 20-metre buffer around stockpiles or exposed areas would likely not be sufficient to protect the nests of ground-nesting species such as the Common Nighthawk. It stated that a 200-metre buffer from high disturbance activities would be more appropriate during the breeding season. The proponent suggested that a strict buffer distance would not necessarily consider all factors that could influence the protection of the species and could limit operational flexibility. It committed to conducting surveys and developing buffer and non-disturbance distances and zones that incorporate adaptive management in consultation with Environment Canada and the Province of Nova Scotia. The proponent stated that it would protect nests within buffer zones by ceasing potentially disruptive activities (e.g. use of machinery, disposal or removal of material, stabilization measures) within the buffer and by undertaking non-disruptive measures to reduce the potential for erosion of materials piles. It also committed to monitoring known nests until they become inactive. Surveys would be conducted by site personnel using a protocol developed in consultation with Environment Canada and the Province of Nova Scotia.

The Province of Nova Scotia advised that even a 200-metre buffer around nests would likely be insufficient to prevent Common Nighthawks from abandoning their nests. The Province advised that temporal sequencing for clearing and grubbing activities would be important mitigation.

Fisheries and Oceans Canada stated that the Canso and Chedabucto Bay area is important for fin whales during winter and spring, when large schools of herring and mackerel are in the area. It also stated that the lack of sightings of fin whales by the proponent during surveys could be explained by lack of observation effort rather than lack of whales. As such, the presence of fin whales should be considered possible or likely in project waters and environmental impacts should be considered for this species.

The proponent acknowledged the potential presence of fin whales near the Project in Chedabucto Bay. It recognized the potential for collisions between vessels and whales, but noted that research indicates that collisions are relatively infrequent. The proponent committed to ensuring that all contracted vessels are instructed to adhere to standard vessel operating procedures, including reduced speed limits and use of a licensed pilot, to minimize interactions between marine mammals and vessels. The proponent noted that observation and avoidance measures would be especially important when vessels would be sailing between the main shipping lane and the Project site.

Environment Canada and Fisheries and Oceans Canada, have advised that the analysis conducted as part of the environmental assessment meets requirements set out in section 79 of the *Species at Risk Act* and that the effects of the Project on species at risk would be mitigated by the proposed mitigation measures.

Public

The Sierra Club (Atlantic Canada Chapter) commented that the proponent did not provide enough information on marine mammal and sea turtle species at risk. It raised concerns about how vessels strikes, noise, and accidents (e.g. oil spills) could injure or kill members of these species, or adversely affect their migration routes. The proponent provided more information on marine mammals during the environmental assessment.

6.4.3 *Agency analysis and conclusion*

Based on information provided by the proponent, government departments, and the public, the Agency assessed the Project's potential impacts on federal species at risk in accordance with section 79(2) of the *Species at Risk Act*. Clearing and site preparation for the Project would cause habitat loss, habitat fragmentation, and plant mortality. Marine species at risk could be affected by the loss of fish habitat due to the construction of the marine terminal. Marine species could also experience disturbance and change in behaviour due to noise from ship traffic, pile driving, and blasting. The potential for vessel collisions with marine mammals or turtles could be mitigated by reducing vessel speed when outside established shipping lanes. The Agency notes that there is no critical habitat for any federal species at risk within 40 kilometres of the Project.

Based on information provided by the proponent, expert advice from government departments, and comments received from the public, the Agency believes that measures that would mitigate effects on other components of the environment (i.e. freshwater fish and fish habitat, marine species, migratory birds) would also mitigate effects on species at risk. In addition, the Agency recommends the following additional measures as necessary to mitigate effects on species at risk:

- Ensure that large piles or patches of bare soil are covered or vegetated during the breeding season. If any ground- or burrow-nesting species initiate breeding activities on stockpiles or exposed areas, immediately establish an appropriately sized buffer, in consultation with Environment Canada, and avoid the area until early August; and
- Implement measures during operations to mitigate the risk of collisions between vessels and marine mammals and sea turtles taking into consideration the *Notice for Mariners General Guidelines for Aquatic Species at Risk and Important Marine Mammal Areas*. The measures include:
    - requiring vessels associated with the Project to travel at a speed limit of 10 knots during vessel transit between shipping lanes and the marine terminal;
    - conducting and recording observations for marine mammals and sea turtles during vessel transit between shipping lanes and the marine terminal;
    - requiring vessels associated with the Designated Project to slow down to less than 7 knots when within 400 m of the nearest marine mammal or sea turtle; and
    - reporting collisions with marine mammals and sea turtles between shipping lanes and the marine terminal within 2 hours to the Canadian Coast Guard, and notifying Aboriginal groups in writing.

The Agency believes that measures that would be used to monitor effects on other components of the environment (i.e. freshwater fish and fish habitat, marine species, migratory birds) would also monitor effects on species at risk.

The Agency concludes that, after taking into account the implementation of the mitigation measures, the Project is not likely to cause significant adverse effects on marine and migratory bird species at risk.

6.5 Commercial Fisheries

6.5.1 *Proponent's assessment of environmental effects*

The proponent reported that marine commercial fisheries represent an important, sustainable resource-based industry of historical, cultural, social and economic value to local communities and the Nova Scotia Mi'kmaq. There are no freshwater commercial fisheries on the project site or aquaculture operations in Chedabucto Bay.

Chedabucto Bay supports productive and diverse marine commercial fisheries. The commercial species potentially harvested within Chedabucto Bay are limited to: lobster; shrimp; scallop; sea urchin; tuna; squid; herring; and mackerel. Sea urchin, rock crab, marine plants and eels are not currently fished in Chedabucto Bay on a commercial basis, although local fishers have licences that permit the harvest of these species. All other fisheries are offshore, outside of Chedabucto Bay including crab, groundfish, hagfish, and swordfish.

The core of the fishery in Guysborough County is coastal, family-based, and uses boats that are less than 34.9 feet. In 2014, the estimated landed wharf value of all harvested species combined was over 65 million dollars annually. Almost all license holders who fish along the south shore of Chedabucto Bay are multi-species license holders; however, the proponent noted that lobster is the primary fishing industry in Guysborough County. The project area is located in Lobster Fishing Area 31A and herring and mackerel fishing areas 19.

The Mi'kmaq have recognized communal rights to fish for livelihood purposes. These fisheries activities are managed under the Department of Fisheries and Oceans through communal commercial licenses. Communal

commercial fishing licences are issued to Aboriginal groups and not individuals. Ten Mi'kmaq communities hold a number of communal commercial fishing licences in Chedabucto Bay for sea urchin, tuna, lobster, shrimp, and mackerel. In the Project area, communal commercial fishing is limited to one shrimp trap licence. Communal commercial tuna fishing licences permit fishing in 'Atlantic waters'; the proponent indicated that tuna fishing activities are possible, though with low probability, to occur in the project area.

The proponent focused the effects analysis relative to commercial fishing on commercially harvested finfish and shellfish fishery activities within Chedabucto Bay. The potential effects of the Project on fishing for food, social, or ceremonial purposes are discussed in section 6.6; effects on Aboriginal rights in section 8; effects on the marine environment in section 6.2, and effects of accidental spills in section 7.

The proponent predicted that construction of the marine terminal would disturb the substrate, suspend sediment into the water column, and generate noise and vibrations. Although this may affect or increase mortality for less mobile invertebrates, fish would likely re-locate to adjacent areas to avoid the disturbance. The proponent stated that underwater noise criteria applicable to fish habitats (including shellfish and crustaceans) may be exceeded during pile driving, extending seaward up to 10 metres. Effects on fishing would be greater if marine construction were to occur during the lobster fishing season, which runs from April 29 to June 30. The proponent committed to constructing the marine terminal outside of lobster fishing season to the greatest extent possible.

The presence and use of the marine terminal would limit access to lobster harvesting, lead to a loss of lobster habitat, and could potentially cause displacement into other fishing areas. The marine terminal footprint combined with a safety exclusion zone around the terminal would be approximately 20 hectares in size, which is a small portion of the area available. The marine terminal would likely be left in place rather than removed during project decommissioning.

The proponent reported that the area where the marine terminal would be located is currently fished by two or three fishers. However, with the creation of new habitat, it predicted that the removal of habitat for the Project is not anticipated to limit the amount of suitable available habitat for lobster and its prey species. Furthermore, preliminary discussions with lobster fishers have indicated that there is an opportunity to create new lobster habitat adjacent to the Project. The proponent committed to preparing a fisheries offsetting plan pursuant to paragraph 35(2)(b) of the *Fisheries Act* to counterbalance the loss of productivity of fisheries resources within the marine terminal's footprint. The fisheries offsetting plan would create offsets for 1.1 hectares of lobster fishery and be developed in consultation with the Nova Scotia Mi'kmaq and local commercial fishers.

As discussed in section 6, marine water quality may be negatively affected by the discharge of sediment-laden water from the Project. The proponent predicted that this may displace fish but is unlikely to cause mortality.

The proponent stated that transport vessels could interfere with commercial fishing due to increased noise disturbance and reduced access to fishing areas (i.e. ship avoidance for safety reasons or not wanting to risk gear damage). The proponent reported that the deep water shrimp fishery concentrated along the edge of the established shipping lane is vulnerable to shipping activities. Fishers raised concerns that shipping activity may interrupt or temporarily displace shrimp trap fishing, which is the principal livelihood fishery in the area. Following dialogue between the proponent and shrimp fishers, the proponent agreed to modify the shipping

route near the marine terminal so vessels would avoid preferred shrimping grounds (i.e. waters deeper than 40 fathoms or 73 metres) to the extent that this would be safe.

The proponent stated that the Project is not expected to impact the fixed berth mackerel, herring, and squid trap fisheries since these berths are considerably removed from the project site. The closest would be two mackerel traps located in Indian Cove approximately four kilometres east of the marine terminal. Local fishers suggested that the marine terminal might divert mackerel from the current route that brings them into Indian Cove where the traps are located. Instead, fish may remain offshore and travel directly from Black Point to Fox Island, bypassing Indian Cove. The proponent indicated that residual effects would not occur on mackerel movement due to the magnitude of effects being low and the geographic scope being relatively limited. In addition, it reiterated its commitment to follow Fisheries and Oceans Canada's *Guidelines for the Use of Explosives in or near Canadian Fisheries Waters*, thereby minimizing the potential to affect mackerel movement.

The proponent committed to addressing claims of gear damage and loss and, when appropriate, providing compensation. It also committed to on-going communications with representatives of the local fishing community, the Kwilmu'kw Maw-klusuagn Negotiation Office, and Sipekne'katik First Nation.

The proponent's assessment of effects on commercial fisheries including consideration of factors such as magnitude, extent, duration and reversibility, is summarized in Appendix A and the mitigation measures, monitoring, and follow-up activities to which it has committed are listed Appendix C. The proponent predicted that the residual environmental effects of the Project on commercial fisheries would be: low in magnitude, varied in duration, and reversible or irreversible (depending on the effect). Overall, the proponent predicted that effects on commercial fisheries, including the communal commercial fishery, are not likely to be significant.

6.5.2 *Views expressed*

Government

Fisheries and Oceans Canada advised the Agency that it is satisfied that proposed mitigation measures and follow-up would address the potential impacts on commercial fishing.

Aboriginal

The Kwilmu'kw Maw-klusuagn Negotiation Office commented that the baseline data collected by the proponent did not represent all First Nations' fishing activities in the project study area, and consequently that impacts on fish, fish habitat, and commercial fisheries may not have been accurately predicted. It requested that a Mi'kmaq fisheries study be conducted. It also recommended that the proponent's mitigation, monitoring and fisheries offsetting plan be incorporated into project approvals. In response to these comments, the proponent gathered additional communal commercial fisheries data and committed to including the Mi'kmaq in its development of the fisheries offsetting plan. It committed to monitoring lobster habitat that it would create through the fisheries offsetting plan, as directed and in accordance with the timelines in the offsetting plan to be approved by Fisheries and Oceans Canada. In addition, the proponent stated that it would report the success of the plan to Fisheries and Oceans Canada and other interested parties such as the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation.

Public

The Guysborough County Inshore Fishermen's Association expressed concern about the Project's effects on the marine environment and potential loss of fishing access due to marine vessel and terminal activity. The public expressed concerns about the effects of effluent on fish-bearing waters and, in turn on fishers. In addition, the Guysborough County Inshore Fishermen's Association raised concerns about shipping-lane traffic and routes for marine vessels, silting of nets and fish traps, noise and vibrations (i.e. that may disperse pelagic schooling, mating and migration patterns), loss of access to fishing grounds, and safety zones around vessels in port and in transit. The proponent assured the fishing industry that all operations would be conducted causing the least amount of harm to the marine environment as possible, with minimal silting from operations. Vessels would travel in established shipping lanes and breakaway routes would be directed away from primary fishing grounds. Loss of space would be compensated by creating artificial reefs for lobster habitat in nearby areas that are currently unsuitable for lobster.

6.5.3 *Agency analysis and conclusion*

The Agency reviewed the proponent's analysis and agrees that the principal sources of environmental effects from the construction and normal operations of the Project on commercial fisheries include: habitat loss from the construction of the marine terminal; establishment of the safety exclusion zone; and disturbance from shipping traffic and terminal construction. The Agency is of the view that the magnitude and geographic extent of these effects are likely to be low. The habitat loss under the terminal would be for the duration of the Project but would be mitigated through an appropriately-designed and implemented fisheries offsetting plan, in accordance with any *Fisheries Act* authorization required for the Project. The Agency notes that the proponent has committed to addressing claims of gear damage and loss and, when appropriate, providing compensation.

The Agency considered the mitigation measures proposed by the proponent and comments received from Fisheries and Oceans Canada, Aboriginal groups, and the public in identifying the following key mitigation measures (in addition to mitigation listed in section 6.2):

- construct the marine terminal outside of lobster fishing season;
- design marine vessel transportation routes in consultation with local fishers to optimize the avoidance of vessel traffic within current shrimp trap areas (generally 40 fathoms and deeper) to the extent that it would be safe; and
- ensure on-going communication with representatives of the local fishing community, the Kwilmu'kw Maw-klusuagn Negotiation Office, and Sipekne'katik First Nation.

The proponent committed to monitor terminal operations and fishing access, should concerns be expressed by the local fishing community. Monitoring of the effectiveness of the marine fisheries offsetting plan, as directed by Fisheries and Oceans Canada, would be undertaken to assess the effectiveness of the offsetting measures.

The Agency concludes that, after taking into account the implementation of the mitigation measures, the Project is not likely to cause significant effects on commercial fisheries.

6.6 Current Use of Lands and Resources by Aboriginal Peoples for Traditional Purposes

6.6.1 *Proponent's assessment of environmental effects*

The Project would result in changes to the environment that may affect the current use of lands and resources by aboriginal peoples for traditional purposes. According to the Mi'kmaq Ecological Knowledge Study, current use, or contemporary use, refers to Mi'kmaq land and resource uses, and occupancy activities and locations, within living memory, approximately from 1900 to present. Examples of potentially impacted activities could include hunting and trapping, plant gathering and fishing for food, social, and ceremonial purposes.

Potential Effects on Environmental Components

The Project is predicted to affect components of the environment that support current use. For example, changes to the environment as a result of the Project include potential effects on terrestrial wildlife, marine species, and plants.

The Project would diminish or eliminate the productive capacity of some terrestrial habitat within the Project footprint (e.g. clearing project site, quarry development). Approximately 213 ha of coniferous forest and wetland occurring on the Project site would be removed during site development. Habitat removal and fragmentation would displace wildlife within the Project footprint, thereby adversely affecting terrestrial wildlife populations within the Project area. However, species that can move easily would likely move to similar habitats elsewhere, if such habitat is available. The species of cultural value to Mi'kmaq communities identified within the Project areas, in particular medicinal plants, are also present within the surrounding areas. Mitigation measures, such as providing access to the site prior to clearing, would further reduce potential effects. Effects to wetlands would be addressed through a wetlands compensation plan.

With respect to the marine environment, the marine terminal would have a footprint of 1.1 hectares. The loss of fish habitat, primarily affecting lobster, would be offset through a fisheries offsetting plan. An additional safety exclusion zone around the marine terminal would limit access to approximately 20 hectares of marine habitat. The marine environment will be further disturbed by project noise and vessel traffic (i.e. 90 ships per year).

The proponent reported that the effects of noise on fauna could modify local behaviour (e.g. birds that avoid the area) or cause mortality (e.g. marine species sensitive to noise vibration). It reported that noise would occur over the lifetime of the Project. However, the proponent predicted that effects of noise were not likely to have widespread impacts on regional resource abundance and distribution. The proponent predicted that noise would not exceed a ten kilometre radius, with the exception of blasting activities, which could be detectable at a distance up to 100 kilometres from the source. Blasting was assessed as having a moderate magnitude; however, it would meet applicable limits for noise as required by the *Nova Scotia Pit and Quarry Guidelines* and the *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters*.

Emissions as a result of project construction and operation - dust or particulate matter being the primary concern - could have an effect on air quality and adversely affect wildlife and plants. Based on the source release type, emissions quantity, meteorological conditions and concentrations, the proponent predicts that emissions would likely dissipate to concentrations below levels of concern within 500 metres of the source (i.e. within the

boundary of the Project) and are not anticipated to exceed maximum acceptable concentrations established by regulation. The effects of the emissions from the Project are predicted to be low in magnitude.

The proponent reported that changes to ambient light conditions could negatively affect wildlife. Patterns of light and darkness are used to regulate natural cycles and control the behavior species. As described in section 6.3, lights could disorient and attract migrating birds. The proponent predicted that the effects of light would be of low magnitude and not exceed a ten kilometre radius around the Project; however it would be a continuous effect over the life of the Project.

Project activities could affect water quality and quantity. For example, the Project could increase the amount of sediment released into the freshwater environment during construction. Construction of roads may require watercourse crossings and culvert installations which could result in a loss of habitat. Water quality may be affected by construction altering drainage patterns, the operation and maintenance of roads, surface water discharges, and blasting residue. Removal of rock would alter surface and groundwater flow patterns, including reducing Reynolds Brook inflows and may reduce surface flows and water quality further downstream. Based on the studies conducted, there were no freshwater fish found on the project site, likely due to a naturally acidic freshwater environment. It is possible that changes to water quality and quantity could potentially affect the downstream freshwater environment.

Additional information on the potential effects of the Project on freshwater quality and on fish and fish habitat are described in section 6.1, effects on marine species are described in section 6.2, effects of migratory birds are described in section 6.3, effects on species at risk are described in section 6.4, effects on commercial fisheries are described in section 6.5, effects from shipping traffic, and accidents and malfunctions (e.g. spills) are described in section 7.1.

Potential Effects on the Current Use of Aboriginal Peoples

The proponent analysed environmental effects on current use of lands and resources based on a Mi'kmaq Ecological Knowledge Study, interviews with First Nation fisheries managers, site visits with elders and Mi'kmaw representatives, and meetings with community consultation representatives from Sipekne'katik First Nation and the Kwilmu'kw Maw-klusuagn Negotiation Office.

The study area for the Mi'kmaq Ecological Knowledge Study stretched from Halfway Cove to Durells Island and Canso and included the shore, the adjacent strip of land of about five kilometres wide, and near-shore waters of the Chedabucto Bay (Figure 5). The Mi'kmaq Ecological Knowledge Study documented intensive historical use of the lands and waters within the study area and surrounding the project area.

The Mi'kmaq Ecological Knowledge Study indicated that until very recently a number of Mi'kmaq families lived seasonally or year-round in communities near to the Project area including Half Island Cove, Fox Island, Cook Cove and Dorts Cove. Although families no longer live there, resource use continues but at a far-lower intensity. Activities identified in the Mi'kmaq Ecological Knowledge Study were hunting, trapping, plant gathering, and fishing in the marine environment for food, social and ceremonial purposes. The study suggested that terrestrial resources in the area are used by members of Paq'tnkek, Pictou Landing, Chapel Island, and Millbrook First Nations. The proponent reported that Waycobah First Nation and Paq'tnkek First Nation harvest fishery resources for food social ceremonial purposes within Chedabucto Bay.

Based on information from the Mi'kmaq Ecological Knowledge Study and site visits, the proponent concluded that there is presently no direct Mi'kmaq use of the project site for subsistence harvesting of food or furbearing animals. However, it predicted that Aboriginal uses outside the project area could be adversely affected by dust, noise and light from the Project impacting on biophysical components of the environment (e.g. terrestrial wildlife, migratory birds). The proponent reported that marine commercial fisheries represent an important, sustainable resource-based industry of historical, cultural, social and economic value to the Nova Scotia Mi'kmaq. The impacts to the communal commercial fishery are described in section 6.5 Commercial Fisheries. The proponent reported that the present food social ceremonial fishery in the vicinity of the Project (defined as the marine terminal including any safety exclusion zone around the terminal and extending out to the established shipping lanes in the approximate centre of Chedabucto Bay) is modest in scale and value to the Mi'kmaq.

Hunting and trapping

The proponent reported that the Mi'kmaq have traditionally hunted and trapped over most of Nova Scotia on an opportunistic basis. Within the Mi'kmaq Ecological Knowledge Study area, there are many areas to hunt and trap and several species of importance to the Mi'kmaq, specifically deer, hare, porcupine, grouse, and geese. The proponent stated that all species found on the Project site that are of value to the Mi'kmaq are also readily available within the wider Mi'kmaq Ecological Knowledge Study area. The proponent reported that the terrestrial portion of the project site is not presently being used by the Mi'kmaq.

Mainland moose is traditionally hunted by the Mi'kmaq and is listed as an endangered species under the *Nova Scotia Endangered Species Act;* a hunting ban is in effect. The proponents stated that potential effects of the Project on mainland moose include the loss of habitat (foraging, wintering, calving), habitat fragmentation, disruption of migratory routes, mortality due to vehicle collisions, increased poaching levels in area due to increased traffic, noise disturbance within several hundred metres of the active area and exposure to runoff from hazardous materials or contaminated soils.

The proponent conducted two surveys for mainland moose on the project site; one in 2014 and another in 2015. No mainland moose were observed during either survey; however, tracks, scat and scrapes were observed. The proponent reported that the site does not provide ideal habitat for the species, but committed to conducting two additional annual surveys for mainland moose, and to engaging an elder from the Paq'tnkek First Nation to participate in these surveys. Given the results of the two surveys that were conducted, and the paucity of suitable moose habitat at the site, the proponent predicted that effects of the Project on mainland moose would be negligible.

Figure 5 Mi'kmaq Ecological Knowledge Study Area

Source: Black Point Quarry Environmental Impact Statement, SLR Consulting (Canada) Inc.

The proponent stated that the Project would result in exclusion of wildlife and loss of habitat from the project site and that increased noise, light and dust could diminish the availability of wildlife adjacent to the Project. In addition, the environmental changes of the Project (e.g. dust, noise) as well as reduced availability of wildlife could deter Mi'kmaq from hunting and trapping near the Project. The proponent identified measures to mitigate the changes to air, dust and noise from the Project and predicted that these measures would also mitigate effects on the wildlife being hunted and trapped for traditional use. In addition to measures listed in sections 6.2 to 6.4, the proponent proposed the additional mitigation listed below. A complete list of mitigation proposed by the proponent is included in Appendix C.

Noise effects would be mitigated by measures such as:

- locating product stockpiles and other structures such as buildings and conveyors so as to attenuate the noise from the processing equipment, to the extent possible;
- restricting operating hours for the quarry and processing plants to 16-hours per day so that noise levels are reduced during night time;
- restricting blasting to daytime hours and weekdays;
- minimizing the use of reversing alarms by designing the site layout to avoid reversing, such as by including drive-through for parking and deliveries; and
- avoiding metal-to-metal contact on equipment at night.

Effects of light would be mitigated by measures such as:

- aiming all lighting downward as much as possible and shielding light sources to prevent light escaping above the horizontal plane (known as full cut-off luminaires) and keeping lights as close to where they are required as possible;
- choosing and aiming lights for the marine terminal so as to prevent, where possible, light shining directly into the water and minimizing marine terminal lighting when the terminal is not in operation;
- monitoring operations so that lighting can be switched off by work area when it is not needed; and
- considering the use of light sources with emissions spectra (i.e. bulb type) that have a lesser effect on wildlife, to help reduce lighting effects on nocturnal species.

To minimize the dust, the proponent committed to:

- applying dust suppressant (e.g. water or suitable chemical) on all disturbed areas and roads as necessary;
- limiting the amount of vegetation clearing to the smallest extent possible;
- suspending site preparation, soil and aggregate handling and blasting activities during periods of sustained high winds (greater than 30 kilometres per hour) if fugitive dust emissions cannot be controlled;
- locating piles in areas sheltered from wind where possible;
- minimizing rock drop distances;
- restricting access to soil and aggregate piles during periods of inactivity using gates, fencing, or on-site security personnel; and

- ensuring efficient operation of dust-suppression equipment on portable processing units.

Plant gathering

The Mi'kmaq Ecological Knowledge Study reported that there are several species of subsistence and medicinal plants on the project site as well as wood and wood products, including caraway seeds, hazelnuts, chokecherries, strawberries, blueberries, cranberries, fox berries, Labrador tea, and maple and birch bark. These species are also readily available in the surrounding area and are more easily assessable outside the project site. The proponent reported that there is currently no gathering on the project site; however, gathering does occur in areas outside the project boundaries.

The proponent found that potential adverse effects on terrestrial flora would result from site preparation (i.e. clearing, grubbing, grading, blasting), and road, power line and building construction. Plants may also be affected by associated dust, erosion and sedimentation, and the possible introduction of invasive species. Vegetation outside the site could be affected by dust generated by the Project.

In addition to standard mitigation for dust and sedimentation and erosion, site rehabilitation would enable partial recovery of habitat. The proponent committed to remove and salvage topsoil (i.e. approximately the upper 30 centimetres), store it separately, and reuse the soil for site restoration where possible. The proponent committed to transferring culturally important flora to suitable nearby habitat if determined to be warranted and feasible through communication with Mi'kmaq communities. As the quarry activities progress, the affected habitats would be replaced with exposed soil and rock surfaces and buildings. In sections where quarrying is completed, site rehabilitation measures would be implemented to initiate re-vegetation in exposed areas that would not be disturbed further by the operation. The proponent also stated that it would use local native vegetation for restoration and that consideration would be given to the preferential use of vegetation of interest to the Mi'kmaq. The proponent committed to including a rehabilitation plan in the decommissioning plan. Additionally, monitoring to confirm impact predictions related to dust and noise levels beyond the quarry boundary will be undertaken in accordance with *Nova Scotia Pit and Quarry Guidelines.*

Fishing for food, social and ceremonial purposes

The Mi'kmaq have the right to harvest marine resources from Chedabucto Bay for food, social and ceremonial purposes. To prevent conflict with commercial fishers, food, social and ceremonial fishing has generally been conducted in areas (or at times) that are not habitually fished for commercial purposes. The proponent found that lobster, scallop, cod, herring, and mackerel are present in the area of the marine terminal and safety exclusion zone.

Given the presence of well-established commercial fisheries within the confines of Chedabucto Bay and especially near the project site, and the prohibition of the use of mobile gear when fishing for cod, herring and other species within Chedabucto Bay, it is possible that Mi'kmaq harvesters seek their food, social, and ceremonial resources in less actively fished areas. The proponent reported that only two Band fisheries managers reported a food, social, and ceremonial fishery within Chedabucto Bay. Waycobah First Nation harvests nearshore mollusks and salmon, while Paq'tnkek's harvests were not specified.

The proponent predicted that the lobster fishery could be affected by the marine terminal and associated exclusion zone. Specifically, the marine terminal would result in the direct loss of 1.1 hectares of habitat and

access restrictions would be in place within an approximately 20-hectare area around the terminal. The proponent stated that vessel traffic between the marine terminal and established shipping lanes could affect scallop, cod, herring, and mackerel fisheries, for example by displacing or damaging fishing gear. In addition, the Project could affect mackerel fisheries if noise and disturbance cause changes in the migratory pattern whereby fish remain offshore and would travel directly from Black Point to Fox Island, bypassing Indian Cove.

To mitigate impacts on food, social and ceremonial fishing, the proponent committed to ensuring good communication with Mi'kmaq fishers so that there would be minimal disruption to fishing from vessel traffic. The proponent stated that it would work through a Community Liaison Committee model and interact directly with affected Mi'kmaq communities to establish and maintain regular communication with Mi'kmaq fishers. As discussed in section 6.2, the proponent committed to implementing a fisheries offsetting plan. Impacts on commercial fishing, including communal commercial fishing, are discussed in section 6.5.

The proponent's assessment of effects on the current use of Aboriginal peoples, including consideration of factors such as magnitude, extent, duration and reversibility, is summarized in Appendix A and the mitigation measures, monitoring, and follow-up activities to which it has committed are listed Appendix C. Overall, the proponent predicted that:

- effects from loss of wildlife and plant resources are localized only to the Project site and would not likely have widespread impact on regional resource abundance and distribution;
- effects of noise on fauna can modify local behaviour (often a temporary effect as many species would acclimatize to anthropogenic noise). Noise effects would not likely have widespread impact on regional resource abundance and distribution; and
- effects on fisheries were predicted to be of minor significance.

Overall, the proponent predicted that effects of the Project on the current use of Aboriginal peoples are unlikely to be significant.

6.6.2 *Views expressed*

Government

The Province of Nova Scotia (Office of Aboriginal Affairs) recommended that the proponent's engagement strategy include more specific steps for regular communication with the Mi'kmaq regarding fishing activity. It further recommended that the proponent provide regular written updates describing engagement activity with the Mi'kmaq and associated results. The proponent committed to maintain regular communication with the Mi'kmaq and to provide written updates describing its engagement activities.

Aboriginal

The Kwilmu'kw Maw-klusuagn Negotiation Office commented that while the Environmental Impact Statement indicated there would be minimal effects on Mi'kmaq fishing, it did not clearly identify how this conclusion was reached, given that a Mi'kmaq fisheries study had not been completed. The Kwilmu'kw Maw-klusuagn Negotiation Office requested additional information on how impacts to fish and fish habitat and Mi'kmaq fishing activity would be avoided or mitigated.

Based on comments provided by the Kwilmu'kw Maw-klusuagn Negotiation Office, the proponent provided additional baseline information on food, social and ceremonial fishing and updated its effects assessment accordingly. In addition, it committed to conducting a Mi'kmaq Fisheries Study and compensating for gear damage or loss that is demonstrably caused by Project-related vessel traffic.

The Kwilmu'kw Maw-klusuagn Negotiation Office requested that a field study of plants important to the Mi'kmaq be conducted and incorporated into project approval. It stated that plants of cultural importance should be categorized according to their traditional uses, along with mitigation and recommendations if rare species are found. The Kwilmu'kw Maw-klusuagn Negotiation Office noted that the importance of a species to the Mi'kmaq would be determined not only by its abundance (or rarity), but also by its cultural and spiritual value. The proponent committed to notifying the Kwilmu'kw Maw-klusuagn Negotiation Office of construction and project schedules in advance to allow it to access the site and to catalogue and harvest resources of importance to the Mi'kmaq, prior to construction. It also committed to use local native vegetation for restoration and to preferentially use vegetation types of interest or significance to the Mi'kmaq.

The Kwilmu'kw Maw-klusuagn Negotiation Office expressed concern that the recovery of the Mainland Moose could be adversely affected by the Project. The 2007 Recovery Plan for Mainland Moose lists a number of action items that will be instrumental in the recovery of this species. The short-term objectives of the recovery plan are to maintain and enhance the current population and distribution, mitigate threats that limit recovery (disease, poaching), initiate research to address priority knowledge gaps, and maintain and enhance habitat. Survey work undertaken by the proponent indicates that the project site does not represent good moose habitat; however, the proponent committed to conduct additional surveys in conjunction with the Mi'kmaq.

6.6.3 *Agency analysis and conclusion*

Based on information provided, the Agency understands that there was historical use of the lands and waters surrounding the project area and within the local study area described in the Mi'kmaq Ecological Knowledge Study. Hunting, trapping and plant gathering in the project area has declined since the mid-1900s due to a number of external factors but members of Paq'tnkek, Pictou Landing, Chapel Island, and Millbrook First Nations do continue to use the area to a limited extent.

Based on the Agency's analysis, the majority of effects on Aboriginal peoples' current use of land and resources for traditional purposes would be caused by Project-induced changes to dust, noise, light and habitat that could affect wildlife, birds, vegetation, and fish relied on by Aboriginal peoples. These effects would extend for a limited extent outside of the Project boundary.

The Agency is of the view that the Project's residual effects on traditional hunting and trapping due to the loss of habitat, injury or mortality of traditional species, or impacts from sensory disturbance would be negligible to low in magnitude and localized in extent, but long-term given the Project's planned lifespan. The terrestrial habitat removed by the Project is of a limited size (approximately 350 hectares) and does not contain any critical or unique habitat for species of importance to Aboriginal peoples. The Agency agrees with the proponent that hunting and trapping could continue outside Project boundaries.

The Agency determined that residual effects on traditional gathering due to construction and operation activities would be negligible to low because the effects would be localized and traditional gathering could

continue outside the affected area. The terrestrial component of the project site does not contain any unique vegetation important to the Mi'kmaq or represent a site with particular cultural importance.

The proponent's objective of final reclamation is to return lands disturbed by Project activities to a condition that is physically stable, safe, and environmentally sustainable. The quarry pit would not be returned to its pre-project condition, but would naturally fill with water to create a new 30-hectare water body. Reclamation goals include the successful re-establishment of natural vegetation communities on areas of the reclaimed landscape which can support it. The Agency has determined that while progressive reclamation using native plant species would mitigate some project-related effects on traditional gathering, there would be a residual effect on species within the disturbed area of the project footprint. However, plants currently found at the site are available within the wider Mi'kmaq Ecological Knowledge Study local study area.

The Agency acknowledges that currently available information indicates that there is a limited food, social, and ceremonial fishery within Chedabucto Bay, and specifically near the Project site, and that the proponent is undertaking a Mi'kmaq fisheries study to supplement existing information. The Agency considers that the proponent has proposed mitigation measures that would address any residual effects on food, social and ceremonial fishing if new information arises. These potential residual effects of the Project could include habitat loss of approximately one hectare and access restrictions around the marine terminal for approximately 20 hectares. The proponent would offset habitat loss and has committed to compensating fishers for any fishing gear that has been demonstrably damaged or lost due to Project related vessel traffic.

Mitigation measures outlined for fish and fish habitat (section 6.1), marine species (section 6.2), migratory birds (section 6.3), and commercial fisheries (section 6.5) would also mitigate potential effects on current use for traditional purposes. The Agency recommends the following additional key measures:

- incorporate noise and dust reduction measures in the design of the Project, and implement noise and dust reduction measures during all phases of the Project;
- in consultation with the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation, develop an abandonment and rehabilitation plan, subject to approval by the Province of Nova Scotia, for the Project based on progressive reclamation and preferential use of native plant species that are significant to the Mi'kmaq;
- notify the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation in advance of clearing activities, providing sufficient time to allow for the cataloguing and harvesting of resources of importance to the Mi'kmaq, and transfer important flora to suitable nearby habitat if warranted; and
- develop and implement a Communication Plan with the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation to minimize vessel traffic interaction with Mi'kmaq fishers.

In order to verify the predictions of effects related to mainland moose, the Agency has identified that a follow-up and monitoring program is required for surveys for mainland moose and the involvement of the Nova Scotia Mi'kmaq in these surveys. Follow-up would also be required to confirm impact predictions related to dust and noise beyond the project boundary in accordance with methodologies described in the *Nova Scotia Pit and Quarry Guidelines*.

The Agency concludes that, after taking into account the implementation of the mitigation measures described above, the Project is not likely to cause significant adverse environmental effects on the current use of lands and resources for traditional purposes by Aboriginal people.

6.7 Physical or Cultural Heritage and Historical, Archaeological, Paleontological or Architectural Sites or Structures

This federal environmental assessment considers the effects of the Project on the physical and cultural heritage of Aboriginal peoples and on structures, sites, and things of historical, archeological, paleontological, or architectural significance related to Aboriginal peoples. The environmental assessment also considers the effects of the marine terminal on the physical and cultural heritage and on structures, sites, and things of historical, archeological, paleontological, or architectural significance related to non-Aboriginal people. Aboriginal and non-Aboriginal sites potentially affected by the quarry were assessed in the environmental assessment conducted by the Province of Nova Scotia.

6.7.1 *Proponent's assessment of environmental effects*

Project activities have the potential to affect Aboriginal and non-Aboriginal archaeological and heritage resources. The proponent stated that the potential for loss of archaeological resources would most likely occur while the site is being prepared for construction (e.g. during clearing, grubbing, and grading).

Historical Mi'kmaq presence has been well documented in Guysborough County and specifically in the vicinity of Canso, less than 15 kilometres from the study area. The proponent's archaeological consultant (Davis MacIntyre & Associates Limited) conducted archaeological resource impact assessments of the project site in 2011 and 2014. These studies reported no evidence of historic Mi'kmaq use of the project property and concluded that there is low potential for Mi'kmaq artifacts or remains on the site. The assessments noted that the high and inhospitable nature of the barrens suggests that little cultural activity would have occurred in the central portion of the study area and the treacherous nature of the shoreline would have deterred habitation and bringing small boats ashore. Beach areas that may have been used in passing by the Mi'kmaq are high energy environments that typically do not preserve historical remains.

The archaeological assessments observed evidence of non-Aboriginal use of the lands within the Project Area. Items of historical interest that indicate past habitation of the coastal platform were recorded. Six probable house foundations were identified; other historical artifacts located were stone piles, apple trees, and the remnants of an iron stove. Of the six non-Aboriginal archeological sites recorded, two sites, located on the South-East portion of the site, are expected to be impacted by the Project. No signs of archaeological material were found along the shore, including in the area of the proposed marine terminal. The proponent reported that the headland on the northwest end of the former Fogarty property may be the location of reported historic burials.

The proponent committed to developing a Cultural Resource Management Plan prior to construction to guide personnel in the event that archaeological or heritage resources are identified during construction. The plan would describe a notification procedure in the event that remains were found and describe resource-specific preservation measures, such as archaeological excavation or site avoidance. Mitigation measures would be

subject to approval by the Province of Nova Scotia. The Proponent has also committed to a separate site visit undertaken with a qualified Mi'kmaq archaeologist prior to project implementation.

The proponent stated that exploratory excavation would likely be required in those areas that could be disturbed during construction. It committed to ensuring that excavation work would be undertaken under the direction of experienced archeologists before construction begins. The proponent also committed to flagging potential heritage resources identified during the 2014 study to ensure they are not inadvertently affected by construction activities.

The proponent's assessment of effects on archaeological and heritage resources, including consideration of factors such as magnitude, extent, duration and reversibility, is summarized in Appendix A and the mitigation measures, monitoring, and follow-up activities to which it has committed are listed Appendix C. The proponent predicted that the residual environmental effects of the Project on archaeological and heritage resources would be: low in magnitude, permanent, and non-reversible. Overall, the proponent predicted that effects on archaeological and heritage resources are not likely to be significant.

6.7.2 *Views expressed*

Government

The Province of Nova Scotia (Department of Communities, Culture and Heritage) noted that the proponent's Environmental Impact Statement did not specifically adopt the recommendations from the archaeological assessment regarding archaeological findings. However, the Province recognized that mitigation, monitoring, exploratory excavation, flagging of potential heritage resources, and the implementation of a Cultural Resource Management Plan prior to construction are included in the Environmental Impact Statement. The Province of Nova Scotia acknowledged that the Environmental Impact Statement noted that mitigation measures pertaining to archaeology and historical sites would be subject to approval by the Department of Communities, Culture and Heritage, prior to site construction. The Province of Nova Scotia reaffirmed that approved mitigations measures would ensure that the resources noted in the archaeological assessments are protected and recorded, or effects on them mitigated.

The Province of Nova Scotia (Office of Aboriginal Affairs) recommended that the proponent consider communicating with the Kwilmu'kw Maw-klusuagn Negotiation Office regarding any archaeological investigation or monitoring activity on the project site, given that the Mi'kmaq have expressed an interest in on-site archaeological investigations.

The proponent indicated that in the event that archaeological remains are excavated, recommended guidelines as directed by the Nova Scotia Communities, Culture, and Heritage Coordinator of Special Places would be employed. Should evidence of Aboriginal archeological remains be uncovered, all activity would cease until Mi'kmaq archaeological experts have had an opportunity to examine the site and determine appropriate action.

Aboriginal

The Kwilmu'kw Maw-klusuagn Negotiation Office's Archaeological Research Division recommended that the proponent conduct a survey for petroglyphs in barrens on the project property as well as an additional survey, which would include subsurface testing, in the proposed layout and administrative areas. It further

recommended that the proponent work directly with the Kwilmu'kw Maw-klusuagn Negotiation Office's archaeologist to ensure that the Mi'kmaq of Nova Scotia's concerns are addressed in future archaeological assessment work on the site. The proponent presented additional information from the 2014 archaeological resource impact assessment, during which a team examined instances of exposed granite for signs of petroglyphs; but observed none. The assessment concluded that the only exposures of granite on the barrens appeared to have been caused by all-terrain vehicle activity over the past decades scraping the vegetation from the stone, where it is slow to regenerate. In addition, the report stated that any petroglyph creation in the area would likely have necessitated not only a steep and dangerous climb from the water or the lowlands, but also scraping away ten to 30 centimetres of moss and other vegetation to create petroglyphs, which would likely have been recovered within a few decades unless maintained.

Public

Concern was raised about the lack of commitment by the proponent to implement a 100-metre buffer surrounding the Fogarty Family foundations, as recommended in the archaeological assessment. In May 2015, the proponent met with the Province of Nova Scotia to discuss additional archaeological work, mitigation measures, and sequencing for the design of the plant. The Province advised the proponent that it would require additional archaeological inspections to determine the presence or absence of any items of significance, if additional work is to be conducted within any of the recommended buffers (i.e. 100 metre buffer for construction activities from foundations and probably gravesite locations).

6.7.3 *Agency Analysis and Conclusion*

The Agency notes the low potential for Mi'kmaq artifacts or remains on the site. The Agency also noted that, although six non-Aboriginal archaeological sites were observed on the property, the focus of the federal environmental assessment for non-Aboriginal sites is restricted to the area affected by the marine terminal and none of the sites are located within that area. Based on the evidence presented in the archeological studies and the environmental impact statement, the Agency concurs that the likelihood of finding artifacts of importance to the Mi'kmaq on site is low, However, in the event that artifacts are found, it is important that the proponent develop a Cultural Resource Management Plan in consultation with the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation.

The Agency considered the mitigation measures proposed by the proponent and comments received from government authorities, Aboriginal groups and the public and identified the following key mitigation measures:

- prior to construction, develop a Cultural Resource Management Plan in consultation with the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation, subject to approval by the Province of Nova Scotia (Nova Scotia Minister of Communities, Culture and Heritage); and
- carry out additional archaeological work at the site in the areas that may be disturbed during construction. This may include, but not limited to: shovel testing, site mitigation, site buffering etc.

Taking into account the implementation of the mitigation measures described above, the Agency concludes that the Project is not likely to cause significant adverse effects on the physical and cultural heritage of the Nova Scotia Mi'kmaq, or on structures, sites or things of historical, archaeological or architectural significance to either the Nova Scotia Mi'kmaq or non-Aboriginal peoples.

6.8 Tourism and Recreation

The construction, operation, and decommissioning of the marine terminal could result in changes to the environment that could affect socio-economic conditions related to tourism and recreation. Authorizations from Fisheries and Oceans Canada and Transport Canada may be required for the construction of the marine terminal. Accordingly, the environmental effects of the marine terminal on tourism and recreation are considered in accordance with subsection 5(2) of CEAA 2012.

6.8.1 *Proponent's assessment of environmental effects*

In 2010, seven percent of visitors to Nova Scotia visited the Eastern Shore, of which nine percent visited Guysborough and 18 percent visited Canso (2010 Nova Scotia Visitor Exit Survey). The main tourist attractions along the Eastern Shore were beaches, trails and parks. Infrastructure associated with tourism and recreational activities includes accommodations, marinas, recreation centres and parks. The closest tourism and recreational facilities to the Project would be Lower Half Island Cove Beach, 1.7 kilometres to the west, Eagle Valley and Hayden Lake Cottages, 880 metres and 980 metres south, respectively, and Seabreeze Campground 3.3 kilometres to the east.

Residents and tourists alike utilize the terrestrial and marine landscapes in the county for outdoor activities such as camping, hiking, fishing, boating, off-road motoring, and hunting. These activities are popular and available due to the largely undeveloped nature of Guysborough County. Recreational fishing in the Chedabucto Bay is a popular tourist and local recreational activity (e.g. for Bluefin tuna, mackerel).

The proponent reported that the project area is used occasionally for recreational fishing and that coastal regions of the project area are occasionally visited by local residents who enjoy the beaches and undeveloped vistas. The Project would change the current uses of the property from trapping and fishing (all-terrain vehicle passage and near shore fishing) to a quarry and marine terminal. Specifically, the proponent stated that as result of the Project, the marine recreational fishing that currently occurs in the area may no longer be practiced. However, it predicted that effects on recreational fishing would not be significant since many other recreational fishing opportunities exist in the vicinity. Impacts of the Project on the marine environment, including fish and fish habitat, and on commercial fisheries are described in sections 6.2 and 6.5.

Tourism and recreation in the vicinity of the Project could also be affected by noise, light, air emissions and changes in viewscapes that would result from the construction and operation of the marine terminal:

- **Light trespass** – The proponent predicted that during operations, light trespass from the marine terminal (plus ancillary lighting), could reach up to ten kilometres. It stated that light may be perceptible from viewpoints to the east and west;
- **Noise emissions** – The proponent predicted that noise from construction of the marine terminal would not be audible beyond one kilometre from the Project; however, noise from operations of associated vessels during construction could reach up to ten kilometres. During operations, noise from the ship loader could also be audible up to ten kilometres from the Project. Noise may be perceptible from the east and west;
- **Air emissions** –The proponent stated that dust (i.e. total particulate matter, total suspended particulate, particulate matter up to particle sizes of ten microns and 2.5 microns) would result from activities including material loading and unloading, conveying, and transfer. An air dispersion model used to simulate the

transport of contaminants released from the Project, including vessel emissions, predicted that air contaminant concentrations at the nearest residences would remain well below the maximum acceptable levels established by regulation (i.e. Canada-wide standards); and

- **Changes in viewscapes** – The proponent stated that some of the Project area would be visible from the beach at Indian Cove, located 3.5 kilometres east of the processing plant. The marine terminal would likely remain in place upon closure.

Marine traffic, dust and light from the Project could cause a decrease in wilderness and nature-oriented recreation and tourism within the Project area. Visually, the Project, including the terminal, may deter boaters and kayaks from visiting the area, which may negatively affect revenue at local campgrounds, rental accommodations, and other service providers.

The proponent predicted that noise from the Project would be perceived as a component of ambient background noise at Seabreeze Campground and Cottages, and that attendance rates at the campsite would not likely be affected.

The proponent's assessment of effects on tourism and recreation, including consideration of factors such as magnitude, extent, duration and reversibility, is summarized in Appendix A and the mitigation measures, monitoring, and follow-up activities to which it has committed are listed Appendix C. The proponent predicted that the residual environmental effects of the Project on tourism and recreation would be: low in magnitude, varied in duration, and reversible. Overall, the proponent predicted that effects on tourism and recreation are not likely to be significant.

6.8.2 *Views expressed*

Public

A member of the public who has visited the Project area as a tourist expressed concern about potential changes to the environment as a result of the Project. Another member of the public disagreed with the proponent's measurements of the distance between the Project and Seabreeze Campground and Cottages; indicating that the actual distance was approximately 1.5 kilometres by road, and less than one kilometre 'as the crow flies". The individual stated that effects of the Project would result in the loss of summer jobs and a decrease in property value. Furthermore, the individual stated that noise from the quarry would travel greater distances than those predicted by the proponent due to its location by the water. The proponent verified the distance to Seabreeze Campground is greater than two kilometres, as shown on Figure 1.

The Sierra Club (Atlantic Canada Chapter) indicated that residents have expressed concern about the economic impacts of the Project (i.e. lost opportunities for tourism, conservation and other resource industries).

6.8.3 *Agency analysis and conclusion*

The Agency considered pathways of dust, noise and light and the related influence of landscape and environmental conditions. The Agency notes that the visual impact of the marine terminal would extend beyond the life of the Project because, although aspects of the terminal may be dismantled, the terminal itself would likely remain in place upon closure and thus some of its effects would be irreversible.

Although the Project would result in local impacts, the Agency agrees that the overall effects of light and noise from the marine terminal would be low or moderate in magnitude and the geographic extent would be relatively localised (ten kilometres or less). Based on the source release type, emissions quantity, meteorological conditions and concentrations, the Agency accepts the prediction that emissions would likely dissipate to concentrations below levels of concern within 500 metres of the source (i.e. within the boundary of the Project) and that project-related air contaminants at the nearest public receptors (720 to 750 metres from property boundary) would be below the maximum acceptable concentrations established by regulation. The Agency's analysis with respect to tourism and recreation specifically focuses on the effects from the marine terminal (e.g. dust, light), which would be a portion of the Project's overall effects.

Although there would be a local loss of land for tourism and recreation and on-going impacts on viewscapes, there are other areas nearby that offer recreational opportunities and landscapes similar to those of the Project given the relatively undeveloped nature of Guysborough County. The Agency believes it is important that the proponent implement and monitor measures to mitigate the potential effects of light, noise and air emissions, which would also mitigate effects on tourism and recreation. Mitigation measures outlined in section 6.6 on current use would also mitigate effects on tourism and recreation.

The Agency concludes that, with the implementation of measures such as those outlined to mitigate effects on current use (section 6.6.3) the Project is not likely to cause significant effects on tourism and recreation.

7 Other Effects

7.1 Effects of Accidents and Malfunctions

CEAA 2012 requires consideration of the environmental effects of accidents and malfunctions that may occur in connection with a designated project. Accidents and malfunctions can occur at various phases of the Project, from construction of a project to the closure phase. In addition to mechanical or structural failure, or human-error-induced accidents and malfunctions, the effects of the environment on the Project may cause an accident or malfunction, or increase the severity of its consequences; this is discussed further in section 7.2.

7.1.1 *Proponent's Description of Potential Accidents and Malfunctions*

Accidents and malfunctions during the Project could affect the valued components. The proponent identified hazards associated with the Project, and predicted that the greatest potential for environmental effects would be from:

- structural failures (e.g. aggregate stockpile slope failure, sediment pond failure);
- accidents (e.g. explosives accident, marine spill, transportation accident such as vehicle and marine collisions, hydrocarbon spills on land or in the water); and
- other malfunctions (e.g. unspecified health and safety incidents, wildlife encounters, forest fires).

The proponent assessed each potential accident or malfunction taking into consideration the likelihood of the event (negligible to high) and the magnitude of associated environmental effects (negligible to extreme). The proponent also considered the mitigation, operational safeguards and emergency response measures available to minimize environmental effects, and the cost of remediation (as a measure of severity). An overall risk rating was determined by creating a matrix of likelihood and consequences, for example, higher risk is associated with events having a greater likelihood of occurrence and a greater magnitude of effects (Table 5).

Table 5 Proponent's Accident and Malfunctions Risk Ratings

Malfunction or Accident	Potentially-affected environmental component	Likelihood	Magnitude	Overall Risk 1 = Maximum 9 = Minimum
Stockpile Slope Failure	Human Health and Safety Surface Water Resources Terrestrial Habitat and Vegetation	Negligible	Moderate	8
Sedimentation Pond Failure	Marine and Surface Water Resources Terrestrial Habitat and Vegetation Marine Species and Habitat Species at Risk	Very Low	Low	8
Processing Plant Infrastructure Failure	Marine and Surface Water Resources Marine Species and Habitat	Very Low	Moderate	7

	Species at Risk			
Marine Terminal Infrastructure Failure	Marine and Surface Water Resources Marine Species and Habitat Species at Risk	Very Low	Moderate	7
Terrestrial Spill	Human Health and Safety Geology, Soil & Sediment Groundwater Resources Wetlands	Low	Moderate	7
Explosives Accident	Human Health and Safety Marine and Surface Water Resources Terrestrial Habitat and Vegetation Terrestrial Wildlife Marine Species and Habitat Species at Risk	Negligible	Moderate	8
Vessel Accident/Collisions	Human Health and Safety Marine Species and Habitat Species at Risk Local Economy Commercial Fisheries	Very Low	Very High	5
Marine Spill	Human Health and Safety Marine and Surface Water Resources Marine Species and Habitat Species at Risk Local Economy Commercial Fisheries	Very Low	Very High	6
Transportation Accident	Human Health and Safety Terrestrial Habitat and Vegetation Terrestrial Wildlife	Low	Moderate	8
Forest / Site Fire	Human Health and Safety Air Quality Terrestrial Habitat and Vegetation Terrestrial Wildlife Tourism and Recreation Aboriginal Land and Resources Use	Negligible	High	7
Quarry Pit Slope Failure	Human Health and Safety	Negligible	High	7

Stockpile Slope Failure

In case of stockpile slumping, the proponent predicted that soil would remain confined within the property boundary, based primarily on the sloping of the coastal platform to the south. The proponent proposed the following measures to mitigate the potential for stockpile slope failure:

- aggregate stockpiles would be located greater than 30 metres from the coast on a sloped platform designed to contain storm-water drainage;

- overburden stockpiles would be placed at the southern property boundary at least 20 metres from the nearest watercourse and would be compacted using loaders and dump trucks; and
- perimeter ditches would be installed, as needed, to manage water from the screening berm.

In the event of a failure, the proponent would secure the area, and depending on the scale of the failure, the stockpile slope would be re-contoured in place. Slumped material would be excavated and returned to the stockpile and, if required, drainage ditches would be repaired.

Sedimentation Pond Failure

Sedimentation pond failures could result in uncontrolled discharge of sediment-laden water to the environment. The proponent predicted that due to the sloping and configuration of the coastal platform, sedimentation pond failure would not result in the release of sediment laden runoff to the environment. In the case of excessive water, both the ponds and the pit sump could overflow without discharge to the ocean as overflow would collect against the south cliff and in the pit.

The proponent proposed the following measures to mitigate the potential for sedimentation pond failure:

- design sedimentation ponds to accommodate anticipated storm-water runoff;
- excavate low, large-volume engineered ponds into rock and berm with crushed stone several tens of metres thick; and
- confine fines storage to areas within the quarry pit.

In a pit flooding event, the proponent states that it would pump pit water to the sedimentation ponds for clarification prior to discharge. If the sedimentation ponds were already full, it would wait until the water meets discharge requirements prior to release into Chedabucto Bay.

The proponent would carry out regular inspection and monitoring of sedimentation ponds and erosion and sediment control measures, including during and after extreme precipitation events. Erosion and sediment control structures found to be damaged would be repaired immediately and any other remedial action would be taken as necessary.

Processing Plant/Marine Terminal Infrastructure Failure

Structural failure of processing plant components (e.g. crushers, screening, conveyors, supporting structures) or the shiploader could occur due to metal fatigue, corrosion or inadequate maintenance. The proponent states that failure of the shiploader arm could cause an aggregate spill in the marine environment. The proponent indicated that an aggregate spill may cover marine flora, benthic habitat, and affect the quality of fish and habitat function (e.g. could cause mortality, habitat loss), however, the washed and crushed granite would be chemically inert and would eventually be colonized by marine biota. The proponent proposed a regular inspection and maintenance program to replace worn or inefficient equipment on regularly scheduled intervals.

Terrestrial Spill

Accidental releases could occur during fuelling, through breaks or leaks in hydraulic lines, or from storage container failure. Spills could include petroleum products (i.e. gasoline, diesel), oils and lubricants, waste oil, used glycol, and spent parts washer fluids. In the event of a large spill, soil, groundwater and surface water

contamination could occur. The proponent predicted that a spill would not adversely affect the quality of wildlife habitats since the working areas where a spill might occur would already be largely devoid of vegetation. It proposed the following measures to mitigate the potential for terrestrial spills:

- store fuel in above-ground storage containers and ensure that all storage tanks are either double-walled, self-contained tanks or single-walled tanks with secondary containment;
- store all petroleum storage containers 55 gallons (208 litres) or larger within a contained area capable of holding 110 percent of the volume of the largest reservoir placed within it; and
- conduct fueling on a reinforced concrete slab or lined containment area enclosed within side curbs and with a sloped floor to contain any spills or leaks; locate the fuelling area at least 60 metres from the nearest surface watercourse and at least 100 metres from the ocean.

Mitigation proposed by the proponent is listed in Appendix C. In the event of a spill or leak, the proponent stated that immediate action would be taken to stop the spill and contain the spilled material. Spills would be contained and cleaned up using standard equipment (e.g. absorbent pads) and spill response procedures. All spills would be reported to the 24-hour environmental emergencies reporting system as per the *Environmental Emergency Regulations* of the *Canadian Environmental Protection Act, 1999* and the *Emergency Spill Regulations* of the *Nova Scotia Environment Act.* A Spill Contingency Plan would be developed and approved by regulatory agencies prior to construction.

Explosives Accident

An explosives accident could include premature blasts or accidental detonation. Available accident data indicated that “flyrock” and lack of blast-area security are the primary causes of blasting-related injuries in surface mining. A spill of explosives ingredients (i.e. fuel oil and/or ammonium nitrate) or emulsion could contaminate local ground and surface water. A spill while in transit to the pit (i.e. on the access road) could reach soil and surface waters. The proponent proposed the following measures to mitigate the potential for explosives accident:

- store no explosive material on-site; and
- ensure that all blasting activities are conducted by an experienced and trained, licensed contractor, who would be responsible for designing blasts and methods in accordance with the *Blasting Safety Regulations* of the *Nova Scotia Occupational Health and Safety Act*, the *Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters* (Wright and Hopky 1998), and in accordance with the *Nova Scotia Pit and Quarry Guidelines* (NSEL 1999).

Spills of explosive components would be managed in accordance with the Emergency Response Plan and under the direction of the blasting contractor. A spill from a truck on the access road or elsewhere within the property would be managed like any other fuel spill.

Vessel Accident or Collision

Project-related vessel collisions, both between ships and with the terminal, could occur. Navigational error, navigation equipment malfunction, engine malfunction and poor weather conditions could contribute to these accidents. In the event of a vessel tank rupture following an accident at sea, marine diesel oil fuel could be

discharged to the marine environment. The proponent proposed the following measures to mitigate the potential for accidents and collisions:

- use double hulled fuel reservoirs on aggregate transport vessels;
- ensure that the marine terminal is properly constructed and has navigational aids and anti-collision radar; and
- employ a mooring plan that identifies and establishes operating limits (including weather-related) for all marine terminal activities (i.e. berthing, mooring, and aggregate loading).

Mitigation proposed by the proponent is listed in Appendix C. A discussion of potential marine spills is presented below.

Marine Spills

In the event of a vessel tank rupture, such as could occur from a collision with another vessel or the terminal, up to 2500 to 3000 tonnes of marine diesel fuel oil could be released into the marine environment. Such spills could adversely affect aquatic life (e.g. fish, marine mammals, birds) and habitat, commercial fisheries, and tourism and recreation. The proponent proposed that no fuel would be stored at the terminal and no vessel refuelling would occur at the Project site.

The proponent proposed to prepare an Emergency Spill Response Plan that contains predictive oil spill modelling. In addition, advance planning (e.g. mock simulations of spill events) would occur and spill response equipment would be maintained on site (on vessels, near the marine terminal, or both) to ensure rapid deployment. The proponent would retain the services of a certified spill-response contractor for use in the event of a spill. It stated that spilled fuel would be contained with oil booms and recovered with absorbents. The proponent stated that dispersants may also be used.

Transportation Accident

Most vehicle traffic would be confined to the pit where rock would be loaded and transported to the primary crusher. Accordingly, the proponent predicted that a fuel spill would be confined to the pit. Spills from accidents on the access road could reach roadside ditches; however, the proponent predicted that these would be low-volume spills. It proposed the following measures to mitigate the potential for a transportation accident:

- ensure access and haul road width is sufficient to allow safe side-by-side passage of two vehicles;
- clear vegetation to ensure adequate line of sight around corners and at road junctions; and
- post and enforce speed limits within the quarry.

Appendix C lists the mitigation measures proposed by the proponent. Procedures outlined in the Emergency Response Plan would be followed in the event of a vehicle collision or accident.

Forest Fire

A lightning strike or human carelessness could result in a forest fire at or near the site. This could result in habitat loss, direct mortality of wildlife, loss or damage of property, and the release of air emissions such as particulate matter, carbon dioxide (CO_2), carbon monoxide (CO), nitrogen oxides (NO_X), and sulphur dioxide (SO_2). The proponent predicted that due to the lack of vegetation, it would be unlikely that a vehicle or other on-

site fire could cause a forest fire that might spread elsewhere. The proponent proposed the following measures to mitigate the potential for a forest fire:

- train all plant personnel on fire hazards, fire prevention, and firefighting roles, responsibilities and requirements for their respective positions; and
- provide fire detection systems at appropriate locations (e.g. administrative office, fuel dispensing/maintenance shop).

Appendix C lists the mitigation measures proposed by the proponent. The proponent stated that it would distribute its Emergency Response Plan or portions thereof the Queensport and Canso Fire Departments. Representatives of these Departments would be invited to meet with the proponent to view the site, review access and evacuation routes, and understand the activities undertaken at the site.

7.1.2 *Views expressed*

Government

The Province of Nova Scotia expressed concern about the potential for an oil spill from the marine terminal and ship traffic and associated risk to wildlife species. Tern colonies are especially sensitive to the adverse effects of oil during the breeding and migration season. Significant concentrations of eider ducks, harlequin ducks and many other species of waterfowl known to occur in relatively high numbers at all seasons of the year on islands and along the Chedabucto Bay are also at elevated risk of episodic and low levels of chronic oiling. It was recommended that the proponent prepare an oil spill and emergency plan to consider proactive management at the terminal for all petroleum products and effective emergency response to minimize impacts on marine organisms (i.e. birds) and its habitat. The marine oil spill emergency measures plan and petroleum products management measures should be developed with the Province of Nova Scotia (Nova Scotia Environment), Environment Canada, and Fisheries and Oceans Canada. The proponent committed to preparing an Emergency Response and Spill Contingency Plan with measures to prevent birds from becoming oiled (i.e. deterrents/measures to remove oil from water or land) and a strategy to deal with accidents where birds are oiled or sensitive habitats contaminated.

Environment Canada asked the proponent to expand its assessment of accidents and malfunction on migratory birds beyond "unplanned explosive effects", recognizing that these may be affected by other events (e.g. fuel spills, marine collisions, fires) and the associated emergency response. Environment Canada also asked the proponent to consider migratory birds and their habitat in its definition of significance for vessel accidents and collisions and marine spills. The proponent provided the requested additional analysis, as reflected in the proponent's analysis of the effects of accidents and malfunctions in section 7.1.1.

Public

Comments were received stressing the importance of coastal areas. It was recommended that the proponent model currents and trajectories to determine which areas would likely be impacted by a spill into the marine environment. The proponent committed to preparing an Emergency Response and Spill Contingency Plan, developed in consultation with the Province of Nova Scotia, Environment Canada and Fisheries and Oceans Canada. The plan would include spill dispersion modelling in the marine environment to aid in rapid and effective emergency response.

7.1.3 *Agency analysis and conclusion*

The proponent identified potential accidents and malfunctions related to the Project and assessed associated environmental effects. Compliance with international, federal and other legislated requirements, as well as appropriate design standards and construction and operational practices would mitigate the probability of occurrence of the scenarios identified. The potential consequences of accidents and malfunctions would be limited by effective emergency response based on pre-defined plans for incidents that may occur. The Agency supports this commonly-used approach.

The Agency has considered the mitigation measures proposed by the proponent, expert advice from government authorities, and comments received from the public in identifying the following key mitigation measures in relation to accidents and malfunctions:

- prepare an environmental protection plan with the aim of preventing accidents and malfunctions that could affect marine and terrestrial organisms and their habitats. The plan shall take into consideration the potential effects of the environment on the Project, including climate change, and be approved by the Province of Nova Scotia, and include measures such as:
    - employing double hulled fuel reservoirs on aggregate transport vessels;
    - identifying and establishing operating limits for all marine terminal activities (i.e. berthing, mooring, and aggregate loading) under severe environmental conditions;
    - storing fuel in above-ground storage containers and ensuring that all storage tanks are either double-walled, self-contained tanks or single-walled tanks with secondary containment;
    - conducting vehicle fueling on a reinforced concrete slab or lined containment area enclosed within side curbs and having a sloped floor to contain any spills or leaks, located at least 60 metres from the nearest surface watercourse and at least 100 metres from the ocean; and
- conduct spill dispersion modelling in relation to spills in the marine environment to inform effective emergency response; and
- prepare an oil spill and emergency response plan to deal with fuel or other petroleum product spills, with the aim of minimizing effects on marine and terrestrial organisms and their habitats; the plan should include:
    - measures to prevent birds from becoming oiled (i.e. deterrents or measures to recover oil from water or land);
    - a strategy to deal with accidents where birds are oiled or sensitive habitats are contaminated;
    - spill response exercises on a regular basis; and
    - spill response equipment on site to ensure rapid deployment.

Additional measures that would mitigate the potential for an accident or malfunction to occur are listed in sections 6.2 and 6.3.

The Agency agrees with the proponent that the likelihood of most accidents occurring is considered low. Although minor spills or other smaller incidents may occur during the life of the Project, effects of these would be local, short-term, and reversible; and are not expected to cause a significant adverse effect on any valued

component. The Agency concludes that no significant adverse environmental effects are likely to result from accidents and malfunctions, taking into account the implementation of mitigation measures, project design, and response plans.

7.2 Effects of the Environment on the Project

CEAA 2012 requires that the federal environmental assessment take into account any change to the Project that may be caused by the environment. Extreme environmental conditions or events can cause or increase the probability of an accident or malfunction, such as an oil spill or settling pond overflow that in turn could adversely affect the environment. Resulting environmental effects could include the loss or contamination of habitat, reduced water and air quality, and effects on wildlife. In addition, over the life of this Project (50+ years), climate change may contribute to increased likelihood and severity of certain meteorological events.

7.2.1 *Proponent's Assessment of Effects of the Environment on the Project*

The natural environment may adversely affect the Project through various meteorological, climatological and seismological events. Resulting events and related changes to the Project were summarized by the proponent as shown in Table 6.

Table 6 Environmental Events and Their Potential Effects on the Project

Hazards	Effects on the Project
Drought	• Increased dust on-site; increased potential for off-site dust transport. • Reduced availability of wash water for quarry operations. • Reduced availability of on-site potable groundwater.
Extreme precipitation and flooding	• Dangerous driving conditions due to reduced visibility and washed out roads. • Failure of erosion and sedimentation and erosion control measures (e.g. overflow of settling ponds). • Increased site run-off from exposed areas. • Pit and other project-area flooding.
Extreme high/low temperatures	• Damage to or malfunctioning of mechanical equipment.
Freeze/thaw conditions	• Development of pot holes or roads breaking apart, creating a hazard to driving. • Ice blockage of flow conveyance in ditches, leading to ditch overflows. • Land access to marine terminal may temporarily be difficult due to thawing ground. • Shifting ground and equipment. • Freezing of exposed piping and equipment that carry water.
Ice storm	• Dangerous driving conditions due to reduced visibility and icy roads. • Chance of power outages due to ice on hydro lines or ice laden trees falling on the hydro lines. • Dangerous quarry conditions due to ice covered operational areas in the pit.

Freezing spray	• Vessel instability due to ice accumulation on ship superstructure.
Severe wind events including hurricanes, and associated sea state	• Impact on vessel berthing/loading procedures and schedules. • High waves crashing into marina causing damage. • Chance of power outages due to trees falling on the hydro lines.
Lightning strikes	• Damage to processing plant components. • Power surges / power outages.
Sea Ice	• Change in shipping routes; shipping delays. • Vessel and terminal icing due to freezing sea spray. • Icing of the processing plant causing delays.
Fog	• Change in shipping routes resulting in delay.
Earthquakes and tsunamis	• Damage to processing plant and marine terminal infrastructure. • Rock slides in the pit.

The proponent stated that the lifespan of the Project is long enough to be affected by climate change. Climate trends suggests potential changes in rainfall (i.e. amount, frequency, intensity), temperatures, occurrence patterns of ice storms, and sea level rise, in addition to more frequent and more intense storms (with associated higher wind speeds, storm surges and sea state).

The proponent proposed to mitigate the risks posed by such events through engineering design and proper construction of facilities. According to the proponent, preliminary project design considered prevailing historical conditions, including extreme events, as well the anticipated effects of climate change on key weather variables. As the Project moves into the detailed design stage, the proponent would continue to consider potential effects of the environment on the Project. Other prevention strategies and measures include:

- moving mobile equipment to a safe location and elevation;
- reinforcing the anchoring of stationary equipment;
- bringing down conveyors or securing them and filling belts that cannot be dropped by loading with stone;
- transferring fuel and other products stored in bulk to a secure location or anchoring tanks and closing and securing all connection valves and drain and fill lines;
- modifying or suspending marine operations to ensure that vessels are safely out of the area prior to storm impacts;
- de-energizing electrical equipment and disconnecting plant power; and
- draining water management systems including ponds, piping and ditches to ensure there is adequate free board to accept anticipated precipitation.

In addition to measures intended to prevent or minimize the probability of adverse environmental effects of the environment on the Project, potential adverse effects would be mitigated through emergency response and contingency planning, which is discussed more fully in section 7.1.

The proponent predicted that the effects of the environment on the Project would not be significant and that associated risks can be managed through appropriate design of facilities, implementing preventative measures to reduce the probability of occurrence and being prepared to respond effectively to situations that may arise.

7.2.2 *Views expressed*

Government

Transport Canada inquired as to whether the design of the alignment of berth for vessels takes into consideration prevailing currents, tides and winds, if the design had been discussed with the Atlantic Pilotage Authority, and if any simulations had been done to determine best approaches for alignment. The proponent confirmed that shipping activity, pilotage issues, and proposed shipping routes had been discussed with the Atlantic Pilotage Authority on September 3, 2014. Simulations have not been conducted to date but may be initiated at the detailed design stage following the environmental assessment.

Environment Canada requested an opportunity to review additional environmental information during the detailed design stage. The proponent committed to providing this opportunity for review and discussion.

With respect to sea level rise, the Province of Nova Scotia (Environment Department) recommended using the upper bound estimates and cautioned that many predictions, based on observation, under-estimate total sea-level rise. It advised taking a precautionary approach in estimating the future impact of the environment on the Project and noted that an additional 20 percent is a commonly-used buffer (i.e. predict sea level rise to be 20 percent higher than current estimates).

Aboriginal

The Kwilmu'kw Maw-klusuagn Negotiation Office indicated that the discussion of seismic activity in the Environmental Impact Statement provided a good regional overview of the Laurentian slope activity and the implications of a near site epicenter that may cause a tsunami. The group noted that the Environmental Impact Statement discussion could have focused on some of the nearer activity (< 100 kilometres) that is on record. The Kwilmu'kw Maw-klusuagn Negotiation Office observed that earthquakes and tsunamis are identified as a potential effect of the environment on the Project with no adverse effect expected.

Public

The Sierra Club (Atlantic Canada Chapter) commented that the proponent did not address additional changes that may be necessary if climate change predictions for the region are taken into account. High-volume, high flow-rate discharges from the ponds may be necessary in anticipation of exceptional storm events.

7.2.3 *Agency analysis and conclusion*

The Agency is of the view that the proponent adequately considered the effects of the environment on the Project for the purposes of the environmental assessment. As noted in section 7.1, key mitigation identified by the Agency includes the need for the proponent to consider the effects of the environment on the Project, including climate change, in its environmental protection plan. This plan would be approved by the Province of Nova Scotia. On this basis, the Agency is satisfied that potential effects of the environment on the Project would be adequately accounted in the event that the Project is permitted to proceed.

7.3 Cumulative Environmental Effects

Cumulative environmental effects are defined in CEAA 2012 as effects that are likely to result from a designated project in combination with the effects of other physical activities that have been or will be carried out.

Cumulative environmental effects assessment for federal environmental assessments is guided by the Agency's Operational Policy Statement - *Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012* (CEAA 2013) and the *Technical Guidance for Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012* (CEAA 2014).

7.3.1 *Proponent's Assessment of Cumulative Effects*

In its Environmental Impact Statement the proponent assessed cumulative effects on 1) shipping and navigation, and 2) local economy, land and resource use. Upon request by the Agency, the proponent expanded its assessment to include all valued components for which residual environmental effects were predicted, in accordance with the Agency's Operational Policy Statement and Technical Guidance. Within several valued components, the proponent chose indicators based on its analysis of the status and key stressors associated with the valued component.

The proponent defined spatial boundaries for the cumulative effects assessment for each valued component, based on the area within which cumulative effects could occur. To establish temporal boundaries, the timing and duration of project-related residual effects were compared with the timing and duration of other projects and activities. The cumulative effect of past projects was considered by the proponent to be reflected in baseline conditions. The proponent then considered the potential for residual environmental effects of the Project to overlap and interact with residual environmental effects of past, present and reasonably-foreseeable projects and activities. Current or proposed projects and activities considered in the assessment included forestry, shipping, land development, the Chedabucto Aggregates Quarry, the Goldboro Liquefied Natural Gas Project, the Maher Melford Container Terminal, and the Bear Head Liquefied Natural Gas Project (Appendix D).

For each valued component, the proponent's assessment proceeded according to the following five steps: scoping, analysis, mitigation, significance, and follow-up. The proponent's analysis of cumulative effects was qualitative and concluded that cumulative effects were not likely to be significant with the implementation of mitigation measures already identified for individual valued components. The proponent did not propose any follow-up specifically for cumulative effects.

The proponent's analysis showed that cumulative effects on marine mammals warranted greater focus, given that shipping levels in Chedabucto Bay are predicted to increase by 80 percent over the coming years, if all currently-proposed projects proceed as planned. There is potential for collisions between vessels and marine mammals, the probability of which would rise in response to increased shipping traffic. Fin whales are known to be present in the Bay, especially when schools of mackerel and herring are present. On this basis, the remainder of this section describes potential cumulative effects on marine mammals, which are considered as part of the marine fish and fish habitat valued component.

Cumulative effects on marine mammals

The Harbour Porpoise was selected as the indicator for marine fish and fish habitat as this species is mobile throughout Chedabucto Bay, visible at the surface, at continued risk from fishing, and potentially exposed to physical activities.

The proponent reported that there are currently about 600 large vessels moving in and out of Chedabucto Bay annually and an additional 585 vessels would be added to this number as a result of proposed projects. The additional 585 vessels would be comprised of 90 vessels per year for the Project, 260 for the proposed Maher Melford Terminal, and 135 for the proposed Bear Head project. Shipping can affect marine species, such as the harbour porpoise, through collisions, discharge of oil-contaminated bilge, and noise. The proponent reported that collision and noise risks are generally confined to specific routes taken from a marine terminal to designated shipping lanes. In addition, it stated that resident marine mammals become familiar with the noise signature, direction, and speed of individual vessels and habituate to ships following consistent course or frequency presence in an area. The proponent noted that observation and avoidance measures would be important measures to mitigate impacts on marine mammals when vessels traverse between shipping lanes (where marine mammals would be accustomed to vessel traffic) and the Black Point site. The proposed mitigation measures are described more fully in sections 6.2 (Marine Species and Habitat) and 6.4 (Species at Risk). The proponent noted that the harbour porpoise population in Chedabucto Bay is relatively robust and predicted that cumulative effects would not be significant.

7.3.2 *Views expressed*

Neither the public nor Aboriginal groups expressed any comments about cumulative effects.

Government

After it reviewed the Environmental Impact Statement, Fisheries and Oceans Canada stated that the potential cumulative environmental effects of shipping from noise, spills and vessel strikes on marine mammals and marine species at risk should be assessed (or justification should be provided about why this assessment was not conducted). In response, the proponent conducted additional analysis of the potential cumulative effects on marine mammals. After reviewing the additional information, Fisheries and Oceans Canada advised that the Fin Whale may have been a better indicator for marine species, given that increased shipping would pose a relatively higher risk to Fin Whales than to Harbour Porpoises, due to the Fin Whale's relatively greater susceptibility to acoustic disturbances and lower maneuverability. However, Fisheries and Oceans Canada further advised that the use of another indicator would not have changed the mitigation and overall conclusions related to marine mammals and, on that basis, it was satisfied with the additional information provided. Overall, Fisheries and Oceans Canada advised that the cumulative effects of the Project in combination with other physical activities would be appropriately addressed.

7.3.3 *Agency analysis and conclusion*

The Agency is satisfied that the proponent followed the Agency's Operational Policy Statement and Technical Guidance for cumulative effects. The level of analysis used to assess cumulative effects was appropriately varied between valued components and the Agency supports the proponent's use of indicators to assess the cumulative effects on key valued components.

The Agency agrees with the proponent's selection of other current or proposed projects and activities that could cause cumulative effects in combination with the Project.

The Agency's analysis focuses on the cumulative effects on marine mammals given the predicted increase in shipping levels in Chedabucto Bay over the coming years and associated noise and collision risks. The Agency

notes that the ships would travel within established shipping lanes, except on approach to or departure from the marine terminal. When marine mammals or aquatic species at risk are observed or reported in the area, the proponent shall adhere to the *Notice for Mariners General Guidelines for Aquatic Species at Risk and Important Marine Mammal Areas*, when transiting between the shipping lanes and the marine terminal. This would include reducing vessel speed to 7 knots when within 400 metres of a marine mammal. These have been recommended as key mitigation measures in section 6.3.2. Based on the implementation of this Project-specific mitigation, the Agency predicts that impacts on marine mammals would be appropriately mitigated and that no additional mitigation specific to cumulative effects would be required. Overall, the Agency is of the view that cumulative effects would be low in magnitude, but would occur continuously throughout the life of the Project.

The Agency determined that, based on the analysis conducted by the proponent, the proposed mitigation measures, and advice received from Fisheries and Oceans Canada, the Project is not likely to cause significant adverse cumulative environmental effects.

8 Impacts on Potential or Established Aboriginal or Treaty Rights

8.1 Potential or Established Aboriginal or Treaty Rights

The Mi'kmaq of Nova Scotia claim all of Nova Scotia, including the project area, as traditional territory. Under the *Constitution Act, 1982*, existing Aboriginal and Treaty rights are recognized as constitutionally protected rights. Between 1725 and 1779, various Peace and Friendship Treaties were signed between the Mi'kmaq and British settlers, the terms of which were intended to help establish peace and commercial relations. As affirmed by the courts, these treaties guarantee Aboriginal rights to hunt and fish throughout the region in pursuit of a moderate livelihood.

The Governments of Canada and Nova Scotia continue to work with First Nations to negotiate outstanding Treaty, title, and Aboriginal rights questions in Nova Scotia. A Made-in-Nova Scotia Process has been established as a rights-based process to ensure that the interests of Aboriginal groups in land, resource management, and environmental protection are realized and that claimants share in the benefits of development. On February 23, 2007, a framework agreement was signed between the Mi'kmaq of Nova Scotia, the Province of Nova Scotia, and the Government of Canada to set out the process to promote efficient, effective, orderly, and timely negotiations toward a resolution of issues respecting Mi'kmaq rights and title. Further, a trilateral agreement, the Consultation Terms of Reference was signed in 2010 which commits the Mi'kmaq, the province of Nova Scotia and the Government of Canada to a process for discharging the duty to consult and accommodate on decisions regarding natural resources which have the potential to adversely affect potential or established Aboriginal or Treaty rights.

In addition to the engagement efforts by the proponent, the federal government, along with the Province of Nova Scotia, consulted under the Consultation Terms of Reference with the Assembly of Nova Scotia Mi'kmaq Chiefs to understand potential project impacts on potential or established Aboriginal or Treaty rights. The federal government also consulted with Sipekne'katik First Nation. Any potential adverse impacts will be taken into consideration before the environmental assessment decisions on the Project are made.

8.2 Potential Adverse Impacts of the Project

During the course of the environmental assessment, the Mi'kmaq expressed concerns about the impacts of the Project on the exercise of their potential or established Aboriginal or Treaty rights and related interests, including hunting, fishing, plant gathering as well as physical and cultural heritage.

Generally speaking, exclusion from land or loss of access to resources, that could support the exercise of potential or established Aboriginal or Treaty rights would be limited to the Project area or affected area defined by the proponent. Outside of the immediate project area, it is expected that land and resources would continue to be available, accessible, and that there would be sufficient resources for the exercise of potential or established Aboriginal or Treaty rights.

Hunting and Trapping

The Project may interact with the Mi'kmaq's ability to exercise their potential or established Aboriginal or Treaty rights related to hunting and trapping. In assessing the potential impacts of the Project, the Agency considered factors such as species abundance, habitat loss, and sensory disturbance. Based on information provided by the proponent, the Agency believes that there would be a permanent loss of wildlife habitat on the project site and that the indirect effects of noise, light, and dust could affect wildlife abundance adjacent to the Project. However, species found on the project site that would be hunted or trapped, and that are of value to the Mi'kmaq, are also readily available in the wider Mi'kmaq Ecological Knowledge Study area. The Agency also considered the concerns of the Mi'kmaq with respect to the recovery of the mainland moose and is satisfied that the effect of the Project on mainland moose recovery, and the asserted right to hunt them would be negligible. A discussion of potential effects on the current use of wildlife for hunting and trapping is presented in section 6.6, along with the Agency's conclusion that the Project is not likely to cause significant adverse environmental effects on the current use of lands and resources for traditional purposes, taking into account the implementation of mitigation measures.

Plant Gathering

The Project has the potential to interact with the Mi'kmaq's ability to gather plants. There are several species of plants within the project site that are important to First Nations for food and medicinal purposes; however, these species are readily available in the surrounding area and are more easily assessable outside the site. A number of mitigation measures have been proposed to address potential impacts from the Project on plants and gathering activities, these measures would also mitigate potential impacts on Mi'kmaq potential or established rights to gather plants.

Fishing

The Project may interact with Mi'kmaq fishers' ability to exercise their potential or established Aboriginal or Treaty rights to fish traditionally or commercially. Although ten Mi'kmaq communities hold communal commercial fishing licences in Chedabucto Bay, in the project area communal commercial fishing is limited to one shrimp trap licence. Additionally, the proponent indicated that the current food, social and ceremonial fishery in the vicinity of the Project is extremely modest in scale, if one is present at all. The Agency understands that this latter point will be further confirmed through a Mi'kmaq Fisheries Study, committed to by the proponent. In the absence of active fishing, the Project could still have an impact on potential or established rights to access the fishery.

The Agency assessed the potential impact of the Project on the potential or established Aboriginal or Treaty right to fish, considering both potential impacts on access to preferred fishing areas, as well as the potential effects on fish and fish habitat that could reduce the availability and quality of fish. Discussions of potential effects of the Project on marine species and habitat, commercial fishing, and current use are presented in sections 6.2, 6.5, and 6.6 respectively. In these sections, the Agency has concluded that the Project is not likely to cause significant adverse effects on these valued components, taking into account the implementation of appropriate mitigation measures. The mitigation measures proposed would also serve to accommodate potential impacts on potential or established Aboriginal or Treaty rights to fish.

During the environmental assessment, Aboriginal groups submitted comments to the Agency and to the proponent about potential impacts of the Project on potential or established Aboriginal or Treaty rights. These are summarized in Appendix F.

8.3 Proposed Accommodation Measures

Section 6 sets out the proponent's mitigation measures and follow-up and monitoring programs for freshwater fish and fish habitat, marine species and habitat, migratory birds, species at risk, current use of lands and resources for traditional purposes, physical and cultural heritage, tourism and recreation, and commercial fisheries. In the Agency's view, these also serve as accommodation measures to minimize or avoid potential adverse impacts on potential or established Aboriginal or Treaty rights, and address concerns of Aboriginal groups. Key mitigation measures related to effects to potential or established Aboriginal or Treaty rights include:

- Measures related to the avoidance and mitigation of effects on fish and fish habitat, including the development and implementation of a fisheries offsetting plan in accordance with the *Fisheries Act* authorization required for the Project;
- Developing and implementing a Communication Plan with the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation to minimize vessel traffic interaction with Mi'kmaq fishers;
- Notifying the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation in advance of clearing, providing sufficient time to allow for the cataloguing and harvesting or resources of importance to the Mi'kmaq and transfer significant flora to suitable habitat if warranted;
- Developing and implementing a wetland compensation plan approved by Nova Scotia Environment. Providing the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation with an opportunity to review a draft wetland compensation plan and to identify alternatives; and
- Developing an abandonment and rehabilitation plan for the Project based on progressive reclamation preferentially using native plant species that are of interest or significance to the Mi'kmaq.

The Agency has identified the following follow up and monitoring program as necessary to verify the predictions of effects on potential or established Aboriginal or Treaty rights and to verify the effectiveness of mitigation measures:

- Involving the Nova Scotia Mi'kmaq in upcoming surveys for mainland moose.

In addition, the proponent is negotiating a Memorandum of Understanding with the Kwilmu'kw Maw-klusuagn Negotiation Office which could lead to an Impact and Benefits Agreement. The proponent also offered to negotiate a Memorandum of Understanding with Sipekne'katik First Nation. The proponent has committed to compensating fishers for any fishing gear that has been demonstrably damaged or lost due to Project related vessel traffic. The Agency considers that these measures would contribute to accommodation of potential impacts on potential or established Aboriginal or Treaty Rights.

The regulatory approval phase of the Project consists of authorizations, licences, or approvals related to areas of federal jurisdiction (e.g. effects on fish and fish habitat). Substantive work for potential federal authorizations under the *Fisheries Act* and *the Navigation Protection Act* would be required if the environmental assessment decisions are such that the Project may proceed. Fisheries and Oceans Canada would be the Crown Consultation Coordinator and would consult Aboriginal communities, as appropriate, prior to making regulatory decisions.

The decision to undertake additional Crown consultation would take into consideration the consultation record resulting from the environmental assessment.

8.4 Agency Views on Impacts on Aboriginal Rights

Based on the analysis of environmental effects of the Project on Aboriginal peoples and the related mitigation measures and potential adverse impacts and accommodation measures provided in sections 6 and 7, the Agency is satisfied that the potential adverse impacts of the Project on potential or established Aboriginal or Treaty rights have been adequately identified and appropriately accommodated. The proponent also indicated its intention to negotiate an Impact and Benefits Agreement with the Kwilmu'kw Maw-klusuagn Negotiation Office to further address potential adverse impacts on their rights.

If the Minister of the Environment decides that the Project is not likely to cause significant adverse environmental effects, or in the event that adverse environmental effects are considered significant but justified in the opinion of Governor in Council, the Minister would establish conditions in relation implementation of mitigation measures and a follow-up program. Conditions related to mitigation measures that address environmental effects on Aboriginal peoples would also support accommodation of potential impacts on potential or established Aboriginal or Treaty rights.

9 Benefits to Canadians

The Agency, assisted by federal and provincial government authorities, assessed the potential effects of the Project on valued components of concern to Canadians. Management of environmental issues through the environmental assessment process brings a net benefit to Canadians. The public and Aboriginal groups were invited to participate at key points in the environmental assessment. The proponent modified part of the project design, as a result of these consultations and to accommodate the issues and concerns that were raised. The main benefits realized as a result of the EA process include:

- The proponent established a community liaison committee to facilitate community engagement. The meetings, presentations and site visits have generated a mutual awareness and understanding of the needs and intentions of each party that will continue after the environmental assessment is complete.
- As a result of public consultation, the proponent's proposed vessel approach routes between the marine terminal and the main shipping lane in Chedabucto Bay were reviewed and critiqued by local area fishers. This process resulted in the selection and modification of a preferred route to avoid preferred fishing grounds to minimize the effects on commercial fisheries.
- The Nova Scotia Mi'kmaq will have an opportunity to provide input into the development of the wetland compensation plan and the fisheries offsetting plan. Several potential fisheries offsetting project locations have already been identified during meetings with local fishers. These include areas immediately west of the Project and well as in Indian Cove.
- The Nova Scotia Mi'kmaq will be provided notification of clearing activities to enable sufficient time to allow for the cataloguing and harvesting of resources of importance to the Mi'kmaq, and to transfer important flora to suitable nearby habitat, if warranted.
- The size of the coastal buffer (i.e. between the coastal shore side of the project and the project components) will be maximized, to the satisfaction of the Province of Nova Scotia. The buffer shall be a minimum of 30 metres in the plant operations areas and 75 metres in all other areas with the exception of the marine terminal and ship loading conveyor, to minimize the disturbance to migratory birds.
- When marine mammals or aquatic species at risk are observed or reported in the area, the proponent shall adhere to the *Notice for Mariners General Guidelines for Aquatic Species at Risk and Important Marine Mammal Areas*, when transiting between the shipping lanes and the marine terminal. This would include the reduction of vessel speed to 7 knots when within 400 metres of a marine mammal.

Evaluation of alternative means of carrying out the Project allowed the selection of alternative methods that were technically and economically feasible and considered the environmental and socio-economic effects of those alternative means.

10 Conclusions and Recommendations of the Agency

In determining whether or not the Project is likely to cause significant adverse environmental effects, the Agency considered:

- the proponent's Environmental Impact Statement and responses to the Agency's responses requests for additional information after reviewing the Environmental Impact Statement;
- the views of the public, government agencies, and Aboriginal groups; and
- the mitigation measures to be implemented by the proponent.

The environmental effects of the Project were evaluated using assessment methods and analytical tools that reflect current best practices of environmental and socio-economic assessment, including the consideration of cumulative effects, effects of the environment on the Project, and the effects of potential accidents and malfunctions.

The Agency concludes that the Black Point Quarry Project is not likely to cause significant adverse environmental effects, taking into account the implementation of the key mitigation measures recommended in this report (Appendix E). It has also proposed the requirements of a follow-up monitoring plan to be implemented by the proponent.

Following the comment period on this Draft Environmental Assessment Report, the Agency will finalize the report for the Minister of the Environment, who will issue an Environmental Assessment Decision Statement indicating whether or not the Project is likely to cause significant adverse environmental effects. The Minister will also specify the mitigation and follow-up program measures that the proponent must comply with in the event that the Project is permitted to proceed.

11 References

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12 Appendices

Appendix A Summary of Proponent's Environmental Effects Assessment

Table 1: Definitions for the Nature and Extent of Residual Effects[2]

Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Ecological / Socio-Economic Context	Residual Effect
U = Unknown 0 = Nil 1 = Low 2 = Medium 3 = High	1 = < 1 km^2 2 = 1–10 km^2 3 = 11–100 km^2 4 = 101–1000 km^2 5 = 1001–10 000 km^2	1 = < 1 month 2 = 1-12 months 3 = 13-36 months 4 = 37-72 months 5 = > 72 months	1 = < 11 events/year 2 = 11-50 events/year 3 = 51-100 events/year 4 = 101-200 events/year 5 = >200 events/year 6 = continuous	R = Reversible I = Irreversible	1 = Relatively pristine area or area not adversely affected by human activity 2 = Evidence of adverse environmental effects	N/A = Not Applicable A = Adverse P = Positive

Table 2: Definitions for Levels of Magnitude

Rating	Magnitude[3]
High	An environmental effect affecting a whole ecological population or group of people, or where the effect or parameter is outside the range of natural variability determined from local knowledge over many seasons.
Medium	An environmental effect affecting part of a population, or one or two generations, or where there are rapid and unpredictable changes in an effect or parameter so that it is temporarily outside the range of natural variability determined from local knowledge over many seasons.
Low	An environmental effect affecting a specific group of individuals in a population in a localized area, one generation or less, or where there are distinguishable changes in a specific parameter; however, the parameter is within the range of natural variability determined from local knowledge over many seasons.
Nil	No environmental effect.
Unknown	An environmental effect affecting an unknown portion of a population or group or where the changes in a specific parameter are unknown.

[2] The legend is typical for biological valued components and may vary from one valued component to another as appropriate.

[3] Definitions for magnitude for air and water are specific and addressed separately in their respective chapters in section 7 of the Environmental Impact Statement.

Table 3: Proponent's Summary of Residual Adverse Environmental Effects Evaluation

Project Environment Interaction / Residual Effect	Proponent's predicted degree of effect after mitigation					Significance of residual adverse effects
	Magnitude	Geographic Extent	Duration / Frequency	Reversibility	Ecological / Socio-economic Context	
Fish and Fish Habitat – Freshwater Species and Habitat						
Loss of catchment area and altered flow in Murphy's Lake / Minimal: likely not observable	1	1	5/6	I	1	Not significant
Reduced flow to Reynolds Brook (adverse during periods of low flow) / Reduced flow (18%)	1	2	5/6	I	1	Not significant
Fish and Fish Habitat – Marine Species and Habitat						
Noise and vibration effects on marine biota from blasting and pile driving / Temporary disturbance	1	2	1/6	R	1	Not significant
Permanent loss of habitat (flora, substrates) resulting from the construction and operation of the marine terminal / None anticipated following implementation of offsetting plan	1	1	3/1	R	1	Not significant
Migratory Birds – Terrestrial Wildlife						
Loss of habitat for terrestrial wildlife, including landbirds / Habitat loss	Low	Limited to Project footprint (quarry is about 180 hectares) – proponent indicated that habitat loss totals 213 ha	- Short-term loss: temporary work camp during construction phase - Long-term alteration: water use (Fogherty Lake) - Permanent loss: quarry footprint (about 180	R but irreversible during lifetime of Project	- Similar habitat exists in the region. - Area is affected by past human activity.	Not significant

Project Environment Interaction / Residual Effect	Proponent's predicted degree of effect after mitigation					Significance of residual adverse effects
	Magnitude	Geographic Extent	Duration / Frequency	Reversibility	Ecological / Socio-economic Context	
			hectares) – proponent indicated that habitat loss totals 213 ha			
Fragmentation of terrestrial habitat in and around the project area / Minimal habitat fragmentation	Low	Project footprint and adjacent areas of similar habitat	Construction and Operation phase	I	Habitats in the Project footprint are not unique; fragmentation already exists from the presence of the highway	Not significant
Disturbance of terrestrial fauna due to construction activities (noise, blasting, dust generation) / Minimal wildlife disturbance	Low	Limited to Project footprint and a 200m buffer (noise)	Construction and Decommissioning phase	R	Nearby areas are already subject to disturbance by human activities (highway)	Not significant
Disturbance of terrestrial fauna due to increased human presence and noise (including blasting)	Low	Limited to Project footprint and a 200m buffer (noise)	Operations phase	R	Nearby areas are already subject to disturbance by human activities	Not significant
Current use of lands and resources for traditional purposes by the Mi'kmaq – Aboriginal Land and Resource Use						
Permanent loss of wildlife and plant resources which have been reportedly traditionally harvested within the immediate Project footprint; loss of future opportunities to harvest these resources	The effects are localized only to the Project site and would not likely have widespread impact on regional resource abundance and distribution.					Not significant

Project Environment Interaction / Residual Effect	Proponent's predicted degree of effect after mitigation					Significance of residual adverse effects
	Magnitude	Geographic Extent	Duration / Frequency	Reversibility	Ecological / Socio-economic Context	
Harm to, or dispersion of local wildlife due to noise disturbance	The effects of noise on fauna can modify local behaviour (often a temporary effect as many species would acclimatize to anthropogenic noise). As above, noise effects would not likely have widespread impact on regional resource abundance and distribution.					Not significant
Potential degradation of the local marine and shoreline habitats surrounding the shipping terminal related to dust contamination, the potential for accidental aggregate spillage during loading, and possible contamination resulting from petroleum products associated with cargo vessels	Since Mi'kmaq exercise their rights to livelihood fisheries in accordance with the Fisheries and Oceans Canada regulatory procedures for commercial fisheries, widespread effects on the Mi'kmaq coastal commercial fisheries would be the same as non-Aboriginal commercial fisheries. This is determined as being of minor significance (for commercial fisheries) as the area is not considered to be critical habitat for commercially important species.					Not significant
Socio-economic conditions of the Mi'kmaq						
Commercial fisheries: Marine terminal construction: noise and suspended sediments causing fish avoidance / Temporary avoidance Loss of access to fishing grounds during construction; displacement / Temporary pending offsetting plan	1	2	3/1	R	1	Not significant
Vessel traffic to support construction; loss of access to fishing grounds; displacement / Temporary displacement	1	2	3/1	R	1	Not significant
Presence of the operational marine terminal; access to fishing grounds; displacement / None anticipated following offsetting plan	1	2	5/6	I	1	Not significant
Federal species at risk						
Terrestrial Flora: Direct and indirect plant mortality due to displacement or loss of biota / Plant mortality	Low	Locations of species of conservation concern	Permanent during lifetime of Project	I during lifetime of Project	Area affected by human activity; pristine areas not known. No critical habitat on-site.	Not significant

Project Environment Interaction / Residual Effect	Proponent's predicted degree of effect after mitigation					Significance of residual adverse effects
	Magnitude	Geographic Extent	Duration / Frequency	Reversibility	Ecological / Socio-economic Context	
Terrestrial Fauna (including mammals and birds): Clearing and grubbing would lead to habitat loss or degradation for fauna / Habitat loss.	Medium	Project site and access road (213 hectares)	Permanent during the lifetime of the Project	I during lifetime of the Project	Area affected by human activity; pristine areas not known. No critical habitat on-site.	Not significant
Clearing of land and road would increase habitat fragmentation for fauna / Minimal habitat fragmentation	Low	Project site and access road (213 hectares)	Permanent during lifetime of the Project	I during lifetime of the Project	Area affected by human activity; pristine areas not known. No critical habitat on-site.	Not significant
Change in fauna behaviour as a result of noise and light disturbances (including blasting) / Displacement	Low	Project site and adjacent lands	All phases	R	Area affected by human activity; pristine areas not known. No critical habitat on-site.	Not significant
Freshwater Aquatic and Marine Species (including fish and mammals): Loss of fish habitat due to construction of marine terminal / None anticipated following offsetting plan	Low	Marine terminal footprint and immediately adjacent	Construction phase through to decommissioning	I during lifetime of the Project	Affected area is a very small portion (approximately 1.1 hectares) of lobster habitat available within Chedabucto Bay.	Not significant
Disturbance and potential change in behaviour due to noise from ship traffic / Temporary displacement	Low	Marine terminal approaches	Construction phase through to decommissioning	R	Marine fish and mammal species at risk/species of conservation concern	Not significant
Disturbance and potential change in behaviour due to noise from pile driving, shore blasting, and other construction activities / Temporary displacement	Low	Chedabucto Bay	Operation phase	R	Potential fish habitat	Not significant

Project Environment Interaction / Residual Effect	Proponent's predicted degree of effect after mitigation					Significance of residual adverse effects
	Magnitude	Geographic Extent	Duration / Frequency	Reversibility	Ecological / Socio-economic Context	
Archeological and Heritage Resources: Damage to or destruction of cultural resources	Low	Limited to the lower coastal platform of the Project footprint (about 30 ha)	Permanent / one time but avoidable with mitigation	I	Area is affected by past human activity	Not significant
Socio-economic						
Commercial fisheries: Marine terminal construction: noise and suspended sediments causing fish avoidance / Temporary avoidance Loss of access to fishing grounds during construction; displacement / Temporary pending offsetting plan	1	2	3/1	R	1	Not significant
Vessel traffic to support construction; loss of access to fishing grounds; displacement / Temporary displacement	1	2	3/1	R	1	Not significant
Presence of the operational marine terminal; access to fishing grounds; displacement / None anticipated following offsetting plan	1	2	5/6	I	1	Not significant
Ongoing terrestrial and marine operations; exclusion of current trapping and all-terrain vehicle passage / Limitations to public access	1	3	5/6	I	Pristine	Not significant
Tourism and Recreation: Construction: Decrease in tourism on/within the property boundary and Affected Areas / Minimal within county	1	2	3/6	R	Area is affected by past activity	Not significant
Operation: Decrease in tourism on/within the property boundary and Affected Areas / Minimal within county	2	2	5/1	R	Area is affected by past activity	Not significant

Appendix B Summary of the Proponent's Analysis of Alternative Means of Undertaking the Project

Project Component	Alternative Means	Technical Feasibility	Economic Feasibility	Environmental Effects	Preferred Option
Quarry location	Black Point site	Technically feasible	Economically feasible	A number of environmental effects are associated with any quarry development; no significant residual environmental effects are anticipated at the Black Point site.	Yes
	Other Nova Scotia sites	Not technically feasible considering the range and specificity of the geographical and resource requirements	Not economically feasible based on the proponent's analysis and given the high-bulk low-cost nature of the aggregate resource	Not assessed since no feasible alternative site was identified.	No
Rock extraction method	Drilling and blasting	Technically feasible	Economically feasible	Environmental effects are similar in both alternatives; would cause noise and dust impacts. Drilling and blasting has lower impact due to shorter duration.	Yes
	Ripping	Not technically feasible considering the hardness and density of the granite resource.	Not economically feasible	Environmental effects are similar in both alternatives; would cause noise and dust impacts. Ripping would have higher impact due to its more-continuous nature and less-controllable dust emissions.	No
Development and transportation	Rock face open pit	Technically feasible	Economically feasible	Environmental effects are largely similar under both mining options.	Yes
	Glory hole open pit	Not technically feasible primarily due to worker safety considerations	Economically feasible but additional infrastructure would significantly increase production costs.	Potential social (human health) effects are greater in the glory hole scenario due to increased worker exposure to accidents and malfunctions.	No

Project Component	Alternative Means	Technical Feasibility	Economic Feasibility	Environmental Effects	Preferred Option
	Transport via ship from dedicated terminal	Technically feasible	Economically feasible	Environmental effects relate primarily to local economy, land and resource use; shipping-related effects are similar in both scenarios	Yes
	Truck transport to an existing terminal (e.g. Auld's Cove), followed by transport by ship	Technically feasible	Not economically feasible due to trucking transportation costs	Significantly more environmental and economic impacts due to truck traffic through rural and residential areas. Increased air and noise emissions in this scenario.	No
Marine terminal location	Eastern location	Technically feasible	Economically feasible	Environmental effects are similar under both alternatives. The marine species and habitat and the commercial fisheries valued components would be affected similarly for both locations.	Yes
	Western location	Not technically feasible due to insufficient water depth	Economically feasible	As above; this location is also slightly more sheltered to winds from the northeast.	No
Marine terminal construction	Rubble-Mound Wharf	Technically feasible and permits secure storage of acid generating rock; more operationally efficient since it permits vehicular access to ship mooring points for maintenance.	Economically feasible; less expensive to design, build and maintain.	Both approaches would affect marine species and habitat and commercial fisheries to approximately the same degree. Rubble-mound wharf occupies more seafloor than the concrete-caisson wharf but the rubble would eventually act as lobster habitat.	Yes
	Concrete-Caisson Wharf	Technically feasible but less stable in severe weather; more dangerous to maintain since boat	Economically feasible.	Concrete-caisson wharf occupies less seafloor than the rubble-mound wharf but would shade the seafloor, negatively affecting habitat quality and use.	No

Project Component	Alternative Means	Technical Feasibility	Economic Feasibility	Environmental Effects	Preferred Option
		access would be needed.			
Stockpile locations	Western end opposite the marine terminal	Technically feasible.	Economically feasible; this location is both operationally and economically more practical.	In both alternatives, several wetlands would be lost. This alternative provides effective noise and visual mitigation.	Yes
	Eastern end near wetland 2	Technically feasible, although it greatly increases the complexity of operation and may introduce occupational health and safety risks.	Not economically feasible; this location requires a complete re-configuration of processing plant and a much longer conveyor system to deliver aggregate to the marine terminal.	In addition to wetland loss, Wetland 2 is potentially exposed to run-off from the stockpiles in this alternative.	No
Waste management	Collection tank for septic wastes with transport and treatment at the Canso municipal waste-water treatment facility.	Technically feasible and practical	Economically feasible and cost effective.	Minimal impact on groundwater resources and marine surface water resources.	Yes
	Other septic treatment systems: conventional septic tank and leach field, raised bed systems, rotating biological contactors, peat-based treatment systems, constructed wetlands, and recirculating sand filtration.	Conventional leach field: Not technically feasible due to lack of soil cover. Non-conventional treatment systems: Technically feasible but poor operational records when applied to operations at this scale.	Economically more expensive to design, purchase, operate and maintain.	Varying long-term impacts can be expected to groundwater resources and marine and surface water resources through treated effluent discharge.	No
	"Crusher fines" storage outside of the quarry.	Technically feasible.	Economically feasible but more expensive considering the	Increased risk of accidental discharge with potential negative effects on marine and surface water resources,	No

Project Component	Alternative Means	Technical Feasibility	Economic Feasibility	Environmental Effects	Preferred Option
			increased transport distance to the storage site and the greater number of times the materials would be handled.	terrestrial ecosystems, habitat and vegetation, wetlands and terrestrial wildlife. Similar anticipated effects (i.e. minimal) on groundwater resources in both alternatives. Increased handling and transport increases impacts to air quality.	
	"Crusher fines" storage within the quarry.	Technically feasible.	Economically feasible.	No risk of accidental discharge to the environment (potentially affecting marine and surface water resources, terrestrial ecosystems, habitat and vegetation, wetlands, and terrestrial wildlife.	Yes
Electrical supply	Tie-in to the existing electrical transmission line.	Technically feasible.	Economically feasible; more expensive over the short term but costs are recovered over the long term.	Environmental effects associated with habitat and vegetation loss within the right of way are minimized by using the same right of way for the access road.	Yes
	Use of multiple on-site generators.	Technically feasible.	Economically feasible but more expensive over the long term due to fuel lubricant and transportation costs as well as maintenance and operating costs.	Increased risk of fire and fuel spills given the generators' fuel requirements; increased impacts to noise levels; increased greenhouse gas emissions.	No

Appendix C Mitigation measures, Monitoring and Follow-up Proposed by the Proponent

Valued Component	Mitigation Measures, Monitoring and Follow-up
Fish and fish habitat (freshwater and marine)	**Mitigation measures** Freshwater: • As per the Erosion and Sediment Control Plan, erosion control measures would be implemented to ensure that discharge water quality meets all relevant regulatory standards prior to discharge to receiving environment. • As per the Stormwater Management Plan, stormwater would be collected in the pit and in ponds near the processing plant to ensure that uncontrolled runoff would not occur. • Overburden stockpiles, fuel and chemical storage facilities, and construction equipment would be located a minimum of 30 metres from any pre-development water body. • Flagging tape would be used to delineate temporary work areas and control construction access near retained wetlands and water bodies to protect natural substrates and vegetation contributing to habitat and bank stability. • An Emergency Response Spill Contingency Plan would be prepared to prevent and manage the effects of any malfunctions and accidents. Marine: • An Environmental Management Plan would describe the following preventative and mitigation measures: • Application of appropriate timing windows for all in-water work. • Implementation of terrestrial erosion and sediment control measures. • Use of surface water monitoring to ensure that quality meets all relevant regulatory standards prior to discharge to receiving environment. • Locate overburden stockpiles, fuel and chemical storage facilities at least 30 metres from Chedabucto Bay. • Implement an Emergency Response and Spill Contingency Plan for Accidents and Malfunctions. • If effects from blasting vibrations exceed the thresholds specified in the Fisheries and Oceans Canada's *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters* (Wright and Hopky 1998), then a site specific standard to protect fish would be implemented. This site specific standard may include modified blasting protocols (based on field testing and as currently described) and/or timing of blasts near the marine environment to avoid sensitive periods. • Ensure that discharges of water from the operation comply with surface water quality standards. • Control ballast water release via "Ballast Water Control and Management Regulations" and the requirements as per the International Convention for the Control and Management of Ship's Ballast Water and Sediments. • Equip the ship loader with aggregate spill containment features. • Implement a fisheries offsetting plan to offset the loss of productivity of fisheries resources. • Ensure that all contracted vessels adhere to standard vessel operating procedures, including avoidance measures, to minimize interactions

Valued Component	Mitigation Measures, Monitoring and Follow-up
	between marine mammals and vessels. Observation and avoidance measures are especially important when vessels are traversing between the main shipping lane, where marine mammals would be accustomed to vessel traffic, and the Black Point site. • Ensure that vessels approaching and leaving the marine terminal would be moving slowly (on the order of 2 knots) and would be under the guidance of a licensed pilot. Large vessels within the Project Area (the southern part of Chedabucto Bay) would not exceed 6 knots and would also host an on-board pilot. Monitoring and Follow-up Activities Freshwater: • Fish habitat assessment and determination of presence/absence is proposed for Reynolds Brook above Hendsbee Lake prior to quarry development. If fish are present, establish water level and flow baselines, and develop a monitoring program for such time as quarry development begins to divert water away from its natural drainage to the south. • During construction and operation, monitoring would focus on: • Condition and location of erosion and sediment control structures; • Water quality testing of effluent and storm-water discharge as outlined in the Surface Water Monitoring Program; • Location and condition of fencing intended to protect sensitive retained features such as wetlands and water bodies; • Ensuring overburden stockpiles, fuel and chemical storage facilities, and construction equipment are a minimum of 30 metres from any natural water body; and, • Groundwater, including potential drawdown of surface waters and potential saltwater intrusion into the water table, through the installation and use of monitoring wells. Marine: • Fisheries offsetting plan and associated monitoring for effectiveness. • Field observations before commencing full blasting to characterize the effects of vibrations on fish. Concussion and ground vibration monitoring during each blast to ensure limits established by DFO for the marine environment are respected.
Migratory birds	**Mitigation measures** • Minimize the project footprint. • Implement dust-prevention and dust abatement measures. • Implement a Wetland Compensation Plan. • Instruct workers to maintain good housekeeping practices and not leave out any food or garbage to avoid attracting wildlife. • To minimize impacts on nesting landbirds, clearing would take place outside of the breeding season for most bird species (April 1 to September 1). If some clearing is necessary during the breeding season the proponent would assess if the work can be undertaken without contravening the *Migratory Birds Convention Act* and develop a contingency in consultation with the Canadian Wildlife Service of

Valued Component	Mitigation Measures, Monitoring and Follow-up
	Environment Canada in order to maintain compliance with the *Migratory Birds Convention Act*. Clearing of vegetation and overburden would be restricted to areas necessary to carry out the Project. • If an Osprey, Bald Eagle or Northern Goshawk nest is found within the forested areas to be cleared, even outside of the breeding season, a buffer zone appropriate to the species(as determined in consultation with NSDNR) would be placed around the nest and clearing would only occur outside of the buffer zone. • Decommissioning activities (e.g. disassembly of structures and buildings to take place outside of the breeding season (April 1-September 1)). If not possible, the Canadian Wildlife Service of Environment Canada would be consulted prior to any disassembly work. • To discourage ground-nesting or burrow-nesting species, no large piles or patches of bare soil would be left uncovered or un-vegetated during the breeding season. • Should any ground- or burrow-nesting species initiate breeding activities on stockpiles or exposed areas, the proponent would work with Environment Canada and Nova Scotia Environment to develop buffer and non-disturbance distances and zones that incorporate adaptive management. • Establish a minimum 30-metre terrestrial buffer between the high water mark and project components, with the exception of the marine terminal and ship loading conveyor, to reduce impacts on habitat and its suitability for migratory bird species. • Noise suppression equipment such as mufflers on mobile equipment and engines would be maintained in original equipment manufacturer (OEM) working condition. • The duration of noise disturbance would be minimized. • Standard mitigation measures for noise (including blasting), as outlined in the Environmental Impact Statement, would minimize impacts on terrestrial fauna, such as: o locating product stockpiles and other structures such as buildings and conveyors so as to attenuate the noise from the processing equipment, to the extent possible; o restricting operating hours for the quarry and processing plants to 16-hours per day so that noise levels are reduced during night time; o restricting blasting to daytime hours and weekdays; o minimizing the use of reversing alarms by designing the site layout to avoid reversing, such as by including drive-through for parking and deliveries; and o avoiding metal-to-metal contact on equipment at night. • Lighting would be restricted to areas where it is necessary. • To minimize interference of nesting activities, workers would be asked to refrain from entering undisturbed habitat areas where no work is done. • In the event that impacts on migratory birds are detected during construction, further mitigation would be developed in consultation with

Valued Component	Mitigation Measures, Monitoring and Follow-up
	the Province of Nova Scotia (Department of Natural Resources) and Environment Canada. • As recommended by Environment Canada, ships would maintain a minimum distance of at least 300 metres from any colony or island occupied by seabirds and waterbirds. • To minimize the risk to migrant birds, the minimum amount of pilot warning and obstruction avoidance lighting would be used on tall structures and where possible, lighting would be kept at low heights. • Lighting for the safety of the employees would be shielded to shine down and only to where it is needed, without compromising safety. • Street and parking lot lighting would also be shielded so that little escapes into the sky and it falls where it is required. • The protocol *Best practices for stranded birds encountered offshore Atlantic Canada* (Environment Canada 2015) would be used for stranded seabirds. • White lights would be preferred for use on towers or high structures at night, as recommended by the United States Fish and Wildlife Service (2003). Solid red or flashing red lights would be avoided as they appear to attract nocturnal migrants more than white flashing lights. • The operation of exterior decorative lights such as spotlights and floodlights, whose function are to highlight features of buildings or to illuminate an entire building, would be avoided unless safety is a factor. • High intensity lights, including floodlights, would be turned off at night outside of working hours, if possible, especially during the spring and fall migration period. Low intensity lighting would be used to the extent possible rather than high intensity lighting. • Where feasible, tinted or frosted glass windows would be used in buildings to reduce bird mortality from collisions. • Lights outside the quarry work area would be kept as low as possible and aimed to prevent lighting areas where it is not needed. • Marine terminal lighting would be chosen to prevent light shining directly into the water; it would be controlled so that minimal lighting would be used when the terminal is not in operation. • If perimeter lighting is required it would be aimed inward to prevent offsite light trespass; full cut off luminaires would be considered to reduce and prevent off site light trespass. • Temporary lighting during construction would be focused on the intended work area and shielded to minimize spillage. • To reduce night time ambient lighting effects, operations would be routinely monitored so that lighting can be switched off by work area when it is not needed. • Directional LEDs would be given consideration to give a better spread of lighting and reduce overall intensity of lighting systems. • Consideration would be given to selecting lights that have a lesser effect on wildlife to help reduce lighting effects on nocturnal species. • Maximize transmission line visibility, to the extent practical; discuss line marking devices with Nova Scotia Power Inc. • An Emergency Response Spill Contingency Plan would be prepared and would include measures to prevent birds from becoming oiled (i.e. deterrents/measures to remove oil from water or land) and a strategy to deal with accidents where birds are oiled (i.e. rehabilitation or

Valued Component	Mitigation Measures, Monitoring and Follow-up
	euthanasia) and/or sensitive habitats contaminated. **Monitoring and Follow-up activities** • Routine site monitoring as described in the Environmental Management Plan would include maintaining records of bird mortality so developing issues related to lighting can be identified. • Periodic routine inspections along the transmission line would be carried out in order to detect and document evidence of bird mortality. • Monitor any future on-site seabird colonies, if found. • The Environmental Management Plan would include provisions describing specific management actions for at species at risk (e.g. ground- or burrow-nesting species).
Current use of lands and resources for traditional purposes by the Mi'kmaq	**Mitigation measures** • While there is currently no Mi'Kmaq harvesting on the site or in waters immediately adjacent, it is intended that the non-hazardous portions of the Project site and adjacent waters would be accessible to Mi'kmaq for harvesting for flora and fauna for food, social and ceremonial purposes, to the extent this is not precluded by safety considerations. • Any future potential Project impacts (environmental, social and economic) on these harvesting activities would be the subject of the formal and regular meetings with the Mi'kmaq community representatives. • Provide the Kwilmu'kw Maw-klusuagn Negotiation Office with an opportunity to review a draft wetland compensation plan and to identify alternatives. • In the event that archaeological remains are excavated, recommended guidelines as directed by the Nova Scotia Communities, Culture, and Heritage Coordinator of Special Places would be employed. Should evidence of Aboriginal archeological remains be uncovered all activity would cease until Mi'kmaq archaeological experts have had an opportunity to examine the site and determine appropriate action. • Topsoil would be removed, salvaged, and stored separately for reuse during site restoration where possible. The Kwilmu'kw Maw-klusuagn Negotiation Office would be notified in advance of construction to allow it to access the site and to catalogue and harvest resources of importance to the Mi'kmaq, prior to construction. Culturally important flora would be transferred to suitable nearby habitat if determined to be warranted and feasible through communication with Mi'kmaq communities. • In sections of the property where quarrying is complete, site rehabilitation measures would be implemented to initiate re-vegetation in exposed areas that would not be disturbed further by operation. Local native vegetation would be used for restoration, and consideration would be given to the preferential use of vegetation of interest to the Mi'kmaq. • A rehabilitation plan for the site would be included in the decommissioning plan. Moose: • Mitigation measures for potential effects on species at risk, including Mainland Moose, are similar to recommendations for terrestrial or marine fauna as a whole. Standard mitigation measures such as minimization of project footprint and temporary work areas, dust control, emissions control, erosion and sedimentation control and monitoring of air quality targets would be sufficient to protect many SAR, if

Valued Component	Mitigation Measures, Monitoring and Follow-up
	present (detailed in sections 7.7 and 7.1 of the Environmental Impact Statement). • Standard handling and storage procedures for hazardous material, as well as procedures for handling and disposal of contaminated soils, would adequately mitigate the potential for exposure of Mainland Moose to any hazardous materials or contaminated soils. • Strict reporting policies for any suspected hunting activities would help to minimize any potential Mainland Moose poaching in the Project area. • Imposing a 50 kilometres per hour speed limit would reduce the potential for vehicle-moose collisions. It would also decrease encounters between humans and Mainland Moose. • Effects of dust, and subsequent impacts on wildlife relied on for traditional hunting and trapping, would be mitigated by measures such as: • applying dust suppressant (e.g. water or suitable chemical) on all disturbed areas and roads as necessary; • limiting the amount of vegetation clearing to the smallest extent possible; • suspending site preparation, soil and aggregate handling and blasting activities during periods of sustained high winds (greater than 30 kilometres per hour) if fugitive dust emissions cannot be controlled; • locating piles in areas sheltered from wind where possible; • minimizing rock drop distances; • restricting access to soil and aggregate piles during periods of inactivity using gates, fencing, or on-site security personnel; and • ensuring efficient operation of dust-suppression equipment on portable processing units. **Monitoring and Follow-up activities** • Monitoring of progress and implementation of MOU and any other agreements reached with other First Nation communities. • Mi'kmaq resource harvesting activities would be reviewed with Mi'kmaq representatives at the Community Liaison Committee meetings. Moose: • The Environmental Management Plan would include provisions describing specific management actions for species at risk e.g. Mainland Moose. • Two additional annual surveys for mainland moose would be conducted and an elder from the Paq'tnkek First Nation would be invited to participate in these surveys.
Health and socio-economic conditions of the Mi'kmaq	**Mitigation measures** • Minimize the impact of construction in the marine environment during and after lobster fishing season to the extent possible. For example: standard construction best management practices and mitigation measures to control onshore sediment release to the marine environment would be implemented (section 7.6 and section 7.11). • The quarry site office would be manned 24 hours per day so that fishers can telephone to receive information regarding vessel arrival and

Valued Component	Mitigation Measures, Monitoring and Follow-up
	departures. The phone number can also be used to report loss or damage to gear caused by Project-related vessel traffic. • Construction and regular use of the marine terminal may result in the loss of fish habitat around the terminal. Loss of these productive habitats will be replaced or mitigated through implementation of an offsetting plan to counterbalance the loss of productivity of the fishery. The offsetting plan would be established in collaboration with local fishers and DFO. • Routine communication with potentially affected Mi'kmaq would occur through the Community Liaison Committee on which they have been invited to sit as members or through other means as established by both parties. Routine communication protocols would be established under the terms of the Collaborative Benefits Agreements. Communications would be undertaken throughout the planning, construction and operation of the Project in order to address any rights-based issues that could result from loss of access to fishing grounds in the future. • Involve the Kwilmu'kw Maw-klusuagn Negotiation Office in the development and implementation of the fisheries offsetting plan. **Monitoring and Follow-up activities** • Monitoring terminal operations and fishing access in response to concerns expressed by local fishing community, as needed; • Monitoring of the effectiveness of the marine fisheries offsetting measures according to the timelines described in the offsetting plan approved by DFO to demonstrate that the program objectives have been met. This would involve formal and routine communications with Mi'kmaq First Nation representatives to determine the effectiveness of mitigation measures.
Physical or cultural heritage	**Mitigation measures** • Prior to construction, implement a Cultural Resource Management Plan to guide site personnel in the event that archaeological and heritage resources are identified during construction. The Plan specifies a notification procedure if remains are found, and would describe specific preservation measures as needed. • These mitigation measures would be approved by the Minister of the Department of Communities, Culture and Heritage before site construction could begin. • Exploratory excavation would be required in those areas that may be disturbed during Project construction. • Potential heritage resources identified during the 2014 study would be flagged to ensure they are not inadvertently affected by construction activities. • Conduct a site visit with a qualified Mi'kmaq archaeologist prior to project implementation. **Monitoring and Follow-up activities** • Follow up pre-construction archaeological assessment and testing excavation to investigate heritage resources that would be lost during project construction. • Monitor construction activities near known or suspected cultural resources.
Federal Species at Risk (Common Nighthawk, Rusty	**Mitigation measures** • Mitigation for potential effects on species at risk is similar to recommendations for terrestrial or marine fauna as a whole. Standard

Valued Component	Mitigation Measures, Monitoring and Follow-up
Blackbird)	mitigation measures such as minimization of Project footprint and temporary work areas, dust control, emissions control, erosion and sedimentation control and monitoring of air quality targets would be sufficient to protect many species at risk, if present (detailed in sections 7.7 and 7.1 of the Environmental Impact Statement). • Standard handling and storage procedures for hazardous material, as well as procedures for handling and disposal of contaminated soils, would adequately mitigate the potential for exposure of bird species at risk to any hazardous materials or contaminated soils. • Exposed soils and soil stockpiles would be adequately covered or vegetated to deter Common Nighthawks from nesting on them. • Should Common Nighthawks initiate breeding, the proponent would work with Environment Canada and Nova Scotia Environment to develop buffer and non-disturbance distances and zones that incorporate adaptive management. NOTE: Environment Canada recommended a 200-metre buffer zone of nests from high disturbance activities and avoidance of the area until early August. • Planning and scheduling clearing, on a best-efforts basis, to avoid key nesting periods (April 1-September 1). • Decommissioning activities e.g. disassembly of structures and buildings to take place outside of the breeding season (April 1-September 1). If not possible, the Canadian Wildlife Service of Environment Canada would be consulted prior to any disassembly work. • An Emergency Response Spill Contingency Plan would be prepared and would include measures to prevent birds from becoming oiled (i.e. deterrents/measures to remove oil from water or land) and a strategy to deal with accidents where birds are oiled (i.e. rehabilitation or euthanasia) and/or sensitive habitats contaminated. **Monitoring and Follow-up activities** • Regular inspections for Common Nighthawk nests.
Socio-economic conditions	**Mitigation measures** • Construct the marine terminal outside of lobster fishing season to the greatest extent possible. • Minimize the impact of construction in the marine environment during and after lobster fishing season to the extent possible. For example, standard construction best management practices and mitigation measures to control onshore sediment release to the marine environment would be implemented (sections 7.6 and 7.11 of the Environmental Impact Statement). • The quarry site office would be manned 24 hours per day so that fishers can telephone to receive information regarding vessel arrival and departures. The phone number can also be used to report loss or damage to gear caused by project-related vessel traffic. • Construction and regular use of the marine terminal would require a safety exclusion zone around the terminal. Loss of these fishing grounds would be mitigated through the creation of new lobster habitat as described in the fisheries offsetting plan to be established in collaboration with local fishers and DFO. • Address claims of fishing gear damage and loss, and when appropriate, provide compensation. • Routine communication with potentially affected Mi'kmaq would occur through the Community Liaison Committee on which they have been invited to sit as members or through other means as established by both parties. **Monitoring and Follow-up activities**

Valued Component	Mitigation Measures, Monitoring and Follow-up
	• Monitoring terminal operations and fishing access in responded to concerns expressed by local fishing community, as needed. • Monitoring of effectiveness of the marine fisheries offsetting plan for a minimum of three years during and after marine terminal construction until it can be determined that the program objectives have been met.
Other Effects: Effects of Accidents and Malfunctions	**Mitigation Measures** • Regular inspection and maintenance program to replace worn or inefficient equipment on regularly scheduled intervals. • In the event of a spill or leak, immediate action would be taken to stop the spill and contain the spilled material. Spills would be contained and cleaned up using standard equipment (e.g. absorbent pads) and spill response procedures. All spills would be reported to the 24-hour environmental emergencies reporting system as per the *Environmental Emergency Regulations* of the *Canadian Environmental Protection Act, 1999* and the *Emergency Spill Regulations* of the *Nova Scotia Environment Act.* A Spill Contingency Plan would be developed and approved by regulatory agencies prior to construction. • The following measures would mitigate the potential for stockpile slope failure: o aggregate stockpiles would be located greater than 30 metres from the coast on a sloped platform designed to contain storm-water drainage; o overburden stockpiles would be placed at the southern property boundary at least 20 metres from the nearest watercourse and would be compacted using loaders and dump trucks; and o perimeter ditches would be installed, as needed, to manage water from the screening berm. • The following measures would mitigate the potential for sedimentation pond failure: o design sedimentation ponds to accommodate anticipated storm-water runoff; o excavate low, large-volume engineered ponds into rock and berm with crushed stone several tens of metres thick; and o confine fines storage to areas within the quarry pit. • The following measures would mitigate the potential for terrestrial spills: o store fuel in above-ground storage containers and ensure that all storage tanks are either double-walled, self-contained tanks or single-walled tanks with secondary containment; o store all petroleum storage containers 55 gallons (208 litres) or larger within a contained area capable of holding 110 percent of the volume of the largest reservoir placed within it; and o conduct fueling on a reinforced concrete slab or lined containment area enclosed within side curbs and with a sloped floor to contain any spills or leaks; locate the fuelling area at least 60 metres from the nearest surface watercourse and at least 100 metres from the ocean.

Valued Component	Mitigation Measures, Monitoring and Follow-up
	• The following measures would mitigate the potential for an explosives accident: o store no explosive material on-site; and o ensure that all blasting activities are conducted by an experienced and trained, licensed contractor, who would be responsible for designing blasts and methods in accordance with the *Blasting Safety Regulations* of the *Nova Scotia Occupational Health and Safety Act*, the *Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters* (Wright and Hopky 1998), and in accordance with the *Nova Scotia Pit and Quarry Guidelines* (NSEL 1999). • The following measures would mitigate the potential for vessel accidents and collisions: o use double hulled fuel reservoirs on aggregate transport vessels; o ensure that the marine terminal is properly constructed and has navigational aids and anti-collision radar; and o employ a mooring plan that identifies and establishes operating limits (including weather-related) for all marine terminal activities (i.e. berthing, mooring, and aggregate loading). • The following measures would mitigate the potential for and the effects of a marine spill: o no fuel would be stored at the terminal and no vessel refuelling would occur at the Project site; o an Emergency Spill Response Plan would be prepared that contains predictive oil spill modelling, and would include measures to prevent birds from becoming oiled and a strategy to deal with accidents where birds are oiled or sensitive habitats contaminated; o advance planning (e.g. mock simulations of spill events) would occur and spill response equipment would be maintained on site (on vessels, near the marine terminal, or both) to ensure rapid deployment; o the services of a certified spill-response contractor would be retained for use in the event of a spill; and, o spilled fuel would be contained with oil booms and recovered with absorbents, and dispersants may also be used. • The following measures would mitigate the potential for a transportation accident: o ensure access and haul road width is sufficient to allow safe side-by-side passage of two vehicles; o clear vegetation to ensure adequate line of sight around corners and at road junctions; and o post and enforce speed limits within the quarry. • The following measures would mitigate the potential for a forest fire: o train all plant personnel on fire hazards, fire prevention, and firefighting roles, responsibilities and requirements for their respective positions; and o provide fire detection systems at appropriate locations (e.g. administrative office, fuel dispensing/maintenance shop).

Valued Component	Mitigation Measures, Monitoring and Follow-up
Other Effects: Effects of the Environment on the Project	**Mitigation Measures** • The consideration of anticipated effects of climate change on key weather variables would influence engineering design and construction of facilities. • The following measures would also mitigate the effects of the environment on the Project: o moving mobile equipment to a safe location and elevation; o reinforcing the anchoring of stationary equipment; o bringing down conveyors or securing them and filling belts that cannot be dropped by loading with stone; o transferring fuel and other products stored in bulk to a secure location or anchoring tanks and closing and securing all connection valves and drain and fill lines; o modifying or suspending marine operations to ensure that vessels are safely out of the area prior to storm impacts; o de-energizing electrical equipment and disconnecting plant power; and o draining water management systems including ponds, piping and ditches to ensure there is adequate free board to accept anticipated precipitation.

Appendix D Summary of Interactions between Physical Activities and Selected Valued Components

Physical Activity / Project	Valued component and indicator species or attribute				Description
	Migratory Birds (Spotted Sandpiper)	Marine Species and Habitat: Species at Risk (Harbour Porpoise)	Commercial Fisheries (Lobster)	Current Use of Lands and Resources for Traditional Aboriginal Purposes – Marine (Access Restrictions)	
Forestry (timber harvesting)	Interaction	No interaction	No interaction	No interaction	This activity has occurred in the past and continues to occur near the Project and within the Municipality of the District of Guysborough. Its primary impact, habitat loss, is additive since it takes many years for the forest to recover and again serve as habitat for migrating birds. It is also cumulative with habitat lost through other land development practices. Timber harvest is expected to continue through the life of the Project (50 years).
Shipping	Interaction	Interaction	Interaction	Interaction	Shipping is ongoing within Cheduabucto Bay and would increase as new projects are developed. Shipping can negatively affect marine aquatic species through collisions, discharge of oil contaminated bilge water, and noise. Collision and noise risks are generally confined to the specific routes taken from a marine terminal to the designated shipping lanes, and along the shipping lane itself. The effects of oil spills may be felt over a much larger area. Migratory birds may also be harmed by oil spills and discharge of oily bilge

					water. Shipping may also prevent non-native and First Nation access to marine resources, specifically to coastal lobster habitat and deeper water shrimp fishing grounds. Shipping effects would continue through the life of the Project (50 years).
Land Development (General)	Interaction	No interaction	Interaction	Interaction	Land development has occurred in the past and would continue through the life of the Project. Land development has a cumulative adverse environmental effect on habitat loss affecting migratory birds. Land development also results in a noise, lighting effects, water quality degradation, and other negative effects on migratory birds, including the indicator species, the Spotted Sandpiper. Land development can also impact upon traditional resource use by limiting access to previously public land and by inducing habitat loss and target species mortality. Development in the marine environment can limit access of commercial and First Nation fishers to valuable fishing grounds and destroy or degrade commercially important fish habitat. Land development may indirectly affect commercial fishing and traditional resources uses though the negative effects of increased shipping, stormwater or effluent discharges to the marine environment, and other effects.
Chedabucto Aggregates Quarry Expansion	Interaction	No interaction	No interaction	No interaction	With respect to migratory birds potential residual environmental effects include terrestrial habitat loss (6.25 hectares over 30 years) and ambient lighting effects. There is no marine component to this project.
Goldboro Liquified Natural Gas Project	Interaction	Interaction	Interaction	Interaction	The Goldboro project is associated with a number of residual environmental effects over its 50 year lifespan, including disturbance to

					terrestrial and marine species at risk, terrestrial habitat loss (estimated at 100 hectares), the effects of ambient lighting on migratory birds, loss and degradation of marine habitat and navigational restrictions affecting the fishery, and increased vessel traffic.
Maher Melford Container Terminal	Interaction	Interaction	Interaction	Interaction	Potential residual environmental effects of federal interest include loss of marine habitat due to terminal construction, increased noise in the marine environment, terrestrial habitat loss and fragmentation (127 hectares), increased vessel traffic and (and thus potential for collision with marine mammals), effects on local fishers (disruption and displacement), operational lighting and noise effects on migrating birds. Project effects would continue through the life of the Project.
Bear Head Liquefied Natural Gas Project	Interaction	Interaction	Interaction	Interaction	Potential residual environmental effects of federal interest include disturbance to and loss of fish habitat; construction related noise in the marine environment affecting marine mammals; increased vessel traffic, terrestrial habitat loss and fragmentation affecting species at risk (17 hectares); effects on birds due to noise, disturbance and lighting; loss of access to fishing grounds from jetty construction and vessel activity; and loss of Aboriginal access to eel and scallop harvesting grounds. Project effects would continue throughout the life of the Project.

Appendix E List of Key Mitigation Measures, Monitoring and Follow-Up Considered by the Agency

Valued Component	Mitigation Measures
Effects identified under subsection 5(1) of CEAA 2012	
Freshwater fish and fish habitat	**Mitigation measures** • Conduct a pre-construction fish habitat assessment and survey, to the satisfaction of Fisheries and Oceans Canada, to determine whether or not fish are present in Reynolds Brook. If fish or fish habitat is present, the proponent shall also: o determine baseline flows and water levels prior to construction (including seasonal variations); and o calculate flow rate and water levels required to maintain fish habitat. **Monitoring and Follow-up** • If fish are found the proponent would periodically monitor to determine if flow reduction to any fish-bearing waters would result in impacts on fish and fish habitat and the need for additional mitigation measures to the satisfaction of Fisheries and Oceans Canada.
Marine species and habitat	**Mitigation measures** • Implement a marine fisheries offsetting plan, developed in consultation with Fisheries and Oceans Canada, local commercial fishers, and the Nova Scotia Mi'kmaq. • Conduct blasting in accordance with Fisheries and Oceans Canada's *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters* (Wright and Hopky 1998) and the *Nova Scotia Pit and Quarry Guidelines* (NSEL 1999). If effects thresholds are exceeded, develop and implement site-specific mitigation standards to the satisfaction of Fisheries and Oceans Canada to protect fish, turtles and marine mammals, such as timing blasts to minimize effects, or increasing setback distances. • Ensure discharges into Chedabucto Bay do not exceed discharge water quality objectives, including those specified in the *Nova Scotia Pit and Quarry Guidelines*, project-specific limits set by Nova Scotia, and are in compliance with Section 36(3) of the *Fisheries Act*. • Design and implement an erosion and sediment control plan to protect surface water, wetlands; and Chedabucto Bay. The plan should include measures to limit run-off, as well as facilities to capture and treat run-off and be approved by the Province of Nova Scotia. • Ensure that overburden stockpiles, fuel and chemical storage facilities, and construction equipment are at least 30 metres from any water body. **Monitoring and Follow-up** • Monitor the effectiveness of the offsetting measures according to the timelines described in the offsetting plan approved by Fisheries and Oceans Canada. • Submit a monitoring plan prior to blasting for review and approval by Fisheries and Oceans Canada that would be used to determine adherence to the Fisheries and Oceans Canada *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters* thresholds or any site-specific mitigation standards developed in consultation with Fisheries and Oceans Canada to protect fish, such as timing blasting to minimize effects. The plan should include pre-blast observations for whales, Harbour Porpoise or sea turtles so that no blasting is conducted

Valued Component	Mitigation Measures
	when these species are observed in the vicinity. • Conduct observations for whales, Harbour Porpoise and sea turtles during vessel transits; between shipping lanes and Project. • Develop and implement a Surface-Water Monitoring Program, developed in consultation with Environment Canada and the Province of Nova Scotia, to test all discharges and to verify the effectiveness of treatment. If results indicate that discharge limits are being exceeded, remedial action should be undertaken.
Migratory birds	**Mitigation measures** • Carry out all phases of the Project in a manner that protects and avoids harming, killing or disturbing migratory birds, loss of habitat, or destroying or taking their nests or eggs. In doing so, the proponent shall take into account the Avoidance Guidelines (2014) by Environment Canada. The proponent's actions in applying the Avoidance Guidelines shall be in compliance with the *Migratory Birds Convention Act*, 1994 and with the *Species at Risk Act*. • Consult Environment Canada prior to any site clearing or dismantling of structures activities during the breeding season. In the event of clearing during the breeding season, develop and implement a contingency plan and monitoring protocol in consultation with Environment Canada. • Restrict lighting to areas necessary to carry out work, without compromising safety. Develop and implement an avian management plan in consultation with Environment Canada to minimize potential effects of lighting on migratory birds and to verify the effectiveness of proposed measures. • Develop and implement a seasonally-sensitive blasting management plan to be approved by the Province of Nova Scotia to minimize impacts of blasting on seabirds. • Develop and implement a wetland compensation plan for approval by Nova Scotia Environment. Provide the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation with an opportunity to review a draft wetland compensation plan and to identify alternatives. • Maximize visibility of the transmission line, through the use of line marking devices (e.g. aerial marker spheres, spirals, and suspended devices, bird strike diverters). • Maximize the coastal buffer (i.e. between the coastal shore side of the project and the project components). The buffer shall be a minimum of 30 metres in the plant operations areas and 75 metres in all other areas with the exception of the marine terminal and ship loading conveyor. Native vegetation within the coastal buffer shall not be disturbed. • Follow the protocol described in the document *Best practices for stranded birds encountered offshore Atlantic Canada* (Environment Canada 2015) if stranded birds are observed on vessels. **Monitoring and Follow-up** • Implement a program to monitor the impact of the Project on migratory birds to assess the effectiveness of the mitigation measures used to avoid harm to migratory birds, their eggs and nests. The proponent shall conduct this monitoring from the start of the operations until the end of the decommissioning phase. Documentation shall be provided indicating the results of any monitoring. The documentation shall

Valued Component	Mitigation Measures
	demonstrate whether the mitigation measures have proven effective and if additional measures were required. • Verify the effectiveness of mitigation measures related to light for a minimum of two years and, based on the outcomes and advice from the Province of Nova Scotia and Environment Canada, implement adaptive measures, if appropriate. • Monitor impacts on blasting on any future on-site seabird colonies. • Monitor known nests around stockpiles and exposed areas from a distance with a spotting scope or binoculars to verify the effectiveness of the buffer until the nests are inactive. • Conduct routine inspections of the transmission line to seek and document evidence of bird collisions. • Notify Environment Canada within 24 hours in the event of the mortality or injury of ten or more migratory birds in a single event or in the event of the mortality or injury of a migratory bird species at risk.
Species at risk	**Mitigation measures** • Ensure that large piles or patches of bare soil are covered or vegetated during the breeding season. If any ground- or burrow-nesting species initiate breeding activities on stockpiles or exposed areas, immediately establish an appropriately sized buffer, in consultation with Environment Canada, and avoid the area until early August. • Implement measures during operations to mitigate the risk of collisions between vessels and marine mammals and sea turtles taking into consideration the *Notice for Mariners General Guidelines for Aquatic Species at Risk and Important Marine Mammal Areas*. The measures include: o requiring vessels associated with the Project to travel at a speed limit of 10 knots during vessel transit between shipping lanes and the marine terminal; o conducting and recording observations for marine mammals and sea turtles during vessel transit between shipping lanes and the marine terminal; o requiring vessels associated with the Designated Project to slow down to less than 7 knots when within 400 m of the nearest marine mammal or sea turtle; and o reporting collisions with marine mammals and sea turtles between shipping lanes and the marine terminal within 2 hours to the Canadian Coast Guard, and notifying Aboriginal groups in writing.
Current use of lands and resources for traditional purposes by the Mi'kmaq	**Mitigation measures** • Incorporate noise and dust reduction measures in the design of the Project, and implement noise and dust reduction measures during all phases of the Project. • In consultation with the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation, develop an abandonment and rehabilitation plan, subject to approval by the Province of Nova Scotia, for the Project based on progressive reclamation and preferential use of native plant species that are significant to the Mi'kmaq. • Notify the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation in advance of clearing activities, providing sufficient time to allow for the cataloguing and harvesting of resources of importance to the Mi'kmaq, and transfer important flora to suitable nearby

Valued Component	Mitigation Measures
	habitat if warranted. • Develop and implement a Communication Plan with the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation to minimize vessel traffic interaction with Mi'kmaq fishers. **Monitoring and Follow-up** • A follow-up and monitoring program is required for surveys for mainland moose and the involvement of the Nova Scotia Mi'kmaq in these surveys. • Confirm impact predictions related to dust and noise beyond the project boundary in accordance with methodologies described in the *Nova Scotia Pit and Quarry Guidelines*.
Physical and cultural heritage	**Mitigation measures** • Prior to construction, develop a Cultural Resource Management Plan in consultation with the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation, subject to approval by the Province of Nova Scotia (Nova Scotia Minister of Communities, Culture and Heritage). • Carry out additional archaeological work at the site in the areas that may be disturbed during construction. This may include, but not limited to: shovel testing, site mitigation, site buffering etc.
Effects identified under subsection 5(2) of CEAA 2012	
Commercial fisheries	**Mitigation measures** • Construct the marine terminal outside of lobster fishing season. • Implement marine vessel transportation routes, developed in consultation with local fishers, between the shipping lanes and the terminal to optimize the avoidance of vessel traffic within current shrimp trap areas (generally 40 fathoms and deeper) to the extent that it would be safe. • Ensure on-going communication with representatives of the local fishing community, the Kwilmu'kw Maw-klusuagn Negotiation Office, and Sipekne'katik First Nation. **Monitoring and Follow-up** • Monitor terminal operations and fishing access, should concerns be expressed by the local fishing community. • Monitor the effectiveness of the marine fisheries offsetting plan, as directed by Fisheries and Oceans Canada, to assess the effectiveness of the offsetting measures.
Tourism and recreation	**Mitigation measures** • Implement and monitor measures to mitigate the potential effects of light, noise and air emissions, which would also mitigate effects on tourism and recreation. • Mitigation measures outlined in section 6.6, Current use of lands and resources for traditional purposes by the Mi'kmaq, would also mitigate

Valued Component	Mitigation Measures
	effects on tourism and recreation.

Appendix F Summary of Aboriginal Consultation

Group	Valued Component	Comment or Concern	Summary of Proponent's Response	Agency Response
Kwilmu'kw Maw-klusuaqn Negotiation Office and Sipekne'katik First Nation	Impacts on Potential or Established Aboriginal or Treaty Rights	Concern that the Project would have impacts on Mi'kmaq Rights and Title and would disrupt traditional use activities including hunting, trapping, fishing and gathering.	The proponent provided an Environmental Impact Statement and subsequent responses to information requests which outline mitigation measures and accommodations to address these concerns.	The Agency's assessment of the impacts of the Project on Mi'kmaq Rights is presented in section 8 of the Environmental Assessment Report. The Agency considers that impacts to potential or established Aboriginal rights and title have been appropriately addressed based on the mitigation measures proposed by the proponent for biophysical valued components as well as current use of lands and resources. The Agency has also proposed potential conditions that would serve to address concerns related to impacts on hunting, trapping, fishing and gathering, outlined in sections 6.5 and 6.6.
Kwilmu'kw Maw-klusuagn Negotiation Office	Current Use of Lands and Resources by Aboriginal Peoples for Traditional Purposes	Request that a field study of plants significant to the Mi'kmaq be a condition of approval. Plants of significance should be categorized according to their traditional uses, along with mitigation and recommendations if rare species of significance are found.	The proponent conducted spring and fall vegetation (vascular plant) surveys as part of its Environmental Impact Statement. The proponent committed to notify the Kwilmu'kw Maw-klusuagn Negotiation Office in advance of clearing activities to allow for the cataloguing and harvesting of resources of importance to the Mi'kmaq. The proponent also committed to use local native vegetation for restoration and to preferentially use vegetation types of interest or significance to the Mi'kmaq.	The Agency notes the proponent's earlier plant survey work and commitment to notify the Kwilmu'kw Maw-klusuagn Negotiation Office with advance notice of clearing activities to enable cataloguing and harvesting activities to occur. The Agency has recommended a condition requiring advance notification.
Sipekne'katik First Nation	Current Use of Lands and Resources by Aboriginal Peoples for Traditional	Loss of access to wildlife and plant resources. Noise, dust and spills may adversely impact resources.	The Project could result in a permanent loss of wildlife resources within the project site and indirect effects of noise, light and dust may diminish availability adjacent to the project site. However, all of the wildlife species found on the site of value to the	The Agency has determined that the Project's effects on traditional hunting due to, the loss of locally harvested wildlife species, habitat, injury or mortality of traditional species, or impacts due to sensory disturbance would be negligible to

Group	Valued Component	Comment or Concern	Summary of Proponent's Response	Agency Response
	Purposes		Mi'kmaq are readily available in the Mi'kmaq Ecological Knowledge Study. Further, the proponent did not find any current use of the project site for harvesting these species. The proponent identified a number of measures that would mitigate the Project's effects on wildlife and predicted that these would also mitigate effects on hunting and trapping for traditional use. Several species of plants within the project site are used for food and medicinal purposes. However, these species are readily available in the surrounding area and are more easily assessable outside the site. There is currently no gathering on the project site. Dust from the Project could cause loss of plants within the project site and beyond the boundaries of the project site. In addition to standard mitigation for dust, the proponent committed to transferring significant flora to suitable nearby habitat if it is determined to be warranted through communication with Mi'kmaq communities. Notice of clearing to the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation would be given to allow for the cataloguing and harvesting of resources of importance to the Mi'kmaq.	low magnitude and localized for the duration of the Project. The Agency agrees with the proponent that hunting can continue in the wider area. The Agency determined that residual effects on traditional gathering due to construction and operations would also be negligible to low because the effects would be localized and traditional gathering can continue outside the affected area. Many of the plants currently found at the site are available within the Mi'kmaq Ecological Knowledge Study area, and the project site is not a preferred area for gathering. The Agency has recommended a potential condition that would require the proponent to notify the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation in advance of clearing activities, providing sufficient time to allow for the cataloguing and harvesting of resources of importance to the Mi'kmaq, and transfer significant flora to suitable nearby habitat if warranted.
Kwilmu'kw Maw-klusuagn Negotiation Office	Physical or Cultural Heritage, and Effect on Historical, Archaeological, Paleontological or Architectural	Recommend that an archaeological assessment with subsurface testing be completed for the Project. The consulting archaeologist should work with the Kwilmu'kw Maw-klusuagn Negotiation Office's archaeologist to ensure all concerns of the Nova Scotia Mi'kmaq are addressed in the archaeological	A second Archaeological Resource Assessment was conducted in October 2014, and included areas along the coast. The proponent committed to further archeological work as recommended in studies completed to date and as required by the Province of Nova Scotia.	The Agency is satisfied that the proponent's approach to inform the Kwilmu'kw Maw-klusuagn Negotiation Office if Mi'kmaq archaeological remains or artifacts are discovered by the proponent in the project area would address potential effects on archaeological resources. The Agency has recommended a potential condition that

Group	Valued Component	Comment or Concern	Summary of Proponent's Response	Agency Response
	Sites or Structures	assessment.	While there has not been a confirmed Mi'kmaq archaeological find at the project site, observations would be maintained during all construction activity and should evidence be uncovered, all activity will cease in the area until Mi'kmaq archaeological experts have had an opportunity to examine the site and determine appropriate action.	would require the proponent to develop a Cultural Resource Management Plan in consultation with the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation that includes procedures in the event that archaeological resources are encountered.
Kwilmu'kw Maw-klusuagn Negotiation Office	Freshwater Fish and Fish habitat	Concern regarding flow reduction to Reynolds Brook. If fish habitat is confirmed to exist in Reynolds Brook, the proponent should be required to determine the flow rate required to maintain downstream fish habitat in the Brook. The Kwilmu'kw Maw-klusuagn Negotiation Office requested additional details about the direction and nature of on-site surface water runoff.	The proponent committed to determining baseline flow and water levels in Reynolds Brook prior to construction. The proponent provided further analysis and a figure depicting the surface water flow direction away from Chedabucto Bay toward the storm-water retention ponds. The proponent indicated that the combination of retention ponds, quarry sump and land sloping would be adequate to contain events larger than a 100-year 24-hour storm event.	The Agency requested that a fish habitat assessment and survey of Reynolds Brook be conducted prior to construction to determine if the brook contains fish and fish habitat and to establish a baseline against which the effects of quarry development could be compared. To reinforce the proponent's commitment to conduct such a survey, the Agency has proposed a corresponding condition that would also require the proponent to gather additional data if fish or fish habitat are present.
Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation	Current Use of Lands and Resources by Aboriginal Peoples for Traditional Purposes and Commercial Fisheries	Questioned how impacts to fish and fish habitat and Mi'kmaq fishing activity will be mitigated and/or avoided. The Kwilmu'kw Maw-klusuagn Negotiation Office requested that a Mi'kmaq Fisheries Study be completed by a Mi'kmaq organization with expertise in Mi'kmaq fishing and fisheries data in order to determine the potential impact of the project on the Mi'kmaq fisheries.	The proponent gathered additional communal commercial fisheries data and committed to conduct a Mi'kmaq Fisheries Study. This would enable the implementation of fisheries mitigation through communication with communities and compensation if there is damage or loss of gear.	The Agency requested that the proponent provide additional information on baseline information for food, social and ceremonial fishing and requested an updated effects assessment with mitigation measures and a follow-up program as appropriate. With consideration of the additional information provided, the Agency considers that the effects on Aboriginal fishing and marine harvesting would be mitigated, particularly through key measures – such as developing and implementing a communication Plan, avoiding areas known for shrimp fishery activities - that have also been reflected in potential conditions. The Agency is satisfied that the proponent contracted a Mi'kmaq

Group	Valued Component	Comment or Concern	Summary of Proponent's Response	Agency Response
				organization to conduct the Mi'kmaq Fisheries Study and will share the result of the study with Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation.
Kwilmu'kw Maw-klusuagn Negotiation Office	Marine Species and Habitats	Recommended that the proponent's mitigation, monitoring and fisheries offsetting plan be incorporated into project approvals.	The proponent would include Mi'kmaq fishers in the development of the fisheries offsetting plan. The creation of new lobster habitat through the fisheries offsetting plan would be monitored as directed by Fisheries and Oceans Canada, for a minimum of three years following habitat creation. The success of the plan would be reported to Fisheries and Oceans Canada, and other interested parties such as the Kwilmu'kw Maw-klusuagn Negotiation Office and Sipekne'katik First Nation.	The Agency is satisfied with the proponent's mitigation and monitoring plan related to the fisheries offsetting plan. The Agency has recommended a potential condition that would require the proponent to develop its offsetting plan in consultation with Fisheries and Oceans Canada and the Nova Scotia Mi'kmaq.
Kwilmu'kw Maw-klusuagn Negotiation Office	Freshwater Fish and Fish habitat and Migratory Birds	Recommended that the proponent avoid wetlands to the extent possible during the construction of the Project, and asked to participate in the development and implementation of any wetland habitat compensation plans developed for the Project.	During a technical session, the proponent committed to provide the Kwilmu'kw Maw-klusuagn Negotiation Office the opportunity to review a draft wetland compensation plan and the opportunity to identify alternative options.	The Agency has considered the changes to wetlands and any potential effects on migratory birds, fish and fish habitat and current use of lands and resources for traditional purposes (i.e. fishing). The Agency considered the key mitigations and follow-up measures and has identified potential conditions related to wetland compensation, including the proponent consulting with the Kwilmu'kw Maw-klusuagn Negotiation Office by providing a draft wetland compensation plan and the opportunity to identify alternative options.
Kwilmu'kw Maw-klusuagn Negotiation Office	Impacts on Potential or Established Aboriginal or Treaty Rights	Requested additional details on the long term monitoring objectives and mitigation measures anticipated for the Mainland Moose. The Mi'kmaq wish to participate in the monitoring efforts for the Mainland	The proponent committed to conducting two mainland moose pellet studies (winter and spring). The proponent would engage a Mi'kmaq elder to participate in those surveys.	The Agency notes the proponent's commitment to conducting additional surveys for mainland moose and engaging an elder from the Paq'tnkek First Nation to participate in these surveys, and to share the

Group	Valued Component	Comment or Concern	Summary of Proponent's Response	Agency Response
		Moose, which may be coordinated through the Kwilmu'kw Maw-klusuagn Negotiation Office.		results of the follow up studies with the Kwilmu'kw Maw-klusuagn Negotiation Office. The Agency considered potential changes to mainland moose as part of the assessment of impacts on potential or established Aboriginal or Treaty rights, particularly hunting. The Agency has proposed a condition that would require the proponent to involve the Nova Scotia Mi'kmaq in upcoming surveys for mainland moose.
Kwilmu'kw Maw-klusuagn Negotiation Office	Benefits Agreement	Requested the Environmental Impact Statement guidelines state that the proponent will develop a Memorandum of Understanding and Impact Benefits Agreement with the Nova Scotia Mi'kmaq.	The proponent is in negotiations to finalize a Memorandum of Understanding with the Assembly of Nova Scotia Chiefs through the KMK Benefits office. The purpose and focus of the Memorandum of Understanding is to guide ongoing discussions regarding collaborative benefits agreements between the proponent and Mi'kmaq communities. Discussions have been ongoing since spring, 2014.	The Agency communicated to the Kwilmu'kw Maw-klusuagn Negotiation Office that the environmental assessment decision is based on the likelihood of significance of environmental effects and does not require a Memorandum of Understanding or a benefits agreement. However, the proponent is negotiating a Memorandum of Understanding with the Kwilmu'kw Maw-klusuagn Negotiation Office which could lead to an Impact and Benefits Agreement. The proponent also offered to negotiate a Memorandum of Understanding with Sipekne'katik First Nation. The proponent has committed to compensating fishers for any fishing gear that has been demonstrably damaged or lost due to Project related vessel traffic. The Agency considers that these measures would contribute to accommodation of potential impacts on potential or established Aboriginal or Treaty Rights.