

Morien Resources Corporation

Black Point Quarry Project Description



Project #60314716

Prepared by
AECOM Canada Ltd
1701 Hollis Street (SH400)
(PO Box 576 CRO)
Halifax, Nova Scotia, B3J 3M8
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February 2014

Morien Resources Corp.

Project Description

Black Point Quarry Project

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Project Number:

60314716

Date:

February 28, 2014

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February 28, 2014

Ms. Micheline Savard
Project Manager
Canadian Environmental Assessment Agency - Atlantic Region
1801 Hollis Street, Suite 200
Halifax, NS B3N 3J4

Dear Ms. Savard:

Project No: 60314716
Regarding: Project Description Document for the Black Point Quarry Project

Please find enclosed the Project Description for the Black Point Quarry Project prepared on behalf of Morien Resources Corp., formerly Erdene Resources.

This Project Description provides an overview of the Black Point Quarry Project in Guysborough County and includes a description of the Project location, components, and associated activities as well as a preliminary description of environmental and socio-economic conditions. Please consider this a formal submission to initiate the environmental assessment process pursuant to the *Canadian Environmental Assessment Act, 2012*. If you require additional information or have any questions, please contact the undersigned. We look forward to receiving your comments as the Project proceeds.

Sincerely,
AECOM Canada Ltd.



Russell Dmytriw, P. Geo.
Senior Project Manager, Environment
Russell.Dmytriw@aecom.com

RD:kv
Encl. Project Description Black Point Quarry Project
cc: Mike MacDonald, Morien Resources Corp.; Helen MacPhail, Nova Scotia Department of the Environment

Executive Summary

Project and Regulatory Environment

Morien Resources Corp. (Morien, the Proponent) proposes the development, operation, decommissioning and abandonment of a granite quarry and marine terminal at Black Point in Guysborough County, Nova Scotia (**Figures ES-1 and ES-2**). The Black Point Quarry Project consists of aggregate production (drilling, blasting, processing and stockpiling) on a 354.5 ha property, along with the construction and operation of a 200 m long marine terminal adjacent to the quarry in Chedabucto Bay. The aggregate will be loaded into bulk carriers up to 70,000 DWT and transported to ports along the US eastern and Gulf coasts and potentially to markets in Canada and the Caribbean.

Designated Project: Black Point Quarry Project
Proponent: Morien Resources Corp. (Morien)

Postal Address: Metropolitan Place
Suite 1480, 99 Wyse Road
Dartmouth, Nova Scotia
Canada, B3A 4S5

Contact Name: Michael A. (Mike) MacDonald, Vice President

Tel.: 902-466-7255 **Fax:** 902-423-6432
Cellular: 902-403-8014 **Email:** mmacdonald@morienres.com

The Project is expected to require an environmental assessment (EA) pursuant to the federal *Canadian Environmental Assessment Act, 2012*. Two specific project activities listed in the federal *Regulations Designating Physical Activities* are anticipated to necessitate a federal EA:

16(g) the construction, operation decommissioning and abandonment of a new **stone quarry** with a production capacity of 3,500,000 tonnes per year or more;

24(c) the construction, operation decommissioning and abandonment of a new **marine terminal** designed to handle ships larger than 25,000 DWT unless the terminal is located on lands that are routinely and have been historically used a marine terminal or that are designated for such use in a land-use plan that has been the subject of public consultation.

Other federal legislative and regulatory requirements applicable to the Project include the *Fisheries Act*, the *Migratory Birds Convention Act, 1994*, the *Species at Risk Act*, the *Explosives Act*, the *Canada Shipping Act, 2001*, the *Oceans Act* and the *Navigable Waters Protection Act*.

As a quarry larger than 4 ha and an undertaking that may disrupt wetlands in excess of 2 ha, the proposed Project is considered to be a Class 1 Undertaking under Schedule A of the provincial *Environmental Assessment Regulations*, and will require the submission of an Environmental Assessment Registration Document.

The lands to be developed by the Proponent are owned by the Municipality of the District of Guysborough (MODG) and will be leased to the Proponent. The Project site consists of properties assembled through a recently approved land exchange with the Province and through expropriation of private lands. In addition to the onshore land requirements, provincial Crown land in the marine environment will be required for construction of the deep-water terminal. This area has not been previously used as a marine terminal and has not been so designated by the

MODG. The Proponent will work with the MODG (the upland landowner) to make application to the Nova Scotia Department of Natural Resources (NSDNR) to lease a portion of the seabed extending from the ordinary high water mark north approximately 300 m to allow for construction and operation of the deep-water terminal.

The Project is not expected to impact federal lands in other provinces or outside of Canada. The nearest terrestrial federal lands are the Canso Islands National Historic Site of Canada (which include the Grassy Island Forts site), located approximately 10 km due east of Black Point. Although the marine terminal will be constructed within the limits of a Provincial seabed Crown lease, aggregate shipping will occur on “federal lands” as defined in CEAA, 2012 s. 2b. Federal lands in this context refer to that portion of the ocean claimed by Canada.

The Project’s geographic co-ordinates are presented in Table ES-1.

Table ES-1 Proposed Project Boundary Coordinates

Boundary Location	Easting	Northing
Terrestrial Property		
North West Corner	643573.480	5023895.438
South West Corner	644005.711	5022431.120
South East Corner	645930.498	5022389.912
North East Corner	645955.893	5023627.756
Submerged Crown Lease		
North West Corner	644130.37	5024312.49
South West Corner	644275.16	5024050.04
South East Corner	644900.62	5024394.53
North East Corner	644791.83	5024744.29

Context and Objectives

Construction aggregates consist primarily of crushed stone, sand and gravel. These resources are critical components for the development and maintenance of modern infrastructure such as roads and buildings. While construction aggregates are relatively abundant, they must be located in accessible areas to be of economic value since they are low priced, high volume commodities and the cost of transporting them to the market can easily exceed the value of the material. Aggregates must also meet strict quality requirements related to the chemical and physical characteristics of the rock.

The primary objective of the Project is to establish a hard rock (granite) quarry to supply construction aggregate to markets on the US eastern and Gulf coasts and potentially to markets in Canada and Caribbean. The anticipated average annual production rate will exceed 1.0 million tonnes with an anticipated peak production rate of up to 7.5 million tonnes per year depending on prevailing market conditions. Estimated rock reserves in the proposed quarry area are upwards of 400+ million tonnes. Quarry operations are expected to take place over an approximate 50+ year period with the finished quarry occupying approximately 180 ha.

The Project will not require federal financial support and will not use federal lands. The lands to be developed by the Proponent are owned by the Municipality of the District of Guysborough (MODG) and will be leased to the

Proponent. In addition to the onshore land requirements, Crown land in the marine environment will be required for construction of the deep-water terminal.

Components and Activities

The Project will be completed in three phases: site preparation, operations and decommissioning. The primary components associated with the Project include:

- An unpaved access road from provincial Route 16 into the quarry;
- The quarry and primary crushing area located within or just outside of the quarry pit;
- Main feed conveyer from the primary crusher to the processing plant;
- The processing (finishing) plant consisting of secondary and tertiary processing and a stockpile laydown area;
- Modular buildings that comprise the administration complex; and,
- A 200 m long marine terminal and load-out facility.

The site preparation and construction phases of the Project will begin with the clearing of vegetation and overburden from the proposed quarry. An 800 m unpaved road will be constructed from Route 16 to the quarry property boundary then extended approximately 2.5 km into the quarry property to access the processing area and marine terminal. The marine terminal will be constructed adjacent to the processing area and will be equipped with an anchored radial arm ship loader. Electrical needs will be satisfied through a tie-in to the existing Nova Scotia Power Inc. electrical transmission line that parallels the southern boundary of the Project site.

Quarrying will be undertaken using drilling and blasting. Blasted rock will be loaded by front-end loaders or hydraulic shovels into haul trucks for transport from the working face to the primary crusher(s). After being reduced in size in the primary crusher, the rock will be transported via conveyor to a surge pile located near the secondary crusher(s) that will feed the processing plant. The different aggregate products will be stockpiled according to size and rinsed on wash screens prior to being loaded into ships or barges for transport to end use markets.

The anticipated plant operating schedule is 16 hr/day, 7 days/week for nine months per year (weather permitting). The quarry will operate 16 hr/day at peak production, over nine months of the year. The marine operations will run 24 hr/day, 7 days per week all year to accommodate shipping schedules and the time needed to load ships. The Project will employ 60 to 100 persons full time at peak production. Drilling and blasting activities will require additional personnel that may be subcontracted to a professional blasting company.

All shipping and associated activities (crews, provisions, refueling and other supplies, waste management, etc.) will be contracted to a third party. Ships will depart from the marine terminal under the control and supervision of the Canadian Coast Guard's Eastern Canada Vessel Traffic Services Zone and will enter nearby shipping lanes currently used by marine traffic accessing the Strait of Canso Port. Aggregate shipping will exit Chedabucto Bay in an easterly direction and access domestic commercial shipping lanes currently used by a range of tanker, bulk and containerized cargo carriers. Project related shipping will remain far from the nearest federal Marine Protected Area, namely The Gully located approximately 250 km southeast of Canso. The nearest terrestrial federal land is the Canso Islands National Historic Site of Canada near Canso.

The ships will not pass near any National Wildlife Areas although ships will pass to the south of the Port Joli, Port Hebert, Sable River and Haley Lake Migratory Bird Sanctuaries. These Sanctuaries are located along Nova Scotia's southwestern shore and together form the South Shore Important Bird Area.

Table ES-2 lists the anticipated potential federal permits required to undertaken the Project.

Table ES-2 Anticipated Potential Federal Permit Requirements

Regulatory Requirement	Approval/Permit	Sections	Project Activity/Trigger	Responsible Agency
FEDERAL				
Fisheries Act	Authorization	S. 35(2)(b)	Marine terminal construction, blasting in the near shore area; quarry activities through or adjacent to watercourses	Fisheries and Oceans Canada
Navigable Waters Protection Act / Navigation Protection Act	NWPA Permit	TBD ¹	Marine terminal construction, installation of watercourse crossings	Transport Canada
Canadian Environmental Protection Act, 1999	Disposal at Sea Permit	S. 127/128	Dredging in preparation for marine terminal construction	Environment Canada
Explosives Act	Magazine Licence	S. 7	On-site preparation & storage of explosives	NRCan

Proposed Schedule

The following tentative schedule is proposed:

- File Project Description – February 28, 2014
- Posting of the Notice of Commencement – estimated May 1, 2014
- Environmental Baseline Studies – complete by September 1, 2014
- File Environmental Impact Statement (EIS) - November 1, 2014
- EA Approval – estimated September 1, 2015 (please see note below).
- Current Market Evaluation and Sales Yard Development - March 2016-March 2018
- Site Preparation and Construction – April 2018 – April 2021
- Commence Operation – May 2021
- Decommissioning and Reclamation – 2070+.

Please note that if the Project is subject to an EA by the CEA Agency, it can take up to one year (365 days) of government time to complete the EA starting when the Notice of Assessment is posted. Should the Project be subject to an EA by Review Panel, this period is two years.

Emissions, Discharges and Waste

Dust emissions resulting from quarry construction and operations will be controlled through equipment design technology and/or with the application of water. Fuel combustion emissions associated with the Project include: sulphur dioxide (SO₂), nitrogen oxides (NO_x), carbon monoxide (CO), carbon dioxide (CO₂), and particulate matter (PM). Noise and vibrations will be generated by blasting, processing and general operations. Sound levels for the operation of the quarry will be maintained so as to not exceed the Pit and Quarry Guidelines at the boundaries of the Project site.

¹ As noted, it is anticipated that the amendments to the NWPA will come into force in April 2014.

To the extent possible, aggregate wash water will be recycled and reused. A closed circuit configuration of settling ponds will be employed in accordance with industry best practices and Nova Scotia Department of Environment (NSE) requirements. These controls will ensure that stormwater runoff and process wash water is managed so that discharges will meet the water quality requirements expressed in the Pit and Quarry Guidelines.

Precipitation and groundwater infiltration will collect in sump pits excavated within the quarry floor. Water pumped from the pits will be treated in settling ponds where required. Additional ponds will be constructed in the lay-down area to manage wash water from the processing plant. Sediment that accumulates in the ponds will be excavated on a regular basis, stockpiled during operation and used in progressive reclamation as needed.

Solid waste will be generally limited to office and domestic refuse. All solid waste will be stored onsite until such time that it can be transported to a provincially-approved waste disposal facility. Hazardous waste consisting primarily of used oil will be collected by a company licensed to transport this material and disposed of at an accredited off-site disposal facility.

Existing Environmental Conditions and Potential Effects

A number of environmental studies have been conducted on the property. These studies include: ambient noise condition assessment, fish, fish habitat and surface water quality assessment, wetland type identification and delineation, marine benthic habitat assessment, marine invertebrate community survey, marine sediment survey, marine bathymetric survey, early and late summer vascular plant and lichen surveys, two odonates surveys (dragonflies and damselflies) and bird surveys conducted on six occasions. Mammal and herptile (reptile and amphibian) surveys were conducted simultaneously with the other surveys. No larger scale, regional studies have been conducted in this area.

Most of the property is covered by thin soils hosting a mosaic of barren vegetation, tall shrub barren, and some coniferous forest. There are also patches of mixed forest and wetlands. A total of 26 wetlands were delineated within the Project site totaling 48 hectares. One vascular plant species of conservation concern was detected on the Project site. Southern twayblade (*Listera australis*) is listed as Red by Nova Scotia Department of Natural Resources (NSDNR) and has an Atlantic Canada Conservation Data Centre (ACDC) rarity rank of S1. No plant species at risk listed by SARA, COSEWIC or in the Nova Scotia *Endangered Species Act* (NESA) were identified in the field.

The site also contains three small unnamed watercourses (two of which are intermittent) as well as Fogherty Lake. None of these water features appear to contain fish, apparently due to their naturally elevated acidity.

The immediate marine environment consists primarily of cobble, rock, and large boulders with lesser amounts of sand and silt. The sea floor bottom is hard and has algal cover which provides habitat for many marine fauna including molluscs, lobster, fish and invertebrates. Algal cover is sparse in deeper waters but increases markedly in near shore areas. The algal canopy is dominated by the brown algal species black whip weed (*Chordaria flagelliformis*), bladderwrack (*Fucus sp.*), and sea colander (*Agarum clathratum*). Other marine plant species present include red alga (*Leptophyllum sp.*), green alga (*Acrosiphonia arcta*), Irish moss (*Chondrus crispus*), kelp (*Laminaria saccharina*) and tube weed (*Polysiphonia lanosa*). None of these plants are listed in the *Species at Risk Act*.

Construction of the marine terminal is anticipated to result in the destruction of marine fish habitat (and by extension, marine plants) through direct loss of sea bottom and water column habitat in the zone occupied by the terminal. Harm to or death of fish may occur during construction from the placement of terminal infrastructure or the re-suspension of bottom sediments. Harm or death may also occur during operation from collisions or other interactions with vessels, accidental aggregate spillage, or other accidents or malfunctions (e.g., fuel spills). Other aquatic

species that may be present in the marine environment, such as marine plants, whales, turtles and seals, may also be exposed to harm during construction and operation of the marine terminal. In addition, lobster fishers may be excluded from fishing areas near the terminal.

The Project site is host to many bird populations including four species listed by NSDNR as Yellow or sensitive. The entire coastline extending west to Guysborough and east to Canso is known to potentially host Harlequin Ducks, a federally-designated species at risk. Mammal species present are typical of the area and no listed species were identified during land and marine surveys.

Air emissions associated with the Project include particulate matter from aggregate quarrying, processing, transfer and loading operations and emissions of combustion by-products associated with the use of fossil fuels to power equipment associated with the quarry, processing plant and marine load-out and terminal operations. The Project will generate noise from equipment operation, back-up alarms, drilling and blasting, and transport and loading of rock and aggregate throughout the site. Direct and indirect effects on surface water features including Fogherty Lake are possible as quarrying proceeds. It is anticipated that some wetland habitat will be lost and / or altered as a result of the Project. If rock is quarried below the groundwater table, then dewatering may be required, and the effects (if any) on nearby groundwater elevations will be evaluated. There is potential for the Project to interact with plant species of special concern. Quarry development can result in the loss of wildlife and habitat and the disruption of wildlife species during critical life stages.

There is also the potential to negatively interact with migratory birds during Project operation. Noise generated at the Project site will include blasting several times per week, rock transport to the plant, activities at the processing plant (primarily crushing and washing) and load-out to the waiting ship. These noise sources may negatively affect migration, feeding, nesting, breeding and other behaviours. Project lighting within the quarry, at the processing plant, and at the marine terminal also has the potential to interfere with migrating birds and negatively affect their health and life cycles. In addition, the Project may impact Harlequin Ducks, which are known to inhabit coastal areas along Chedabucto Bay and which are protected under the *Migratory Birds Convention Act, 1994*.

Given that shipping will occur through federal lands, there is a potential for impact to these waters through a shipping accident or malfunction at sea (such as an oil spill), vessel collision, or vessel grounding. These potential impacts are typically mitigated through vessel design, maintenance and equipment testing, and emergency preparedness and response training. Impacts from aggregate shipping may also take the form of emissions to atmosphere (primarily greenhouse gases and other fuel combustion residues), accidental discharge of ballast water or other waste, noise both above and below the waterline, and collisions with fish, marine mammals and other biota.

Ballast and bilge water may contain non-native or invasive plants, animals, viruses and bacteria as well as hydrocarbons. Below water, shipboard noise may interfere with marine species that rely on sound for orientation, communication and feeding. Above water, noise may disrupt feeding, migrating, or resting birds. Ship lights can also attract and/or disorient birds and other marine species. It is not anticipated that shipping will effect any changes to aquatic species at risk.

Social Setting and Consultation

The adjacent communities of Half Island Cove located 2.0 km west and Fox Island Main located 2.5 km east of the property boundary are rural in character and low in population density. Residential development in the vicinity of the Project is relatively sparse, with no residential structures within 500 m of the site boundary, 11 residences within 1.0 km, and fewer than 50 within 2.0 km. The nearest residence is approximately 690 m west of the property boundary along Half Island Cove Road. A cluster of five residences is located along Route 16 approximately 750 m southwest of the property boundary.

The Project site does not include any First Nation Reserve Land although it is located within Mi'kmaq traditional territory. The nearest First Nation community is Chapel Hill, located on Cape Breton Island approximately 58 km north of the Project (155 km by road). On the mainland, the nearest First Nation community is Paq'tnkek composed of Pomquet - Paq'tnkek, Franklin Manor, and Summerside. Pomquet - Paq'tnkek #23 is located at Heatherton, 24 km east of Antigonish, approximately 68 km west of the Project (90 km by road). At this time, it is not known whether any Aboriginal groups or persons hold commercial fishing licences in areas that could be affected by the Project.

A Mi'kmaw Ecological Knowledge Study (MEKS) was completed for the Project in 2013. The Project will require use of lands and resources that are reportedly used for traditional purposes by Aboriginal peoples. Given this, there is a potential for loss of access to wildlife and plant resources and potential harvesting areas. In addition, noise disturbance and dust from quarrying activities may adversely impact wildlife resources and depreciate the quality of local food and medicinal plants. There is also the potential for negative impacts to the marine environment from accidental aggregate spillage. Nevertheless, the MEKS concludes that it is unlikely the Project will have any negative effects on traditional land use provided the recommended mitigation measures are implemented. The Project has the potential to bring positive changes to the Aboriginal socio-economic environment in the form of long term, well paying jobs for members of nearby First Nation Communities.

Since 2010, Morien has undertaken a number of one-on-one discussions with a variety of stakeholders including NSDNR staff, DFO, municipal officials such as the Warden and councillors of MODG; the MODG Regional Development Authority; the Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO); the Paq'tnkek First Nations Chief; local fishermen; and a number of community residents. Table ES-3 provides a list of consultation undertaken with the various jurisdictions and other parties to date.

Table ES-3 Consultation Undertaken to Date

Event and Party Contacted	Purpose	Date and Location	Number of Attendees	Issues Raised
Meeting with DFO	Discuss wharf design and compensation requirements	January 18 th , 2012 at BIO	4	None. Open discussion and transfer of information.
Meeting with 4 fishermen who have licenses in project area (1 has since been sold)	Discussed general project, location and potential impacts as well the fisherman gave input as to best location for the wharf	July 21, 2011, at store near Project site	6	Some concerns initially about loss of fishing grounds, but concerns were lessened once the smaller wharf footprint was discussed.
High school presentations	Inform students and their teachers about nature and scope of Project	October 12, 2011, at Canso and Guysborough high schools	Entire school in Canso ~75; junior & senior class at Guysborough ~50	Most questions were about employment opportunities and what skills would be needed.
Meeting with KMK Mining Table	Project presentation to the KMK	November 21, 2011, at Membertou Conf. Center, Sydney.	7	Discussion regarding the need for an MOU between Erdene (now Morien) and KMK, and who was to do the MEKS.
Telephone conversation with newspaper reporter	Reporter from the Antigonish Casket wanted info. on the project	January 4, 2012, via phone from Halifax Airport	2	Corey Leblanc sought project information, wanted to know why this location and where we were in the process.
Conversation with Brent Lombardo	Discussed project while on plane to US	January 4, 2012	2	Provided contact information with people who could help with project

Event and Party Contacted	Purpose	Date and Location	Number of Attendees	Issues Raised
(area resident)				such as Nancy O'Regan a Curriculum Coordinator with NSCC and others.
Meetings with MoDG	Update Council on project status	Several between 2008-2011 at the municipality	~12	Wanted to stay informed on the project's progress/issues.
Consultations Since February 2012				
Private Lands Acquisition	Acquisition of private land parcels at Black Point	Numerous interactions via legal counsel from Feb 2012 to October 2013	~ 40	Contact heirs to the 2 private land parcels to purchase their interests, regular updates to MoDG
Agreement with MoDG	Negotiations with MoDG regarding development of quarry on Municipality lands	Numerous discussions and meetings from Jan. to Aug. 2013 at the municipality	Several representatives each from MoDG and Morien	Negotiate mutually agreeable terms for agreement.
Presentation to MoDG Council	Present update on Project status	March 13, 2013 at the municipality	15	None. Open discussion and information exchange.
Attended MoDG Council Meeting	Council decision on expropriation of private land parcels	October 9, 2013 at the municipality	MoDG Council and general public	Council voted in favour of expropriation for purpose of developing quarry at BP
Site visits to Black point	Visit the site with potential investors / operating partner	April 15-16, 2013; September 23-24, 2013 at the Project site	11 including MoDG Councilor B. George and local fisherman B. Hendsbee	None. Potential investors were impressed by local support for the Project, including local fishermen.
Meetings with NSDNR	Meet with Lands Branch at NSDNR to discuss requirements for Crown Lease for Submerged Lands	January 2013, February 5, 2014 in Halifax (Hollis St.)	Gretchen Pohlkamp; Arlene d'Eon	Discussed requirements for acquiring Crown Lease for near-shore submerged lands for the construction of marine load-out facility
Interactions with CEAA	Several in-person meetings, phone conversations and emails to update on project status and projected date for submitting EA application	March 4, 2012 May 14, 2012 May-Aug. 2013 Sept. 4, 2013 Sept. 13, 2013 Jan-Feb 2014 in Halifax	Several CEAA representatives (V. Rodrigues, F. Kirstein, M. Atkinson, B. Cogle)	None. Information exchange and review of new federal legislation (CEAA 2012)
Teleconference with NS Environment	Discussion regarding federal-provincial harmonization for EA	Feb 5, 2014	H. MacPhail	Discussed numerous aspects of the project including impact and compensation for wetlands, harmonization process, project update, etc.

Event and Party Contacted	Purpose	Date and Location	Number of Attendees	Issues Raised
Multiple telephone calls with Helen MacPhail and Paul Keats, NSE; James Sandall, NSPI; Paul Colton and Brian Ross, NSTIR and John Dobson, NSDNR	Provided information regarding upcoming site drilling to further define resource estimate and to obtain approval to access the site	Feb 6-Feb26, 2014 from Halifax	6	None. For information purposes only
Meeting with Premier Stephn MacNeil and MLA Lloyd Hines	Introduce the Project and Project Proponents	Feb 18, 2014 in Halifax	6	Discussed the anticipated Project schedule and employment opportunities
Meeting with Laurent Jonart, Office of Aboriginal Affairs	Introduce the Project and Project Proponents	Feb 25, 2014, in Halifax	4	Discussed potential issues of interest to the various First Nation Communities
Inter-agency (federal and provincial) meeting	Present Project and Project Proponents, discuss work conducted to date, discuss draft Project Description	Feb. 26, 2014 in Halifax at the CEAA office	14 present, two on the telephone. Agencies included CEAA, NSE, OAA, DFO, TC, EC, HC, and NRCan	Discussed Project timelines and subjects required to complete the Project Description. Obtained guidance on moving into the Environmental Assessment process.
Twila Gaudet, KMK	Email correspondence to set a meeting time and place to present the Project	11/02/2014 24/02/2014 25/02/2014 26/02/2014 27/02/2014	2	Meeting date and time confirmed for March 11, 2014

Aboriginal and non-aboriginal engagement will continue throughout the course of the EA process. All aboriginal engagement activities will be undertaken in accordance with the principles and procedures established by the KMK and the United Nations Declaration on the Rights of Indigenous Peoples. The Proponent will work closely with provincial and federal government officials who will be conducting consultation with First Nations regarding the Project.

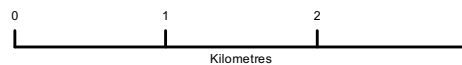


Canso Islands National Historic Site of Canada

REFERENCES:
 Base data is from NSDNR (2010), GeoNova (2009), GeoBase (2007).
 Wetland data and Wilderness Area from NSDNR (2007). Property Boundary data from SNS (2011). Access Road location provided by AECOM (2011).

Map Features

- Building
- Cut Line (> 100m long & < 20m wide)
- == Major Road
- Secondary Road
- Tertiary Road
- Transmission Line
- Property Boundary
- Study Area Boundary
- Contour Line
- Watercourse
- Waterbody
- Wilderness Area
- NSDNR Wetland



DATE: February 17, 2014
 SCALE: 1:50,000
 JOB NO.:
 REVISION: 9
 DRAWN: CA-SEG



Figure ES - 1

Project Location

Proposed Black Point Quarry Project
 Morien Resources Corp.

Figure ES - 2
Conceptual Site Plan
Proposed Black Point
Quarry Project

Legend

- Crown Survey
- Property Buffer 30m
- Ultimate Pit Boundary
- Fill Areas
- Plant Location
- Load Out
- Berms
- Power Line
- Entrance Road
- 30 m Buffer
- Undifferentiated Wetlands
- Coastal Marsh
- Creeks

0 125 250 500
Meters

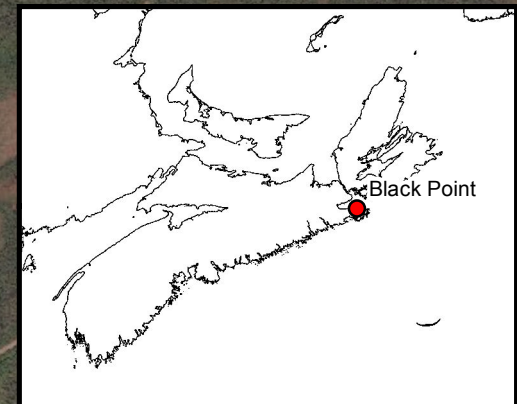


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Appendices

Appendix A	Site Photographs
Appendix B	Site Survey Plan

List of Acronyms

ACCDC	Atlantic Canada Conservation Data Centre
ANFO	Ammonium Nitrate and Fuel Oil
amsl	Above Mean Sea Level
BP	Before Present
CEAA, 2012	Canadian Environmental Assessment Act, 2012
CEA Agency	Canadian Environmental Assessment Agency
DFO	Department of Fisheries and Oceans (Fisheries and Oceans Canada)
DWT	Deadweight Tonnage
EA	Environmental Assessment
EIS	Environmental Impact Statement
NAPS	National Air Pollution Surveillance
NSE	Nova Scotia Department of Environment
NSDNR	Nova Scotia Department of Natural Resources
NSE	Nova Scotia Department of Energy
NSTIR	Nova Scotia Department of Transportation and Infrastructure Renewal
NWPA	Navigable Waters Protection Act
MODG	Municipality of the District of Guysborough
MPMO	Major Projects Management Office
MT	Million Tonnes
POLs	Petroleum, Oil and Lubricants
PRF	Primary Raw Feed
TPM	Total Particulate Matter

Concordance: Prescribed Information....Designated Project Regulations		
Regulation Clause	Requirement	Project Description Section(s)
General Information		
1	Project name	1
1	Nature of the Project	1.1; 2
1	Location of the Project	1; 2.1
2	Proponent's name and contact information	1.2
2	Proponent's primary representative for the purpose of the Project Description	1.2
3	Description of and the results of any consultations undertaken with any jurisdiction and other parties including Aboriginal peoples and the public	3.11.1; 4; table 4.1; 5
4	The EA and regulatory requirements of other jurisdictions	1.4
4.1	A description of any environmental study that is being or has been conducted of the region where the Project is to be carried out	3
Project Information		
5	A description of the Project's context and objectives	2.2
6	The provisions in the schedule to the <i>Regulations Designating Physical Activities</i> describing the Project in whole or in part	1.4.1
7	A description of the physical works that are related to the Project including their purpose, size and capacity	2.4
8	The anticipated production capacity of the Project and a description of the production process to be used, the associated infrastructure and any permanent or temporary structures	2.4
9	A description of all activities to be performed in relation to the Project	2.5
10	A description of any waste that is likely to be generated during any phase of the Project and of a plan to manage that waste	2.7
11	A description of the anticipated phases of and the schedule for the Project's construction, operation, decommissioning and abandonment	2.8
Project Location Information		
12(a)	The Project's geographic coordinates	1.3
12(b)	Site maps produced at an appropriate scale in order to determine the Project's overall location and the spatial relationship of the Project's components	Figs 1-6
12(c)	The legal description of land to be used for the Project, including the title, deed or document and any authorization relating to a water lot	1.3; App B
12(d)	The Project's proximity to any permanent, seasonal or temporary residences	2.1; 3.8.1
12(e)	The Project's proximity to reserves, traditional territories as well as lands and resources currently used for traditional purposes by Aboriginal peoples	3.11.1
12(f)	The Project's proximity to any federal lands	1.5
Federal Involvement		
13	A description of any financial support that the federal authorities are, or may be, providing for the Project	1.5
14	A description of any federal land that may be used for the purpose of carrying out the Project	1.5
15	A list of the permits, licenses or other authorizations that may be required under any Act of Parliament to carry out the Project	1.4.4

Concordance: Prescribed Information....Designated Project Regulations		
Environmental Effects		
16	A description of the physical and biological setting	3
17(a)	A description of any changes that may be caused, as a result of the carrying out the Project to fish and fish habitat as defined in the subsection 2(1) for the <i>Fisheries Act</i>	1.5; 3.3.2
17(b)	A description of any changes that may be caused, as a result of the carrying out the Project to aquatic species, as defined in subsection 2(1) of the <i>Species at Risk Act</i>	1.5; 3.3.1.3
17(c)	A description of any changes that may be caused, as a result of the carrying out the Project to migratory birds, as defined in subsection 2(1) of the <i>Migratory Bird Convention Act, 1994</i>	1.5; 3.6.2
18	A description of any changes to the environment that may occur, as a result of carrying out the Project, on federal lands, in a province other than the province in which the Project is proposed to be carried out or outside Canada	1.5
19	Information on the effects of Aboriginal peoples of any changes to the environment that may be caused as a result of carrying out the Project, including the effects on health and socio-economic conditions, physical and cultural heritage, the current use of lands and resources for traditional purposes or on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance	3.11.2
Summary		
20	A summary of the information required under sections 1 to 19.	

1. Introduction

Morien Resources Corp. (Morien, the Proponent) proposes to develop and operate a construction aggregate quarry and marine terminal at Black Point in Guysborough County, Nova Scotia (the Black Point Quarry Project). The Project is expected to require an environmental assessment (EA) pursuant to the federal *Canadian Environmental Assessment Act, 2012* and as a Class I undertaking, environmental assessment pursuant to the provincial *Environmental Assessment Regulations*. This Project Description serves as a formal filing to support a decision by the Canadian Environmental Assessment Agency (CEA Agency) as to whether an EA will be required.

1.1 Project Nature and Overview

The Proponent proposes the development, operation, and decommissioning and abandonment of a hard rock quarry and marine terminal at Black Point in Guysborough County, Nova Scotia. The proposed 354.5 ha property is located on the south shore of Chedabucto Bay (**Figures 1 and 2**). The anticipated average annual production rate will exceed 1.0 million tonnes (MT) with a peak production rate of 7.5 MT per year, should market conditions warrant this production rate. The Project is anticipated to have capital costs on the order of \$80-\$110 million and will be a significant employer in Guysborough County throughout the expected 50+ year lifespan of the quarry. The finished quarry will occupy approximately 180 ha while the processing plant, administration and stockpile areas together will occupy approximately 28 ha.

The site for the proposed Project was selected primarily due to the significant quantity and superior quality of granite outcropping, combined with thin to non-existent overburden (see photos in **Appendix A**). Rock reserves in the proposed quarry area are estimated at more than 400 million tonnes. Also, the proposed location is ideally suited due to its proximity to deep water, which is sheltered and ice-free, to enable construction of a deep water marine terminal for aggregate shipment. Product from the quarry will be transported in bulk carrier ships, as large as Panamax-sized (up to 70,000 deadweight tonnage or DWT), to ports along the eastern and Gulf coast markets of the US. Ocean-going barges could also be loaded at the proposed marine terminal.

1.2 Proponent Information

Morien is a well-financed and diversified resource development company focused on creating value through the identification, acquisition and advancement of strategically located projects that host commodities with strong market fundamentals. Morien has selected commodities that will provide strong growth potential based on supply and demand forecasts. This currently includes both coal and construction materials.

Designated Project: Black Point Quarry Project

Name of the Proponent: Morien Resources Corp. (Morien)

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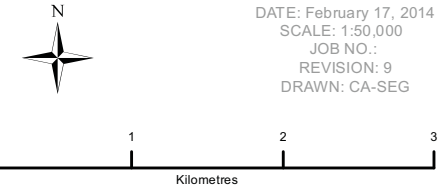
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REFERENCES:
 Base data is from NSDNR (2010), GeoNova (2009), GeoBase (2007).
 Wetland data and Wilderness Area from NSDNR (2007). Property Boundary
 data from SNS (2011). Access Road location provided by AECOM (2011).

Map Features		
■ Building	— Transmission Line	■ Waterbody
--- Cut Line (> 100m long & < 20m wide)	— Property Boundary	■ Wilderness Area
— Major Road	— Study Area Boundary	■ NSDNR Wetland
— Secondary Road	— Contour Line	
— Tertiary Road	— Watercourse	



DATE: February 17, 2014
 SCALE: 1:50,000
 JOB NO.:
 REVISION: 9
 DRAWN: CA-SEG



Figure 1
Project Location
 Proposed Black Point Quarry Project
 Morien Resources Corp.



REFERENCES:
 Base data is from NSDNR (2010), GeoNova (2009), GeoBase (2007). Property Boundary data from SNS (2011), Access Road location provided by AECOM (2011). Imagery and LIDAR derived contours from Leading Edge Geomatics (2011),

Map Features		
■ Building	— Tertiary Road	— Watercourse
- - - Cut Line (> 100m long & < 20m wide)	— Transmission Line	■ Waterbody
— Major Road	— Property Boundary	
— Secondary Road	— Study Area Boundary	
	— LIDAR Contour (5m interval)	

DATE: February 17, 2014
 SCALE: 1:10,000
 JOB NO.:
 REVISION: 8
 DRAWN: CA-SEG

0 200 400 600
Meters



Figure 2
Project Location-Aerial Image
 Proposed Black Point Quarry Project
 Morien Resources Corp.

1.3 Land Ownership

The lands to be developed by the Proponent are owned by the Municipality of the District of Guysborough (MODG) and will be leased to the Proponent. The Project site consists of properties assembled through a recently approved land exchange with the Province (PIDs 35212497, 35212505, 35212521, 35212513, and 35213990) and through expropriation of private lands (PIDs 35044056, 35214014, 35214022, and 35214022). A 2010 site survey plan is presented in **Appendix B** while the generalized property boundary is shown on **Figures 1** and **2**. Table 1.1 provides coordinates for the four corners of the proposed Project area. The land parcel that includes Black Point itself is Crown land; this parcel is not included in the Project.

Table 1.1 Proposed Project Boundary Coordinates

Boundary Location	Easting	Northing
Terrestrial Property		
North West Corner	643573.480	5023895.438
South West Corner	644005.711	5022431.120
South East Corner	645930.498	5022389.912
North East Corner	645955.893	5023627.756
Submerged Crown Lease		
North West Corner	644130.37	5024312.49
South West Corner	644275.16	5024050.04
South East Corner	644900.62	5024394.53
North East Corner	644791.83	5024744.29

In addition to the onshore land requirements, provincial Crown land in the marine environment will be required for construction of the deep-water terminal. This area has not been previously used as a marine terminal and has not been so designated by the MODG. The Proponent will work with the MODG (the upland landowner) to make application to the Nova Scotia Department of Natural Resources (NSDNR) to lease a portion of the seabed extending from the ordinary high water mark north approximately 300 m to allow for construction and operation of the deep-water terminal. The precise location of the water lot will be determined once the marine terminal location is finalized; a range of likely locations for the terminal is shown on **Figure 4**.

1.4 Regulatory Framework

The following sections outline the regulatory framework for the Black Point Quarry Project.

1.4.1 Federal EA Requirements and Legislation

Section 8 of the *Canadian Environmental Assessment, 2012 (CEAA 2012)* requires that the Proponent of a “designated project” provide the CEA Agency with a Project Description so that the federal Minister of the Environment can determine whether an EA is required. Considering that the designated project list given in the *Regulations Designating Physical Activities* enacted under *CEAA 2012* consists of major projects, it is expected that most designated projects, including the Black Point Quarry Project, will require assessment.

There are at least two Project activities designated in the *Regulations Designating Physical Activities* that are anticipated to necessitate a federal EA for the Black Point Quarry Project:

16(g) the construction, operation, decommissioning and abandonment of a new **stone quarry** or sand or gravel pit with a production capacity of 3,500,000 tonnes per year or more;

24(c) the construction, operation, decommissioning and abandonment of a new **marine terminal** designed to handle ships larger than 25,000 DWT unless the terminal is located on lands that are routinely and have been historically used as a marine terminal or that are designated for such use in a land-use plan that has been the subject of public consultation.

The nature of the information that must be submitted in the Project Description is described in the federal *Prescribed Information for a Description of a Designated Project Regulations*.

The CEA Agency will lead and coordinate review of and response to Morien's Environmental Impact Statement (EIS). In consideration of the resource-based nature of the Project, the type of environmental assessment required, and the multi-jurisdictional requirements, it is expected that federal review of the Project will also involve the Major Projects Management Office (MPMO).

In addition to the above EA requirements, the following federal legislation also applies to the Project:

- The recently amended **Fisheries Act** protects the sustainability and productivity of recreational, commercial and Aboriginal fisheries. Among other things the amendments re-emphasize the Proponent's responsibility to avoid harm to fish and fish habitat through the application of appropriate design and mitigation measures. People are prohibited from harming fish in section 35(1) *No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery*. This prohibition is supported by definitions of commercial, recreational and Aboriginal fisheries in the *Act*, as well as a definition of "serious harm to fish", which is the *death of fish or any permanent alteration to, or destruction of, fish habitat*.
- The **Migratory Birds Convention Act (MBCA), 1994** protects migratory bird species and states that *no person shall disturb, destroy or take a nest, egg, nest shelter, eider duck shelter or duck box of a migratory bird* without a permit. Section 35 of the Migratory Birds Regulations prohibits the deposit of oil, oil wastes or other substances harmful to migratory birds in any waters or any area frequented by migratory birds.
- The **Species at Risk Act (SARA)** protects wildlife species from becoming extinct through prohibitions against killing, harming, harassing, capturing or taking species-at-risk, and against destroying their critical habitats. Management of species-at-risk and of special concern (as identified by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC)) is accomplished by providing for the recovery of species-at-risk due to human activity and by ensuring that species of special concern do not become endangered or threatened through sound management.
- The **Canada Shipping Act, 2001**, governs safety in marine transportation, recreational boating and the protection of the marine environment. It applies to Canadian vessels operating in all waters and to all vessels operating in Canadian waters. The *Vessel Operation Restriction Regulations* under the Act regulates the navigation, anchoring, mooring, and berthing of vessels, and applies to all vessels, regardless of size. The *Regulations for the Prevention of Pollution from Ships and for Dangerous Chemicals* lists prohibited ship-source discharges including: oil, noxious liquid substances and dangerous chemicals, sewage, garbage and air anti-fouling systems. Regulations under the Act are also meant to prevent and respond to marine spills from vessels and oil handling facilities as well as control and require vessels to manage ballast water in ways that reduce the potential for invasions of non-indigenous organisms.

- The *Oceans Act* sets out Canada's role with respect to oceans management, specifying the need to integrate marine conservation with development activities to maintain healthy ecosystems. The Act is implemented through three programs, the Marine Protected Areas program (national system of marine protected areas, including designating areas for special protection), the Integrated Management program (leading, facilitating and implementing plans for the integrated management of all activities or measures in or affecting estuaries, coastal and marine waters), and the Marine Ecosystem Health program (establishing marine environmental quality guidelines).
- The *Navigable Waters Protection Act* protects the public's right to navigation and marine safety in Canadian waters. Administered by Transport Canada, the NWPA requires approval for any works that may affect navigation on navigable waters in Canada. The NWPA was amended in December 2012; the amendments are expected to come into force in April 2014 under a new name, the *Navigation Protection Act*.

1.4.2 Provincial EA Requirements

Provincial environmental assessments are regulated under Nova Scotia's *Environment Act* and *Environmental Assessment Regulations*. Projects subject to an environmental assessment are divided into two classes, Class I and Class II. As a quarry larger than 4 ha and an undertaking that may disrupt wetlands in excess of 2 ha, the proposed Project is considered to be a Class 1 Undertaking, which will require the submission of an Environmental Assessment Registration Document. Further requirements for the provincial EA process have been established in the Guide to Preparing an EA Registration Document for Pit and Quarry Developments in Nova Scotia (NSE 2009).

1.4.3 Harmonization

CEAA 2012 also allows the federal Minister of Environment to enter into agreements with provincial and territorial governments relating to the environmental assessments of projects where both federal and provincial governments have an interest. Preliminary discussions with the CEA Agency and NSE suggest that a harmonized federal/provincial EA process may be achievable. This process would include a Federal-Provincial Environmental Assessment Agreement that would define the roles and responsibilities of all parties involved, establish a timeline for the review process, and ensure the federal and provincial requirements are coordinated, to the extent possible. It is desired and anticipated that this Agreement would define the requirement for only one EA report, which would address the interests of both federal and provincial government departments and agencies.

1.4.4 Permits and Authorizations

Further to the above-described EA requirements, the Project will also require a number of federal and provincial regulatory approvals prior to proceeding. The key environmental permits anticipated are indicated in Table 1.2. These permits are typically issued after the successful completion of the EA.

Table 1.2 Anticipated Key Environmental Permitting Requirements

Regulatory Requirement	Approval/Permit	Sections	Project Activity/Trigger	Responsible Agency
FEDERAL				
Fisheries Act	Authorization	S. 35(2)(b)	Marine terminal construction, blasting in the near shore area; quarry activities through or adjacent to watercourses	Fisheries and Oceans Canada
Navigable Waters Protection Act	NWPA Permit	TBD ²	Marine terminal construction, installation of watercourse crossings	Transport Canada
Canadian Environmental Protection Act, 1999	Disposal at Sea Permit	S. 127/128	Dredging in preparation for marine terminal construction	Environment Canada
Explosives Act	Magazine Licence	S. 7	On-site preparation & storage of explosives	NRCan
PROVINCIAL				
Activities Designation Regulations (Nova Scotia Environment Act)	Water Approval	S. 5(1) various	Alteration of water bodies and/or wetlands associated with quarry development	Nova Scotia Environment
Activities Designation Regulations (Nova Scotia Environment Act)	Part V Industrial Approval	S. 13(f)	Quarry development and operation	Nova Scotia Environment

The Proponent acknowledges that dredging and ocean disposal of marine sediments would require a Disposal at Sea Permit pursuant to the *Canadian Environmental Protection Act, 1999*, administered by Environment Canada. Based on the preliminary design and the site information currently available, limited dredging and ocean disposal of marine sediments may be required in preparation for construction of the marine terminal. As the design progresses and more information becomes available, the Proponent will advise the regulatory agencies whether dredging is in fact needed.

Similarly, if it is determined that on-site storage or formulation of blasting agents is needed for the Project, the Proponent will seek the appropriate federal and provincial transport, storage and use permits following completion of the EA.

1.5 Federal Funding and Federal Lands

At this time, no federal or provincial funding will be sought for this Project. However, in the event that federal or provincial funding opportunities become available in the future, Morien may explore such opportunities at that time. No terrestrial federal lands will be used to undertake this project.

The Project is not expected to impact federal lands in other provinces or outside of Canada. The nearest federal lands are the Canso Islands National Historic Site of Canada (which include the Grassy Island Forts site), located approximately 10 km due east of Black Point (**Figure 1**).

² As noted, it is anticipated that the amendments to the NWPA will come into force in April 2014.

Although the marine terminal will be constructed within the limits of a Provincial seabed Crown lease, aggregate shipping will occur on “federal lands” as defined in CEAA, 2012 s. 2b. Federal land in this context refers that portion of the ocean claimed by Canada.

Given that shipping will occur through federal lands, there is a potential for impact to these waters through a shipping accident or malfunction at sea (such as an oil spill), vessel collision, or vessel grounding. These potential impacts are typically mitigated through vessel design, maintenance and equipment testing, and emergency preparedness and response training. Impacts from aggregate shipping may also take the form of emissions to atmosphere (primarily greenhouse gases and other fuel combustion residues), accidental discharge of ballast water or other waste, noise both above and below the waterline, collisions with fish, marine mammals and other biota.

Ballast and bilge water may contain non-native or invasive plants, animals, viruses and bacteria as well as hydrocarbons. Below water, shipboard noise may interfere with marine species that rely on sound for orientation, communication and feeding. Above water, noise may disrupt feeding, migrating, resting or nesting birds. Ship lights can also attract and/or disorient birds and other marine species. It is not anticipated that shipping will effect any changes to aquatic species at risk.

2. Description of Project

As indicated, the Proponent proposes the development, operation, abandonment and reclamation of a construction aggregate quarry and marine terminal at Black Point in Guysborough County, Nova Scotia. The Black Point Quarry Project consists of quarry development and aggregate production (drilling, blasting, processing, and stockpiling) on a 354.5 ha property, along with the construction and operation of a marine terminal adjacent to the quarry in Chedabucto Bay. Processed aggregate will be off-loaded into bulk-size carriers up to 70,000 DWT and transported to ports along the eastern and Gulf coast of the US and potentially to markets in Canada and the Caribbean.

The anticipated average annual production rate will exceed 1.0 million tonnes with an anticipated peak annual production of 2 to 5 million sellable tonnes (7.5 MT total annual production) depending on prevailing market conditions. The anticipated plant operating schedule is 16 hr/day with two operating shifts plus one 8 hour maintenance shift, 7 days/week. The plant will operate for nine months of the year weather permitting. Quarry production is anticipated to operate 16 hr/day at peak production with two 8 hr/day production shifts, and a third 8 hr/day shift for equipment maintenance. The quarry will operate for nine months of the year. The marine operations will run 24 hr/day, 7 days per week, 12 months per year to accommodate shipping schedules and the time needed to load ships.

Estimated rock reserves in the proposed quarry area are upwards of 400+ million tonnes. Quarry operations are expected to take place over an approximate 50+ year period, depending on the demand for aggregate.

2.1 Project Location and Setting

The proposed Black Point Quarry Project is located on a parcel of land along the south shore of Chedabucto Bay, approximately 4.0 km east of Fox Island in Guysborough County, Nova Scotia (**Figures 1 and 2**). Entrance to the quarry will be via an unpaved access road to (shown on Figure 4) be constructed from provincial Route 16, also called Marine Drive. Morien has entered into a long term option to lease the land from the MODG.

The proposed quarry is located on a granite hill with minimal overburden on top of the granite. The hill, which has a maximum elevation of approximately 97 m above mean sea level (amsl), is sloped to the north and abruptly levels off at approximately 20 m amsl where it gradually grades to the rocky coast (**Figure 2**). The regional geology consists of Ordovician-age metamorphosed sedimentary rocks of the Halifax and Goldenville formations that were intruded by Devonian-age granite. The granite will be quarried to produce crushed-stone aggregate.

Habitats within the study area include: rocky coast, mature black and red spruce forest, forest edge, small spruce and willow with rocky outcrops, and wetlands (e.g., bog, fen, marsh, swamp, lake). Residential development in the vicinity of the Project is relatively rare, with no residential structures within 500 m and fewer than 50 within 2 km of the property boundary. The nearest residence is approximately 690 m west of the property boundary along Half Island Cove Road. A cluster of five residences is located along Route 16 approximately 750 m southwest of the property boundary. All blasting will occur more than 800 m away from any residential structures.

Provincial Route 16 runs parallel to and approximately 900 m south of the southern boundary of the Project site. A 69 kVA power transmission line also runs parallel and immediately adjacent to the southern boundary of the Project. The proposed quarry land is currently zoned by the MODG as Heavy Industry (M-2).

2.2 Purpose and Need

The purpose of the proposed Project is to establish a hard rock quarry to supply construction aggregate to markets on both the eastern and Gulf coasts of the United States, Canada and the Caribbean. The revenue generated from the Project will provide economic benefit to the people and governments of Guysborough County and Nova Scotia through royalties and taxes paid, dollars invested into goods and services directly by the project Proponent, and indirect dollars that will go into local businesses and services from employees and contractors working on the Project and at the quarry.

Construction aggregates are composed primarily of crushed stone, natural sand, and gravel. These resources are a necessity for the development and maintenance of modern infrastructure. Although construction aggregates have numerous end uses, their general application is in the production of building materials such as concrete and asphalt. In general concrete is about 80% aggregate and asphalt is about 94% aggregate. According to the US Geological Survey, the US consumed almost 7 metric tonnes of aggregate per person in 2010.

While construction aggregates are relatively abundant in some regions, they must be located in accessible areas to be of economic value since they are low priced, high volume commodities. Aggregates must also meet strict quality requirements related to the chemical and physical characteristics of the rock. Most rock types do not meet these quality specifications and cannot qualify as viable construction aggregate resources.

In the US market, the majority (80% or more) of aggregates are transported by truck from the quarry to the consumer. This form of transport is expensive and limits the typical aggregate operation to a market radius of about 80 km. Coastal markets within the US are increasingly using high volume modes of transportation such as rail and ship to minimize costs. The southeastern US aggregate market is a prime target for bulk transported aggregate due in part to the geologic absence of suitable aggregate resources in coastal areas. For example, the Martin Marietta Materials quarry at Aulds Cove, NS shipped nearly 300 vessels of crushed stone to Florida ports between 2004 and 2009 (Archibald Consulting Services, LLC 2009).

2.3 Project Alternatives

A multi-year aggregate exploration and reconnaissance program was undertaken by Morien to investigate potential quarry sites in the Maritimes, concentrating on Nova Scotia due to its southerly location. These investigations included literature research and site-specific evaluations of existing physical, biological and socio-economic conditions. In general, the following criteria were evaluated for potential sites:

- Geological resource suitability;
- Size and availability of site;
- Proximity to deep, ice free, sheltered water;
- Engineering feasibility;
- Presence or potential for environmental constraints such as species at risk, fish habitat and wetlands;
- Proximity to residential development and existing transportation networks;
- Economic diversity and sustainability; and,
- Presence or potential for unique heritage resources.

Because aggregates are a high-bulk low-cost commodity, the cost of transportation can easily exceed the price of the aggregate. So, for a marine quarry which requires considerably more capital than a land-based quarry to be profitable, the aggregate source must be located immediately adjacent to deep water and capable of being transported to the ship load-out by conveyor. If trucks or rail are required to transport aggregate from the quarry to

the wharf, the project would be uneconomical. No other suitable alternative sites were found. The key factors which led to the selection of the Black Point Quarry Project site are:

- Availability of high quality, large tonnage, fine-to-medium grained, homogenous granite that meets or exceeds all of the necessary physical and chemical requirements to produce Class-A construction aggregate;
- Deep (> 14 m), sheltered, ice-free bay for the location of the marine terminal to enable shipping of processed aggregate rather than trucking products through populated areas;
- Minimal to no overburden on the Project site, reducing development costs and limiting the potential for sedimentation during construction and operation;
- Proximity to well-traveled international shipping lanes (10 km) with existing logistical support, such as pilot tugs; and,
- No significant environmental or regulatory constraints, based on a preliminary review.

In addition to the above-described evaluation, alternative technical and economic means for accomplishing the Project were also investigated.

Drilling and blasting is the proposed approach for material extraction from the Black Point Quarry. Alternative mechanical means and methods of rock extraction (e.g., ripping) are not practical or feasible due to the extremely hard and dense characteristics of the granite. Therefore, there are no feasible alternatives to drilling and blasting as a means of extracting this material.

Alternative site design and transportation methods/routes considered for the Project included:

- Development of a rock face open pit (the quarry) and progression in a southerly direction with transport of blasted rock to the processing area via large truck or conveyor system; and,
- Development of a glory hole open pit with transport of blasted rock to the processing area via a conveyor system.

Due to safety concerns, operational issues, capital costs, and geotechnical considerations, the glory hole alternative consisting of a near vertical ore pass and underground horizontal portals was deemed as not technically feasible.

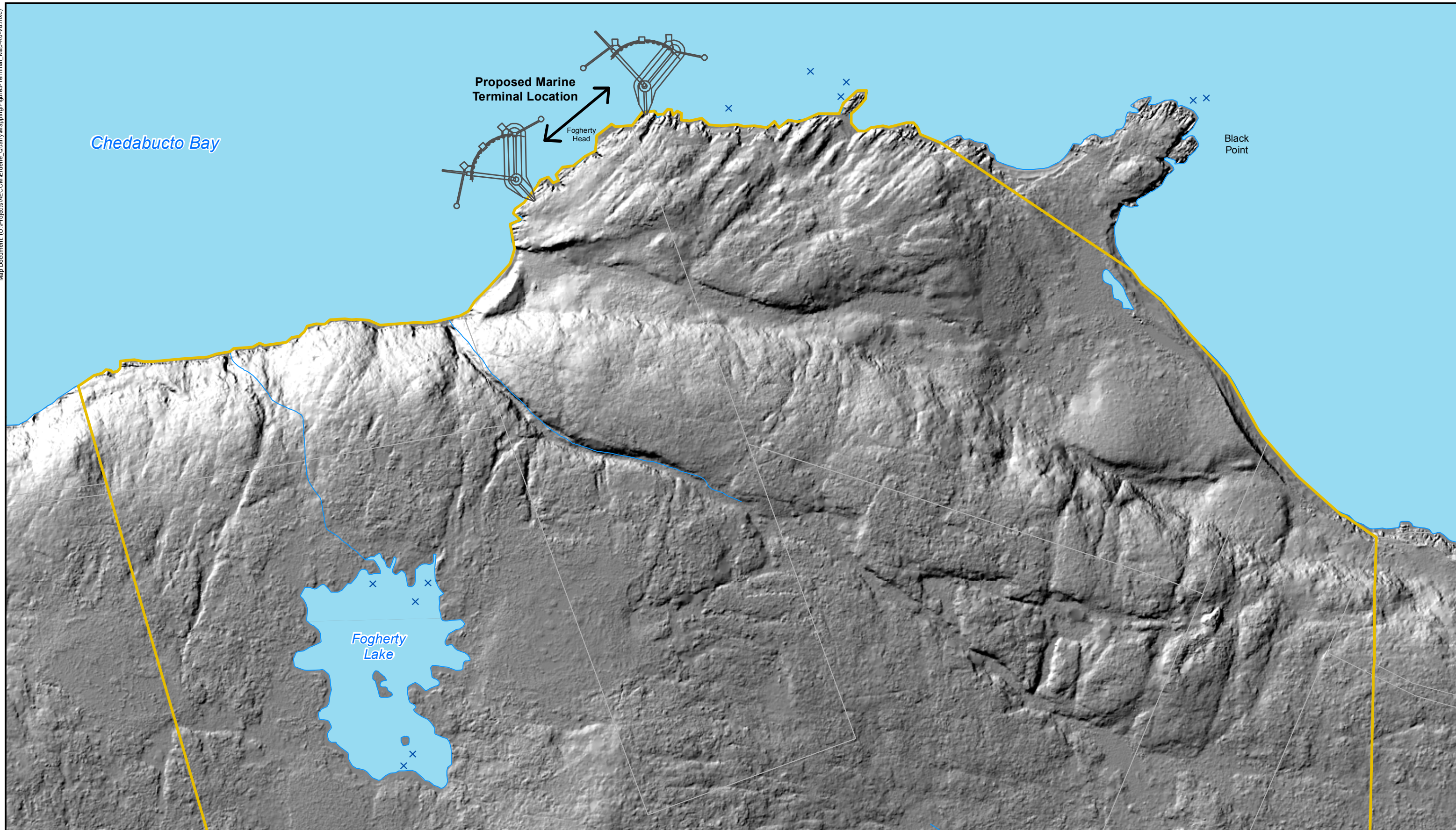
While there are existing bulk terminals in the Strait of Canso, all are too far from the proposed quarry to be of economic use. The cost to transport a tonne of aggregate by truck is about \$0.15/km therefore, transporting material 50 km or so to the Strait would cost over \$7.50 / tonne, essentially doubling the cost of the aggregate. In addition, transport of aggregate to the Strait would require high frequency truck traffic through several communities, which would likely raise concerns from local residents.

Alternative construction methods for the marine terminal were investigated in order to reduce disruption to marine habitats (e.g., in-water blasting and dredging, rock fill, concrete caisson, and steel sheet pile circular cells). Due to the inherent sensitivities of marine environments, blasting and dredging would be limited to the creation of support structures, at least until the design of the marine terminal is further advanced. However, to reach the water depths required for large ships (>14m), a rock fill pad (i.e. 'rubble mound') or similar structure (for example, concrete caissons) will be required as part of the marine terminal construction.

Morien is also considering an alternate location for the marine terminal based on feedback from local fishermen who indicated that locating the terminal as far to the west as possible would increase the sheltering from wind and strong currents off of Black Point. The originally proposed terminal site and the proposed range of alternative sites are presented in **Figure 3**. Additional investigations will be conducted to identify the most appropriate location for the terminal. Morien is also considering the construction of a temporary floating wharf to minimize initial capital costs; if

built, this structure would later be replaced with the permanent rock-fill or other structure once aggregate sales justified such expenditure.

Options for the precise location and timing of component construction will be selected to avoid sensitive biological features and life cycle periods, to the extent possible. Settling ponds and other erosion and sediment control measures will be installed as erodible soils become exposed. These control measures will be modified, maintained, and expanded as required for the duration of the construction and operation. It is anticipated that aggregate production at Black Point will continue over a period of at least 50 years. Both mining and reclamation will be conducted progressively to the extent possible in order to minimize impacts on local wildlife species.



REFERENCES:
 Base data is from NSDNR (2010), GeoNova (2009), GeoBase (2007). Property Boundary data from SNS (2011), Proposed and Alternate Marine Terminal Location provided by AECOM (2011). LiDAR data from Leading Edge Geomatics (2011).

Map Features

Rocks in Water	Watercourse
Property Boundary	Waterbody
Study Area Boundary	

DATE: February 17, 2014
 SCALE: 1:6,500
 JOB NO.:
 REVISION: 8
 DRAWN: CA-SEG



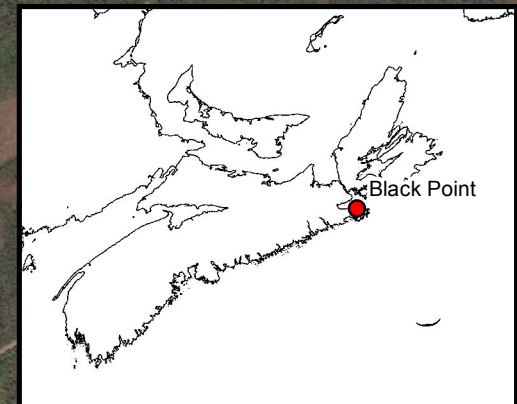
Figure 3 - Proposed Marine Terminal Locations
 Proposed Black Point Quarry Project
 Morien Resources Corp.

Figure 4
Conceptual Site Plan
Proposed Black Point
Quarry Project

Legend

- Crown Survey
- Property Buffer 30m
- Ultimate Pit Boundary
- Fill Areas
- Plant Location
- Load Out
- Berms
- Power Line
- Entrance Road
- 30 m Buffer
- Undifferentiated Wetlands
- Coastal Marsh
- Creeks

0 125 250 500
Meters



2.4 Project Components

The primary components associated with the Project include:

- An unpaved access road from provincial Route 16 into the quarry;
- The quarry and primary crushing area;
- Main feed conveyer from the primary crusher to the processing plant;
- The processing (finishing) plant consisting of secondary and tertiary processing and a stockpile laydown area;
- Modular buildings that comprise the administration complex; and,
- A 200 m long marine terminal and load-out facility.

The locations of the primary project components are depicted in **Figure 4**.

Access Road

Access to the quarry site will be via an unpaved road (to be constructed) north from Route 16 to the quarry property, a distance of approximately 800 m (**Figure 4**). From the property boundary the road will be extended approximately 2.5 km into the quarry property to access the processing area and marine terminal. The access road will be designed to accommodate the anticipated load and size of Project-related vehicles. The intersection of Route 16 and the access road will be designed to meet Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) standards. Fill materials required for access road construction will likely be obtained from within the proposed site. Although none appear to be needed at this time, a bridge or culvert will be installed across any watercourses along the access road in accordance with NSE standards and permit requirements.

Quarry

Quarrying this type of massive, hard rock requires drilling and blasting to establish “benches” along the rock face. This method of extraction is the industry standard for aggregate quarrying. In general, the rock will be blasted using a mixture of ammonium nitrate and diesel fuel (ANFO) or similar commercial product, along a specific drill pattern that will maximize rock breakage and minimize wasted energy to the atmosphere. This in turn reduces vibration, noise, and overpressure (the ‘air blast’ effect from explosives use). Blasting in such a manner creates benches of a preferred height, which is typically maintained throughout the development of the quarry. Bench heights are determined by the rock type and geotechnical characteristics, production demands, and the size of mining equipment used on site. The Black Point Quarry will likely be developed with 15 m to 25 m high benches. An access ramp will be incorporated into the bench design to facilitate the transport of personnel, equipment and haul vehicles in and out of the quarry. The quarry will be developed beginning at the north end of the property and will progress in a southerly direction (**Figure 4**). The ultimate quarry will be approximately 130 m deep (representing 5 to 6 benches) and will occupy approximately 180 ha.

Blasted rock will be transported to the processing facilities either by trucks or conveyors. Initial crushing will occur in the primary crushing circuit to be located within or just outside of the quarry pit. Rock exiting the primary crushing circuit will be conveyed to the secondary and tertiary processing plant where it will receive additional crushing and screening and will then be conveyed into various sized aggregate stockpiles and ultimately loaded onto bulk marine carriers.

Plant and Laydown Area

The physical laydown area is approximately 28 ha and will be located in the northern section of the 354.5 site along Chedabucto Bay as shown in **Figure 4**. This area will be used for processing (e.g., secondary crushing, screening,

washing and conveying), stockpiling aggregate products, equipment, fuel and material storage, ship loading and administrative buildings. The laydown area will also contain a series of settling ponds, likely located on the west side of laydown area, for the collection and treatment of surface runoff and aggregate wash water. At least two and possibly up to five ponds will be used to treat the sediment laden water prior to discharge. The size of these ponds has not yet been determined. Storage locations of overburden and organic materials will be selected as part of detailed site engineering. For the purposes of the Project Description, overburden storage is shown in a berm along the southern property boundary and in various designed piles across the property, as space permits.

Processing Plant

Based on the preliminary design, processing equipment will initially consist of one modular/portable primary jaw crusher located in or just outside the quarry; a main feed conveyor and a modular/portable crushing (finishing) plant. The modular/portable plant will have a capacity of up to 1,000 tonnes/hr. This plant will be used to make fill material for the early site development as well as for initial stone demands. This concept is intended to save capital dollars in the early years of development; the modular/portable plant will be replaced by a larger fixed plant over time as demand requires. The fixed plant will have a flexible design that will allow it to be expanded as market conditions dictate. It would have an initial maximum hourly rate of up to 1,800 tonnes/hr with the capability to increase production up to 3,500 tonnes/hr. The main feed conveyor will transport primary crushed aggregate down slope to a large surge pile located near the secondary crusher(s) that will feed the processing plant. Should the modular plant be used, front end loaders will be used to load the ship loader; if the fixed plant is used the ship loader would be fed directly from a product blending tunnel described below. The processing plant will be designed to minimize airborne dust emissions. Apart from flocculants that may be needed to help settle suspended particulate matter out of the water column, it is not anticipated that any chemicals will be used in the washing process.

The four stage processing plant will consist of:

- Single or double primary crusher(s) (1,000 tonnes/hr up to 3,500 tonnes/hr);
- Secondary and tertiary cone crushers;
- One (1) or two (2) scalping screens and four (4) to eight (8) sizing screens capable of producing several nominal size fraction aggregates;
- 330 m long product blending tunnel with two (2) to four (4) finished product rinse screens; and,
- Two (2) reclaim tunnels to supply the finished product to the ship loader.

Liquids Storage

Fuel and various equipment maintenance materials will be stored on-site in above ground storage containers within the laydown area. Preliminary estimates of the volumes of these materials stored on site is up to 40,000 US gallons (US gal) of diesel fuel; 2,000 US gal of gasoline; 5,000 US gal of oil products; 1,000 US gal of antifreeze; and 2,000 US gal of waste oil³. All storage tanks will be double walled and will have inter-wall monitoring and leak detection. Drums and barrels will be stored within a contained area so that spills or leaks can be managed before any liquids reach the soil. These materials will be stored and handled in accordance with all relevant regulations. The fueling area will be erected on a reinforced concrete slab or lined containment area enclosed within side curbs and with a sloping floor to contain any spills and / or leaks that may occur during fueling. The precise location of the fuel storage area has not yet been determined, but fuel will be delivered to the site by truck, rather than by rail or ship.

³ 150,000 l of diesel fuel; 7,500 l of gasoline; 19,000 l of oil products; 3,800 l of antifreeze; and 7,500 l waste oil

Administrative Buildings

Within the 2.5 ha administrative area (likely located on the east side of plant and laydown area), two double-wide modular buildings will be constructed: one to contain offices and administrative functions and the other to contain facilities for on-site workers such as a locker/shower room, washroom, first aid station, lunchroom, quality control laboratory and shop. Adjacent to the office building, a scale and scale house may be constructed to accommodate the occasional sale of aggregates to local markets; alternatively, a portable scale and scale house could be brought to the site on a job-by-job basis to accommodate sale to local markets.

Electricity and Other Utilities

Electrical power will be required for ancillary buildings and the operation of equipment (pumps, conveyors, crushers, screens, and ship loading). It is anticipated that the Project's electrical needs will be satisfied through a tie-in to the existing 69 kVA Nova Scotia Power Inc. electrical transmission line that parallels the southern boundary of the Project site. A transformer sub-station will be required to reduce the voltage for the quarry. The total electrical power demand for the quarry is estimated to be between 4,000 and up to 6,000 horsepower (i.e., 3.0 – 4.5 MW), mostly for operation of large electrical motors associated with the processing plant equipment. At start-up, power to the site may be supplied via temporary generators until such time as the sub-station and transmission link are constructed. Alternative sources of energy, such as on-site wind turbines, will be considered during the detailed engineering design phase of Project.

Other utilities will include domestic water supply that will be supplied by drilled groundwater wells, and a waste water or sewage disposal system to facilitate the needs of on-site workers. Propane tanks may also be installed for heating or other functions.

Marine Terminal

The preferred construction approach for the marine terminal employs a fill and rock technique that results in a relatively large footprint on the seabed. An alternative approach using individual concrete caissons placed on the seafloor is currently being evaluated.

Should the marine terminal be constructed along the shore using fill and rock (i.e. rip-rap) material sources from the site, the terminal will consist of an approximately 200 m long rock filled approach (**Figure 5**). The terminal will be constructed with a clean rock-filled base, armour stone protection on all sides and a crushed rock surface. These materials will be installed using dump trucks, loaders, conveyors, and bulldozers, and other equipment as needed. This structure will have a seafloor footprint of approximately 16,000 m². Two or three breasting dolphins and two mooring dolphins will be required for the marine terminal. Construction of the pile-supported dolphins will be conducted from a barge using conventional marine construction methods. The dolphins and piles will be designed and constructed to withstand the horizontal loads anticipated from berthing of vessels, as well as environmental loads (wind, waves, etc.).

The main components of the marine terminal are the fill and rock (or concrete caisson) approach, steel sheet pile cell caissons for the breasting and mooring dolphins, slewing rail, ship-loader and walkway supports. Most of these components are anticipated to be delivered to the site by barge, whereas the various-sized stone material will be produced on-site and hauled and dumped into place. It is anticipated the ship-loader will be an approximate 100 m long radial arm loader capable of loading up to 70,000 DWT without warping (shifting) the vessel. The ship-loader serves to transport material from the land-based conveyor into the ship as quickly and safely as possible. The ship-loader will have a loading capacity approaching 5,000 tonnes/hour. Lighting on the ship loader will be shielded to

direct light down onto the conveyor during night operations. Navigational lighting will be provided as required by Transport Canada.

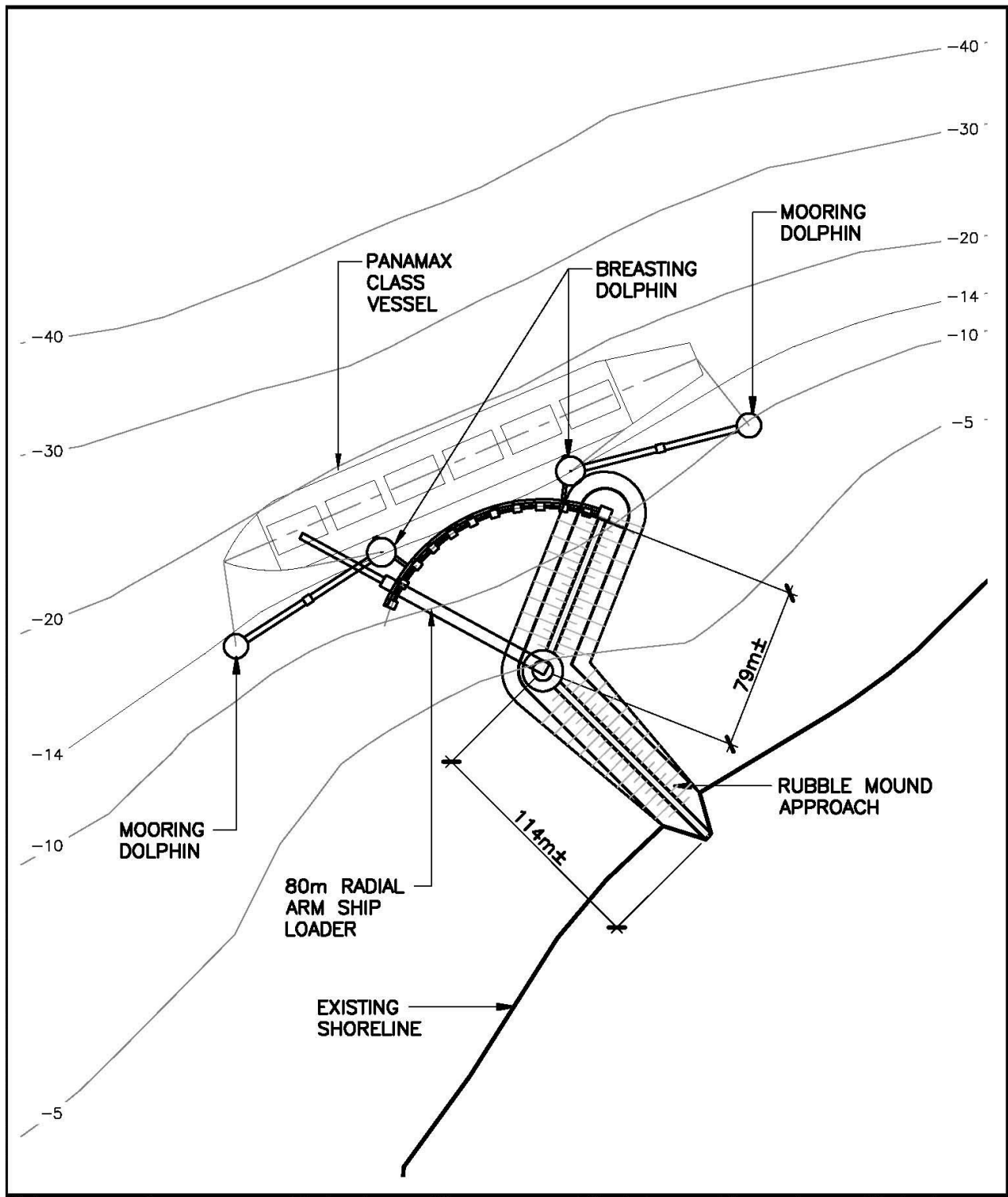
Vessels will not be refueled at the marine terminal; no refueling facilities will be present. All shipping and associated activities (crews, provisions, refueling and other supplies, waste management, etc.) will be contracted to a third party.

It may be necessary to build a temporary wharf constructed of grounded or floating barges and powered by generators to reduce the initial capital development costs. Because this method would only allow for limited loading rates, it would be temporary until sales volumes justify construction of the full wharf and ship loader as described above.

Shipping

As noted, the marine terminal will be constructed within the limits of a seabed Crown lease issued by the Province. Ships will depart from the marine terminal under the control and supervision of the Canadian Coast Guard's Eastern Canada Vessel Traffic Services Zone and will access nearby shipping lanes currently used by marine traffic accessing the Strait of Canso Port. Aggregate shipping will exit Chedabucto Bay in an easterly direction and access domestic commercial shipping lanes currently used by a range of tanker, bulk and containerized cargo carriers. Project related shipping will remain far from the nearest federal Marine Protected Area, namely The Gully located approximately 250 km southeast of Canso. The nearest terrestrial federal land is the Canso Islands National Historic Site of Canada near Canso.

The ships will not pass near any National Wildlife Areas although ships will pass to the south of the Port Joli, Port Hebert, Sable River and Haley Lake Migratory Bird Sanctuaries. These Sanctuaries are located along Nova Scotia's southwestern shore and together form the South Shore Important Bird Area.



Proposed Black Point Quarry Project
Erdene Resource Development Corp.

Source: 2005 10 01 CBCL: Black Point
Quarry Marine Facilities Review of
Conceptual Engineering Study: Plan
View SSP Cell Option: Figure sk-01

Figure 5
Marine Terminal Components

2.5 Project Activities

All Project activities will be conducted in accordance with relevant federal and provincial regulations. In addition, Project activities will be conducted in accordance with the Nova Scotia Pit and Quarry Guidelines (NSE 1999, revised 2009). These guidelines apply to all provincial pit and quarry operations and provide separation distances for blasting, liquid effluent discharge limits, sound level limits, and requirements for a reclamation plan and security bond.

2.5.1 Site Preparation and Construction

The site preparation and construction phase of the Project will begin with clearing of vegetation and removal of organic material and overburden for the purpose of establishing a rock face at the north end of the property. Cell mining, or a phased approach will be used to minimize impacts and to allow natural vegetation to remain as long as possible. After the initial site development of approximately 40 hectares, the site will be cleared in approximate 10-20 ha cells. With the exception of organics, materials extracted during these early development stages will primarily be used for construction of various facilities such as access roads, the laydown areas, and the fill for the marine terminal. Topsoil and excess overburden, if any is encountered, and waste rock will be stockpiled (separately) and stabilized (e.g., seeded) for future use in the reclamation phase. Much of the overburden will be stored in berms on the edges of the property, thereby increasing sound and visual buffers. The site preparation and construction phase of the Project is anticipated to require about 155 person-years (a person-year of employment is assumed to be one year of employment for a person working approximately 2,000 hours) over a 36 month period.

To minimize the potential for erosion and sedimentation, clearing, grubbing and removal of overburden will be conducted in a progressive manner to accommodate drilling and blasting activities, such that the amount of exposed erodible soils is minimized. To the extent possible, clearing activities will take place outside of the breeding season for most bird species (April to August) to prevent the disturbance of migratory birds or their nests. If clearing is necessary during the breeding season, a contingency plan will be applied including nest surveys and exclusion of activities from active nesting areas to ensure compliance with *Migratory Birds Convention Act (MBCA)*.

Settling pond(s) will be constructed to receive groundwater, precipitation, surface runoff and quarry drainage for treatment of total suspended solids (TSS) prior to off-site discharge. The settling pond(s) will be designed to accommodate the anticipated runoff during peak flows (e.g., spring runoff) taking into account anticipated climate change effects over the life of the Project. Additional settling pond capacity will be developed as the quarry expands. The base of the settling pond(s) will be constructed of compacted low permeability earthen material such as overburden. Water from the settling pond will be used for aggregate processing and for dust suppression.

An access road will be constructed from Route 16 to the quarry property using, for the most part, materials extracted from the quarry site. The intersection of Route 16 and a portion of the access road will be paved (to minimize dust) and will be designed to meet NSTIR standards. To the extent possible, the access road will be located so as to avoid watercourse crossings. Where this is not possible, a permanent bridge or culvert will be installed. Installation of these structures may require a Water Approval pursuant to the provincial Activities Designation Regulations and will be installed between June 1st and September 30th, unless otherwise authorized. Structures will be designed to accommodate the 1 in 100 year storm return period. Gradients on the access road will not exceed 10%. Similarly constructed gravel-surfaced secondary access roads within the quarry will be constructed to connect the land-based infrastructure and the ship loading facility. Necessary erosion and sediment controls such as silt fences, hay bales and/or rip rap will be put in place prior to, and during, access road construction.

Preliminary design indicates that approximately 2.5 million tonnes of rock and fill material extracted from the site will be needed for the near-shore construction of the marine terminal. Blasting in the terrestrial near-shore area for construction of the laydown area and approach to the wharf may be required. Construction of the pile supported

dolphins will be conducted from a barge. The piles will be installed using pile driving hammers and churn drills and will be anchored in the bedrock. Silt curtains and acoustic blankets will be considered during installation, as needed. All marine construction will be done using conventional marine construction techniques.

Prefabricated steel required to construct the radial arm ship loader will be delivered to the site by barge. Steel piles will be anchored into the bedrock to support the ship loader bridge (similar to dolphin construction). Installation will be conducted from a floating platform.

The load-out conveyor (equipped with spill containment) will extend from onshore to the ship loader conveyor and will again be supported by piles anchored on top of the rubble fill. The slewing rail (allowing for lateral movement of the ship loading conveyor) will be supported by piles driven into bedrock.

2.5.2 Operations, Monitoring and Maintenance

Upon completion of site preparation and construction activities, the quarry will begin production of aggregate for sale and for transport. Quarrying will advance by drilling and blasting. As the quarry is initially developed, blasting is expected to occur several times a week on a smaller scale; however, once the quarry is fully developed, blasting is anticipated to occur on a larger scale approximately 2 – 3 times a week. The blasting operator will be responsible for blast designs and methods in accordance with the *Blasting Safety Regulations* made pursuant to 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* (NSE 1999). Pre-blast surveys will be conducted in accordance with the requirements set forth by NSE which includes, at a minimum, all buildings within 800 m of a blast.

Blasted rock will be loaded by front-end loaders or hydraulic shovels into appropriately sized haul trucks to transport the blasted rock (also called primary raw feed or PRF) to the primary crusher located within or just outside the quarry. After being reduced in size in the primary crusher(s), the rock will be transported via conveyor to a surge pile located nearby. The material is routed through the remainder of the crushing and screening plant via conveyors to produce sized and washed aggregate. The different aggregate products will be stockpiled according to size and rinsed on final wash screens prior to being loaded into ships or barges. Processing aggregate will require the operation of a variety of equipment including a jaw crusher, live surge pile, sizing screens, blending and load-out tunnels, conveyors, waterlines and pumps, water clarification tank, emergency generator, and other associated mining equipment. This equipment will be operated by electricity, but the modular/portable plant (if used) may for some time be powered by generators. Mobile equipment will likely include excavators, loaders, off-road rock trucks, bulldozers, water trucks, cranes, drill rigs, miscellaneous service trucks, work boat, rock breaker, and barge.

Products will be loaded from the laydown area by conveyors onto a moveable (radial) ship loading stacking conveyor. Aggregate will be conveyed over the shoreline and waters of Chedabucto Bay within long-span gallery trusses. Conveyors will be equipped with inter-locked stop switches, mis-alignment switches, and motion switches located on non-powered pulleys to stop conveyance of material should there be an overload situation, thus preventing spillage.

The wash water system will be operated as a closed circuit, thus recycling as much water as possible. Surface water and groundwater accumulating within the quarry will be collected in settling ponds. Any make up water required for washing will be pumped from the settling ponds. It may be necessary to utilize a water clarification system to dry out waste fines and to assure the required volume of wash water. If used, clarified water will be recycled to the rinsing process and sediments pumped to the dyked sediment disposal area. Waste fines (sediment) will be excavated from the ponds on an on-going basis and used in reclamation. In the event that surface water runoff does not provide adequate volumes for the washing process, the final design will identify additional water

needs and on-site supply sources. A water balance study will be completed during the EA phase to determine water demands and water sources.

The radial arm ship loader will load the aggregate in to the holds of ships (up to 70,000 tonnes) and barges which will transport the aggregate products. Aggregate loading onto the ships will approach 5,000 tonnes/hour once the full load-out is constructed. It is estimated that it will take approximately 18 to 24 hours to load the largest ships and that approximately 100 ships will be loaded each year when sales peak at 5 million tonnes/yr.

Aggregate products will be the only material loaded at the Black Point Quarry. In severe weather conditions, the marine terminal may be used as a refuge for fishing boats or ships in the immediate area. Management of bilge and ballast water will be the responsibility of the ship captain(s). Federal regulations regarding the management of ballast water will be strictly adhered to in order to help manage the movement of invasive aquatic species in Nova Scotia waters.

Fueling of mobile equipment will be conducted onsite, in designated areas, on a regular basis. The fueling area(s) will be erected on a reinforced concrete slab or lined containment area enclosed within side curbs and a sloping floor (as per provincial fuel storage and handling regulations) designed to contain any spillage from fuel transfer operations. Equipment operators will remain with the equipment at all times during fueling in accordance with the provincial *Petroleum Management Regulations*.

The operational life of the proposed quarry and marine terminal is expected to be at least 50 years based on the available rock reserve on the Project site. Yearly production is anticipated to peak at 7.5 million tonnes per year and is estimated to occur within approximately 10 years of quarry development. Quarrying and ship loading will take place on a year-round basis to the extent possible, weather permitting. Operating hours for the quarry will generally be from 6 am to 10 pm (two eight hour shifts), 7 days a week; however ship loading and equipment maintenance may occur 24 hours a day if required to avoid shipping delays and to prevent unintended down time due to equipment malfunctions.

The workforce at the quarry will include an operations manager, office clerk, quality control and environmental control technicians, processing operator, fixed and mobile equipment operators, truck drivers, mechanics, electricians, drillers, laborers. The Project will employ 60 to 100 persons full time at peak production. Drilling and blasting activities involve additional resources which may be subcontracted to a professional blasting company. Shipping of material will typically be arranged through the customers.

2.5.3 Decommissioning and Abandonment

In accordance with the requirements of the provincial Pit and Quarry Guidelines, Morien will prepare a written plan approved by NSE to provide for partial or total abandonment of the site. It is anticipated that the plan will include an initial rehabilitation plan, progressive rehabilitation measures and / or a final rehabilitation plan. Morien will also post interim and final security bonds for the quarry, as required by the Pit and Quarry Guidelines and the *Approval and Notification Procedure Regulations*.

The rehabilitation plan will be developed for the Project site and submitted to regulators for review as part of the provincial Part V Industrial Approval application. The plan will include short-term and long-term reclamation efforts as well as details of the proposed final reclamation plan such as topography, maximum slopes, re-vegetation plans, and potential future land uses once the quarry operation is complete. The final reclamation plan will be developed in consultation with various stakeholders such as provincial and municipal officials, non-government organizations and conservation groups, and adjacent landowners.

Decommissioning of the Black Point Quarry is expected to take place after approximately 50 years of operation, although the final closure date has not yet been established. Stationary equipment and administrative facilities will be removed from the site. Access roads and environmental control structures (including sediment ponds) will be left in place. To avoid disturbance of the marine environment and for potential future use, the breasting and mooring dolphins, buoys, and conveyor support system will likely be left in place.

2.6 Malfunctions and Accidental Events

Malfunctions and accidental events will be prevented and mitigated through a systematic approach to worker health, safety and environmental protection. Contractors will be required to submit health and safety policies and plans to Morien for review and approval prior to any on-site activities. Onsite workers will receive appropriate training to prevent and mitigate workplace accidents and environmental upsets, as required by provincial occupational health and safety regulation.

The key accidents and malfunctions that could potentially occur during site preparation and construction and the operation phase of the Project are described below. Mitigation measures to prevent the occurrence of such events, and response procedures to be implemented in the event they do occur, will be developed as part of the Industrial Approval application process.

2.6.1 Fuel and Hazardous Materials Spills

Petroleum, oil and lubricants (POLs) spills may occur during any phase of the Project while fueling or through breaks or leaks in hydraulic lines or storage vessels. Such spills would be localized and easily cleaned up using standard equipment such as absorbent pads and spill responses procedures. In the unlikely event of a large spill or leak, soil, groundwater and surface water contamination may occur, adversely affecting the quality of habitats and / or resulting in the uptake of contaminants by wildlife. Precautions will be taken to prevent spills from occurring and to ensure an adequate response to mitigate the effects of any spills. Fuel oil will be stored onsite in above-ground storage containers as described above. These materials will be stored and handled in accordance with all relevant regulations. A qualified company will be contracted to conduct regular maintenance of equipment. Used oil and filters will be removed from the site for proper disposal and recycling. Other than used oil, oil filters, used antifreeze and small amounts of solvents for parts cleaning, there will be no hazardous substances stored at the quarry.

All Project equipment and vehicles will meet the requirements of industry standards and be safety certified and fit for their intended use. Regular pre-shift inspections and maintenance programs will ensure the continued reliability and integrity of such equipment.

All fuel, chemicals and wastes will be handled in a manner that minimizes or eliminates spillage and accidents. A Spill Contingency and Emergency Response Plan will be developed in support of the application for provincial Industrial Approval. In fact, the Proponent has already developed a detailed Spill Prevention Countermeasures Control Plan that will be modified for use at the Black Point Quarry site. In the event of a spill or leak during fueling activities, maintenance, or general equipment operation, immediate action will be taken to stop and contain the spilled material. All contaminated material will be collected and stored in an appropriate manner to prevent a re-release to the environment until transportation to an approved treatment / disposal facility. All spills will be reported to the 24-hour environmental emergencies reporting system (1-800-565-1633) in accordance with the *Emergency Spill Regulations* under the Nova Scotia *Environment Act*.

2.6.2 Erosion and Sediment Control Failure

The area containing stockpiled materials will be designed to contain and direct runoff to the settling pond(s). Failure of the engineered ponds to contain runoff could potentially occur, particularly during a significant storm event. Such

an event could result in the release of sediment-laden runoff to the environment with potential adverse effects on wildlife and habitats. The design of the ponds will be engineered to accommodate the anticipated load required for the Project. Additional pond volume will be installed, as required, in accordance with NSE's Erosion and Sedimentation Control Handbook for Construction Sites (NSE 1988). These areas, and erosion and sediment control measures installed elsewhere in the Project area will be regularly inspected and monitored, particularly during and after extreme precipitation events. Erosion and sediment control structures found to be damaged will be repaired immediately.

2.6.3 Vehicle and Vessel Collision

Vehicular / vessel collisions may occur during any phase of the Project. The limited trucking associated with the Project significantly reduces the likelihood of collisions with other vehicles or wildlife during construction and operation. During construction and operation of the marine terminal, there is potential for project-related vessel collisions, albeit limited. The management of marine traffic in Chedabucto Bay is under the responsibility of the Canadian Coast Guard. It is mandatory that all large vessels report to the Canadian Coast Guard at specified points. The potential for collisions will be virtually eliminated through controlling vessel speed, scheduling and coordinating activities with other marine users, Transport Canada and the Canadian Coast Guard, and posting Notices to mariners as needed. The marine terminal will include navigational aids as required by Transport Canada and the Canadian Coast Guard.

2.6.4 Fire

A fire at the Project site may occur during any phase of the Project due to accident, equipment malfunction, human carelessness, or natural causes such as a lightning strike. The immediate concern for a fire is for human health and safety; additional concerns include habitat loss, direct mortality to wildlife, and damage of property. The emissions from a fire would likely consist mainly of smoke (particulate matter) and CO₂, but could also include CO, NO_x, SO₂, and other products of incomplete combustion. A large fire could create air contaminant levels greater than the ambient air quality standard over distances of several kilometres; however, the likelihood of such cases is considered low and the event would be of short duration.

The potential for, and extent of, fires will be reduced by proper material management and operational procedures (e.g., storage, handling and transfer), including emergency response procedures. The Spill Contingency and Emergency Response Plan, to be prepared as part of the Industrial Approval application process, will outline procedures for fire prevention, response and reporting.

2.7 Wastes, Emissions, and Discharges

In accordance with industry best practices and NSE requirements, controls will be in place to ensure that all runoff generated during operations is managed appropriately. Surface runoff as well as groundwater and precipitation at the quarry will collect in sump pits excavated into the quarry floor. Water pumped from the quarry floor will be discharged into a settling pond constructed outside the quarry; additional ponds will be constructed in the laydown area to manage wash water from the processing plant. Water from the settling pond(s) will be used in the aggregate washing process, to the extent feasible. Additional settling pond volume will be installed, as required, in accordance with provincial design standards and requirements. Details regarding the settling pond volume required for the proposed quarry will be defined during the detailed design and EA stage and further refined at the provincial Industrial Approval application stage.

Water discharge will be monitored and sampled in accordance with the terms and conditions of the provincial Industrial Approval and the Pit and Quarry Guidelines (NSE 1999). Monitoring will ensure that total suspended solids (TSS) levels do not exceed the approved final discharge limits. In the unlikely event of a significant rainfall

event causing the discharge of overflow exceeding approved limits as determined through monitoring, contingency measures may include pumping sediment-laden water to vegetated areas (away from watercourses) or through filter bags for additional filtration and / or use of additional filtration devices or structures. A Stormwater Management Plan will be developed for the Project and will be submitted to NSE for review as part the provincial Industrial Approval application process.

Dust emissions resulting from quarry construction and operations will be controlled through equipment design technology and possibly with the application of water obtained from the settling ponds and water that has pooled on the quarry floor. Biodegradable products proven to significantly minimize fugitive dust may also be used. To minimize dust emissions, Morien will install conveyors to transport rock from the quarry to the laydown area to minimize truck traffic and associated dust. Stockpiled soils will be hydro-seeded and potentially covered with straw to minimize erosion. Monitoring of airborne particulate emissions (dust) will be conducted as per the terms and conditions of the provincial Industrial Approval and in accordance with the Pit and Quarry Guidelines and the Nova Scotia *Air Quality Regulations*.

Combustion emissions will be generated from the operation of Project equipment and vehicles. Specific emission types which may be associated with Project activities include: sulphur dioxide (SO₂), nitrogen oxides (NO_x), carbon monoxide (CO), carbon dioxide (CO₂), and particulate matter (PM). Emissions will be localized and temporary, lasting the duration of individual activities. Emissions will be reduced by minimizing trucking (i.e., using conveyors) and through proper equipment selection, maintenance and inspection. Consideration will be given to methods to reduce idling, as feasible. Ambient air quality monitoring will be conducted as per the terms and conditions of the provincial Industrial Approval and in accordance with the Pit and Quarry Guidelines and the Nova Scotia *Air Quality Regulations* and the federal Ambient Air Quality Objectives.

Noise and vibrations resulting from the operation of the proposed quarry and marine terminal will be controlled primarily by attenuation (distance between the source and receptor), vertical separation, and design and enclosure of some equipment. For example the finished crushing plant could be clad in sheet metal to help reduce noise and to help shelter the equipment from freezing. As per the Pit and Quarry Guidelines, sound levels for the operation of the quarry will be maintained so as to not exceed the following levels (Leq) at the boundaries of the Project site:

- 65 dBA 0700 – 1900 hours (Days);
- 60 dBA 1900 – 2300 hours (Evenings); and,
- 55 dBA 2300 – 0700 hours (Nights, Sunday and statutory holidays).

The quarry will not be visible from Route 16 due to the distance, vertical change in topography, forested slopes and the proposed overburden berm. Additionally, consideration will be given where feasible to schedule noise and vibration generating activities to times when they would be the least disruptive to neighbours.

Light emissions will be generated from vehicles using onsite access roads and parking lots, exterior lighting, and lighting of the marine terminal. Illumination will be minimized by shielding lights to shine only where needed, while ensuring the safety of employees.

Details of monitoring programs to be developed for the Project site (e.g., surface water, noise, dust) will be developed in consultation with regulatory agencies and will be outlined in the provincial Industrial Approval application.

Solid waste generated onsite will be generally limited to office and domestic refuse. All solid waste will be properly collected and stored onsite until such a time that it can be transported to a provincially-approved waste disposal facility. Where possible, the Proponent will reuse or recycle waste materials.

As indicated above, used oil and filters will be removed from the site for proper disposal and recycling. All contaminated material that may result from a spill will be collected and stored in an appropriate manner so as to not be re-released to the environment until such a time as it will be transported to an approved treatment / disposal facility.

Liquid wastes such as septic sludge will be removed from the site by a licensed contractor. Any other liquid wastes generated on site will be stored in approved containers until they can be removed from site per conditions stipulated in the Industrial Approval.

Blasting will be required and the Proponent acknowledges the potentially hazardous nature of ammonia-based explosives and their residues. The handling, transportation, storage and use of explosives will be conducted by trained and qualified individuals and in compliance with all applicable laws, regulations, and permit conditions. A blast design plan and monitoring program will be developed and submitted to NSE as part of the application for an Industrial Approval.

2.8 Project Schedule

The tentative Project schedule is outlined as follows, and is subject to the receipt of all required regulatory permits and approvals. Changes in economic conditions and targeted market evaluations could accelerate or delay the tentative schedule below.

- File Project Description – February 28, 2014
- Posting of the Notice of Commencement – estimated May 1, 2014
- Environmental Baseline Studies – complete by September 1, 2014
- EA Approval – estimated September 1, 2015 (please see note below).
- Permit Applications – following EA approval, complete by November 28, 2015
- Current Market Evaluation and Sales Yard Development - March 2016-March 2018
- Site Preparation and Construction – April 2018 – April 2021
- Commence Operation – May 2021
- Decommissioning and Reclamation – 2070+.

Please note that if the Project is subject to an EA by the CEA Agency, it can take up to one year (365 days) of government time to complete the EA starting when the Notice of Assessment is posted. Should the Project be subject to an EA by Review Panel, this period is two years. These timelines do not include time required by the Proponent to prepare reports and provide responses to Agency information requests.

3. Environmental Setting and Potential Environmental Effects

A number of environmental studies have been conducted on the property. The following sections describe existing conditions, potential environmental effects, and the proposed work plans to support the EA. The description of the environmental setting is based on regional data collected from a variety of sources and reconnaissance level and detailed field studies conducted on the property in 2010 and 2011. No larger scale, regional studies have been conducted as part of this Project.

3.1 Atmospheric Environment

The atmospheric environment includes air quality and sound quality.

3.1.1 Existing Conditions

3.1.1.1 Air Quality

Ambient air quality in Nova Scotia is monitored using a network of 13 sites operated by NSE and Environment Canada through the National Air Pollution Surveillance (NAPS) Network. Motor vehicles, electrical power generation, pulp and paper processing and oil refining are the major local sources of air pollutants in the province. Common air pollutants monitored regularly are SO₂, total particulate matter (TPM), particulate matter less than 2.5 microns in diameter (PM_{2.5}), particulate matter less than 10 microns in diameter (PM₁₀), carbon monoxide (CO), ground-level ozone (O₃), and nitrogen dioxide (NO₂). The closest NSE monitoring site to the Project site is located in Port Hawkesbury at the old Post Office, approximately 40 km from the site. In 2012, the station recorded ozone, nitrogen dioxide, nitrogen oxide and PM_{2.5} (Environment Canada 2013).

The Project area and Nova Scotia in general have good air quality due to the combination of maritime climate, relatively small population and limited industrial development (NSE 1998). Climate conditions provide good dispersion of air contaminants emitted by industrial processes. The ambient air quality also benefits from the mixture of relatively clean polar and arctic air masses. Occasionally though, long range transport of air masses from central Canada or the eastern seaboard may transfer contaminants into the area, resulting in occasional instances of poorer air quality.

The Project site is located in a rural setting with little industrial development; the closest industrial development is in Port Hawkesbury approximately 40 km east. Although they have not been specifically measured at the site, background or existing concentrations of common air pollutants (indicated above) are not expected to exceed provincial standards at the proposed Black Point Quarry site.

3.1.1.2 Sound Quality

As indicated above, the Project area is located in a rural setting with little industrial, commercial or residential development. The local region is generally a rural forested area dominated by natural sounds. There is occasional noise associated with forest resources harvesting, some recreational activity (all-terrain vehicle and snowmobile use, hunting), and noise associated with residential land use and traffic. A desktop survey using topographic maps indicates there are no residences within 500 m of the property boundary, one residence at 690 m, two within 750 m, seven residences within 875 m, 11 within 1.0 km, and fewer than 45 within 2.0 km.

3.1.2 Potential Environmental Effects

3.1.2.1 Air Quality

During site preparation / construction and operations phases, air contaminant emissions will occur primarily from operation of construction equipment (i.e., combustion emissions, and dust), drilling and blasting, and aggregate processing. Particulate emissions may be associated with earth/rock moving activities.

Emissions generated during site preparation and construction are expected to be relatively low and, at times, intermittent and of relative short duration. Emissions generated during operation of the quarry are related to rock excavation (i.e., dust from drilling and blasting and transport) and combustion emissions from equipment moving blasted rock and aggregate within the Project site for processing and loading for shipment to market, including emissions from ships berthed at the wharf and from generators required to operate the modular/portable processing plant, should it be required. Equipment will be maintained in good working order to ensure that emissions are within manufacturer's performance specifications. Dust will be managed effectively in dry periods using standard dust suppression best management practices (e.g., water trucks). Calcium chloride and other non petroleum products can also be employed when necessary.

3.1.2.2 Sound Quality

The site preparation and construction phase and the operation phase will generate noise from equipment operation, back-up alarms, drilling and blasting, and transport and loading of rock and aggregate throughout the site. The noise from blasting is expected to be generally confined to the Project site. Noise generated from blasting is expected to occur two to three times per week and will occur during daytime hours. The separation distance between blasting and the adjacent buildings and the short duration of a blast (i.e., a few seconds) is anticipated to mitigate potential noise concerns. Local residents who express interest will be informed of the blasting schedule and protocols related to the blasting safety. Given that the aggregate material will be transported to market via marine shipping, the noise typically associated with trucking along the transportation route will be eliminated.

3.1.3 Proposed Work Plan

No specific air quality testing is proposed to determine background or existing air quality since current air quality is well documented by existing monitoring networks.

A baseline 24-hour sound monitoring survey will be completed at two nearby noise receptors; at the nearest houses to the quarry (i.e., nearest to blasting operations); and at the entrance to the Project site on Route 16. The environmental effects of the Project on Sound Quality will be predicted using modeling in comparison with the baseline data, and will be included in the EIS. Should unacceptable sound levels be predicted at nearby receptors, the Proponent will develop mitigation strategies to ensure sound quality is maintained at acceptable levels.

3.2 Surface and Groundwater Resources

3.2.1 Existing Conditions

The Project site is in a rural area of Guysborough County where residences use private wells to obtain potable water. Fewer than 45 residences are located within 2.0 km of the proposed Project boundary. The location, depth, and water quality of any offsite residential wells are unknown at this time. The characteristics and location of any sub-surface aquifers are unknown at this time.

With the information currently available, the Project site contains three small unnamed watercourses and Fogherty Lake.

The Walsh or Wilkins Lake Designated Water Supply Area is located approximately 4.5 km southeast of the Project and is the municipal water supply for Hazel Hill and Canso. It is not located downstream in terms of surface water flow from the Black Point Quarry Property.

The regional geology consists of metamorphosed sedimentary rocks of the Halifax and Goldenville Formations that were later intruded by granite. It is these granite rocks that will be quarried to produce crushed stone aggregate. A significant amount of testing has been conducted on the granite to confirm its suitability as construction aggregate. Testing included analysis for acid rock drainage (ARD) potential, in accordance with the *Sulphide Bearing Material Disposal Regulations*, as ARD has both structural and environmental implications. Testing indicated that the concentration of sulphur / sulphide in the granite is well below the threshold indicated in the *Regulations* and is therefore considered non-acid producing.

Halifax Formation slates, which are often sulphide-bearing, and Goldenville Formation quartzite and greywacke are present within the Project area at the northern end of the site. Although they will not be quarried for aggregate, these formations may be disturbed for construction of the laydown area and/or the marine terminal. Samples were collected from these formations in 2011 for ARD analysis. Five of the six surface samples reported sulphide content below the 0.4% threshold stipulated in the *Regulations*. One sample had sulphide content above the threshold (i.e., 0.935%); however, the material was found to contain some neutralizing capacity with a pH of 7.4. From all indications, the Goldenville Formation rocks on site are sulphide-free and are proposed for use as rubble-fill in construction of the marine terminal. The Halifax Formation, which may contain sulphides appears to exist only in a small band across the site and will be avoided to the extent possible. The Proponent will work with NSE and NSDNR to confirm that all regulatory requirements are met and will make every effort to avoid/minimize exposure of ARD-generating rock.

3.2.2 Potential Environmental Effects

The physical nature and extent of interactions of the Project with the local groundwater and surface water resources are not known at this time; however, these will be identified and confirmed (see discussion below). This will include the potential for encountering ARD during construction or operation.

3.2.3 Proposed Work Plan

The study team will identify and delineate all relevant watersheds and the location and characteristics of all water bodies within the Project area. A desktop hydrological assessment, including delineation and characterization of watersheds and drainage areas to each watercourse, supplemented by field observations and measurements, will be conducted to evaluate the potential effects of the quarry on water quality and quantity, including storm water runoff and spills from construction and operation.

The study team will also conduct a baseline study to identify groundwater aquifer characteristics and the zone of influence of the quarry operation to determine if and to what extent the Project could interact with residential wells in the vicinity of the Project. A conceptual hydrogeology model for the site will be developed which will include available information supported by water level and flow measurements at the site. The baseline groundwater study will include:

- A review of the physical geography and the geology of the area as it pertains to local and regional groundwater flow systems and aquifer/aquitard systems in the quarry area;
- The physical properties of hydrogeological units;
- Bedrock fracture sizes and orientations in relation to groundwater flow and identification of any preferential flow-paths for groundwater;
- Hydro-geologic maps for the quarry area to outline the extent of aquifers, including fracture zones of bedrock, locations of wells, springs, potentiometric contours, and flow direction;

- Groundwater flow patterns, identifying recharge and discharge areas, and identifying groundwater interaction with surface waters; and,
- A description of any local and regional potable groundwater resource in the area, including:
 - its current use and potential for future use;
 - the location and proximity of nearby drinking water wells to the project site and associated Parcel Identifiers;
 - well record data.

Based on evaluation of rock samples from exploration corings, the potential for disturbance or exposure of ARD-generating rock is low in the laydown area and non-existent within the quarry. This will be further documented in the EA in accordance with the *Sulphide Bearing Material Disposal Regulations*.

The overall study will produce a comprehensive understanding of the groundwater and surface water dynamics at the site along with the potential effects to the identified surface and groundwater receptors. This data will be used to carry out the environmental effects assessment in the EIS.

3.3 Fish and Fish Habitat

Fish and fish habitat includes freshwater fish and fish habitat as well as marine fish and fish habitat. Watercourse locations are provided in **Figure 6**.

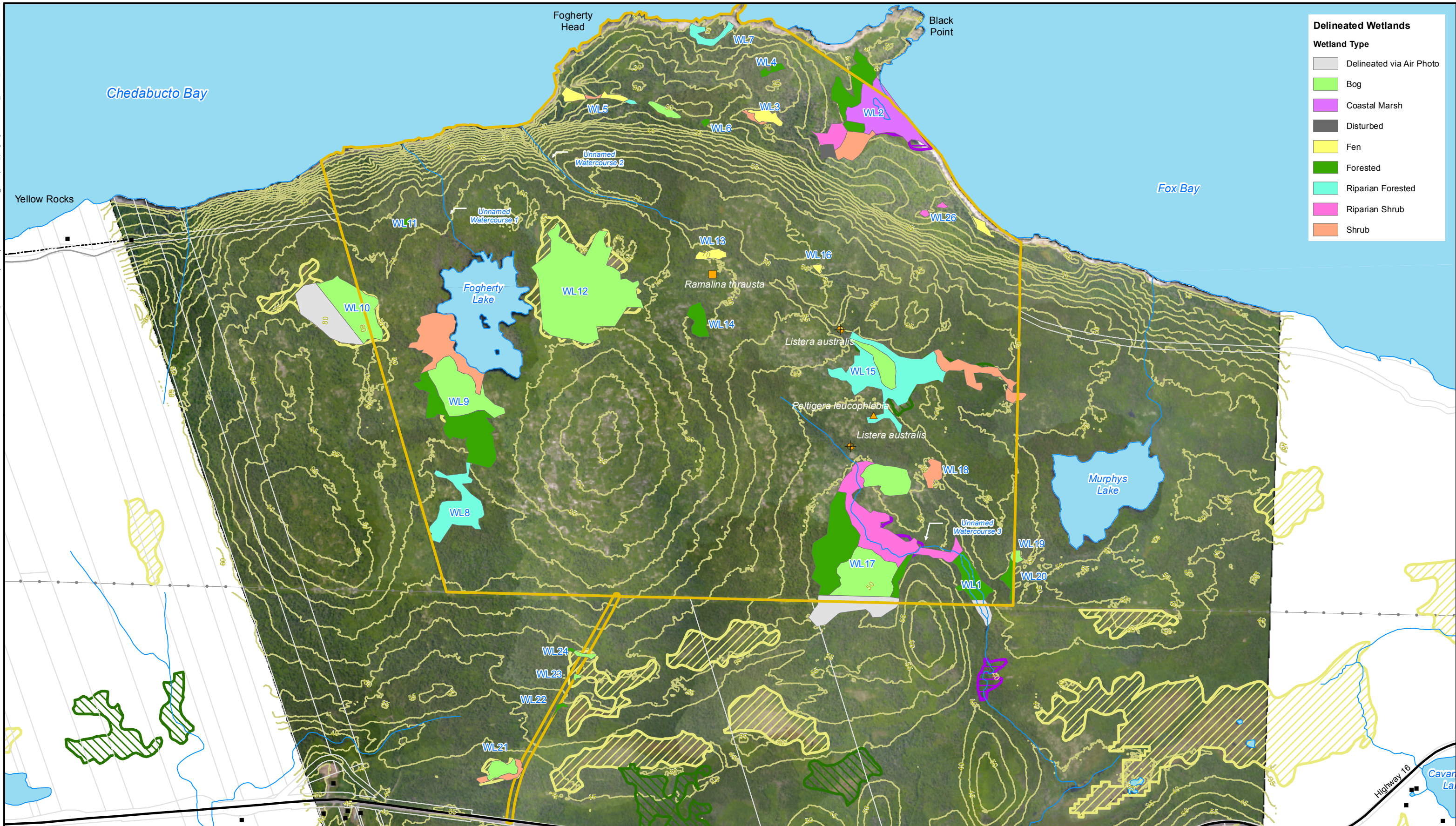
3.3.1 Existing Conditions

3.3.1.1 Freshwater Fish and Fish Habitat

Habitat assessment and fish community surveys were conducted by AMEC field personnel with experience in fish habitat assessment methods on Fogherty Lake and three unnamed watercourses. These freshwater habitats were identified using topographic mapping and aerial photography (AMEC 2011). Field work was conducted during two site visits, on August 24th to 26th and September 20th to 22nd, 2010.

The habitat assessments included physical dimensions and characteristics and field-measured water quality parameters (pH, conductivity, water temperature and dissolved oxygen) of the lake and watercourses. Water samples from each water body were collected and sent for analysis for general chemistry, total metals (including mercury), total suspended solids, and low-level phosphorous.

Fish sampling under DFO license was conducted in Fogherty Lake and the three unnamed watercourses. The sampling consisted of five-minute spot checks with a backpack electrofishing unit to determine presence or absence of fish species. Two multi-panel gillnets, with mesh sizes ranging from 2.5 cm to 10 cm, were deployed on Fogherty Lake for two hours on August 27, 2010. In addition, four minnow traps were baited with dry cat food and placed in shallow water near the shore of the lake for a total of four hours.



Delineated Wetlands

Wetland Type

- Delineated via Air Photo
- Bog
- Coastal Marsh
- Disturbed
- Fen
- Forested
- Riparian Forested
- Riparian Shrub
- Shrub

REFERENCES:
 Base data is from NSDNR (2010), GeoNova (2009), GeoBase (2007). Wetland data from NSDNR (2007). Property Boundary from SNS (2011). Access Road location provided by AECOM (2011). Rare plant and Lichen locations from AMEC report (2011). Imagery and LIDAR derived contours from Leading Edge Geomatics (2011). Delineated Wetlands from AECOM (2011).



Map Features

 Building	 Cut Line (> 100m long & < 20m wide)	 Transmission Line	 Waterbody
 Approximate Lichen Location	 Major Road	 Property Boundary	 NSDNR Wetland
 Ramalina thrausta	 Secondary Road	 Study Area Boundary	 Bog or Fen
 Peltigera leucophlebia	 Tertiary Road	 Contour Line	 Marsh
 Approximate Rare Plant Location	 Watercourse	 Swamp	 Swamp
 Listera australis			

N

0 200 400 600
Meters

DATE: February 17, 2014
 SCALE: 1:12,000
 JOB NO.:
 REVISION: 9
 DRAWN: CA-SEG

Figure 6 - Wildlife Habitat and Known Locations of Species of Concern

Proposed Black Point Quarry Project
 Morien Resources Corp.

Fogherty Lake is a shallow lake surrounded by trees, barrens and exposed rock. The water is clear but darkly tea-coloured, and visibility is nil at approximately one metre depth. The lake substrate is exposed bedrock and large boulders. There is some woody organic debris on the lake bed, which has a strong sulphurous smell. Vegetation surrounding the lake includes leatherleaf (*Chaemodaphne calyculata*), sheep laurel (*Kalmia angustifolia*), possumhaw viburnum (*Viburnum nudum*), rhodora (*Rhododendron canadense*), chokeberry (*Photinia* sp.) Labrador tea (*Ledum groenlandicum*), bunchberry (*Cornus canadensis*) black spruce (*Picea mariana*) and tamarack (*Larix laricina*). Yellow water lily (*Nuphar lutea*) was observed growing in the lake. Water in this lake was found to be very acidic (pH measured in field = 2.94) and dark tea-coloured. No fish were seen or caught in Fogherty Lake, although a few insect species were found in and around the minnow traps, namely dragonflies, damselflies, mayflies, whirligig beetles, caddisfly larvae, and giant water bugs.

Watercourse 1 is the outlet of Fogherty Lake which flows into Chedabucto Bay to the north. A beaver dam is located near the upstream end of the watercourse. On the upstream side of the dam, the channel is deep and wide and the substrate consists largely of fines; downstream of the dam, the channel is a relatively narrow and shallow run with one area of natural dead water. The northernmost 150 m of this watercourse was not surveyed, as it flows down a very steep slope; however, the dimensions and substrate of the downstream reaches appeared to be similar to the run portions of the channel.

Watercourse 2 originates in a steep valley in the north of the Project Site, and flows in a northwesterly direction to the Bay. There was a great deal of deadfall in the channel valley. The upstream reaches were dry at the time of the survey, and further downstream the stream was very shallow; this watercourse is probably ephemeral. The last 220 m of this watercourse were inaccessible, as it flows down a steep slope to the Bay, like Watercourse 1. The dimensions and substrate of the downstream reaches appeared to be similar to the rest of the channel.

Watercourse 3 originates in the southeast portion of the Project Site, flows through softwood forest and fen habitat, and ultimately discharges into Hendsbee Lake, south of the Project Site. The downstream portion of the assessed section is a large pool resulting from a beaver dam just south of the Site property line.

Five minute electrofishing spot-checks were conducted on Watercourses 1 and 3; Watercourse 2 was too shallow to fish. No fish were observed in either watercourse during the electrofishing and habitat assessments. Other AMEC field personnel reported seeing a small unidentified fish approximately 2 cm in length in Unnamed Watercourse 3. Based on habitat limitations, it is unlikely that this was a juvenile salmonid; the pH values measured at the Site range from 2.9 to 3.5, and fish passage to the ocean is impossible due to the steep terrain at the north of the Site (AMEC 2011).

A fourth ephemeral watercourse was identified on the Project Site near the western property boundary. This watercourse appears to drain Wetlands 8 and 9 when water levels are high. It was not surveyed, as it is well away from the proposed Project footprint. A spot check showed the water pH to be 2.65, too acidic to support fish.

In summary, neither Fogherty Lake nor any of the unnamed watercourses present on the site contain suitable fish habitat due to acidic conditions.

3.3.1.2 Marine Fish and Fish Habitat

Three types of marine surveys were conducted by AMEC on the proposed marine footprint of the Project including a benthic habitat survey (i.e., underwater video), a marine invertebrate community survey, and a marine sediment survey. Surveys were conducted between August 31 and September 3, 2010.

A total of six video transects covering 1,200 m of substrate were collected using an underwater video camera operated by a diver. The marine substrate within the characterized area consists primarily of cobble, rock, and large boulders. Lesser amounts of sand and silt were observed throughout the transects.

The hard bottom and algal cover (please see 'Marine Plants' next section) provide habitat for many species. The most common species noted included deep sea scallop (*Placopecten magellanicus*), blue mussel (*Mytilus edulis*), green sea urchin (*Strongylocentrotus droebachiensis*), and American lobster (*Homarus americanus*). Fish species noted along the transects were cunner (*Tautoglabrus adspersus*) and shorthorn sculpin (*Myoxocephalus scorpius*). Other invertebrate species observed along the transects included American oyster (*Crassostrea virginica*), northern rock barnacle (*Semibalanus balanoides*), Bowerbank's halichondria (*Halichondria bowerbanki*), frilled anemone (*Metridium senile*), periwinkle (*Littorina sp.*), sea cucumber (*Cucumaria frondosa*), sea peach (*Holacynthia pyriformis*), sea star (*Asterias sp.*), and waved whelk (*Buccinum undatum*).

For the marine invertebrate community survey, samples were selected from a grid using a random number generator software program. A total of six samples were collected by divers. Samples were shipped to BioTech Inc. (Smithtown, NB) for benthic invertebrate identification and enumeration. The total number of organisms collected at each sample station (density) ranged from 109 organisms to 318 organisms. The number of major taxonomic groups represented ranged from 17 to 47. Three phyla and twelve classes were identified within the collected samples. The most prevalent taxa were the annelid worms (Polychaetes) and molluscs (Gastropods). The most common polychaetes identified include the worm Aricidea (*syn. Acmira*) catherinae, sinistral spiral tubeworm (*Spirobia borealis*) and cirratulids (*Tharyx spp.*). The most prevalent bivalve species included the common tortoiseshell limpet (*Tectura testudinalis*) and interrupted turbonille (*Turbonilla interrupta*).

The sediment samples were obtained from the same well-mixed sample of substrate as the benthic invertebrate sample in accordance with Environment Canada's publication *Guidance Document on Collection and Preparation of Sediments for Physicochemical Characterization and Biological Testing, December 1994*. Three of the six samples were analyzed for a suite of parameters including mercury, chromium, low level polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs); low level benzene, toluene, ethylbenzene, and xylene (BTEX), total petroleum hydrocarbons (TPHs), total organic and inorganic carbon, total dichloro-diphenyl-trichloroethane (DDT), and grain size. Results of the analyses were compared to CEPA Disposal at Sea Regulations, CCME guidelines, and Atlantic Risk-Based Corrective Action (RBCA) Tier 1. None of the analysed parameters exceeded any of these guideline limits.

3.3.1.3 Marine Plants

The high proportion of hard bottom supports a considerable diversity of both floral and faunal species (AMEC 2011). Algal cover is sparse (0-10%) in deeper waters but increases markedly (50-90%) as the transects approached the near shore areas. The algal canopy is dominated by the brown algal species black whip weed (*Chordaria flagelliformis*), bladderwrack (*Fucus sp.*), and sea colander (*Agarum clathratum*). Of note, green fleece (*Codium fragile*), an invasive species in Nova Scotia (Invasive Species Alliance of Nova Scotia, 2011), was found. This species has been previously reported from around the Canso area (Watanabe et al. 2010). Other marine plant species noted during the video transects included red alga (*Leptophyllum sp.*), green alga (*Acrosiphonia arcta*), Irish moss (*Chondrus crispus*), kelp (*Laminaria saccharina*) and tube weed (*Polysiphonia lanosa*). None of these plants are listed in the *Species at Risk Act*.

3.3.2 Potential Environmental Effects

There is potential for the Project to have direct and indirect effects on these water bodies due to quarrying operations, dewatering and accidental events; however, given the lack of fish and the poor habitat quality, there is

limited potential for the Project to result in environmental effects on freshwater fish and fish habitat. The EIS will assess the potential indirect effects as well as any direct effects should the footprint change.

Construction of the marine terminal is anticipated to result in the destruction of marine fish habitat (and by extension, marine plants) through direct loss of sea bottom and water column habitat in the zone occupied by the terminal. Harm to or death of fish may occur during construction from the placement of terminal infrastructure or the re-suspension of bottom sediments. Harm or death to fish may also occur during operation from collisions or other interactions with vessels, accidental aggregate spillage, or other accidents or malfunctions (e.g., fuel spills). Other aquatic species that may be present in the marine environment, such as marine plants, whales, turtles and seals, may also be exposed to harm during construction and operation. Potential impacts from shipping are presented in section 1.5. The EIS will assess the significance of the habitat lost after mitigation is implemented and will discuss opportunities for compensation of such in consultation with DFO.

3.3.3 Proposed Work Plan

Additional water bodies were identified in the Project area during subsequent field studies. These watercourses will be assessed as above. It is believed that most if not all of these additional watercourses are intermittent.

Morien is currently considering different locations for the marine terminal. As needed, part or all of the marine surveys described above can be extended to the alternate location if additional information is required.

3.4 Vegetation

A number of field surveys were carried out by AMEC in order to describe existing plant communities and habitats, identify wetlands, and to confirm presence or absence of rare plants within the Project site. Surveys for rare vascular plants were timed to cover both early and late plant appearances. They were carried out between June 22 and June 25, 2010 (early summer); and between August 31 and September 8, 2010 (late summer). The surveys focused on habitats suitable for potential vascular plant species at risk. Habitats with high potential for species at risk include freshwater and marine wetlands, as well as floodplains of streams and rivers. Forest habitats, except forests in flood plains, are estimated to have medium to low potential for rare vascular plants (AMEC 2011).

3.4.1 Existing Conditions

An inventory of plant species present on the Project site was established in order to describe the existing habitat. Five main habitat types were 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 number of other habitat types were also encountered within the Project site including beaches, coastal barren headlands, coastal cliffs, regenerating forests, and lakes.

One vascular plant species of conservation concern was detected on the Project site. Southern twayblade (*Listera australis*) is listed as



Red by NSDNR and has an Atlantic Canada Conservation Data Centre (ACDC) rarity rank of S1. This species was encountered along two streams located within the Project Area. One location contained over 40 individuals within a relatively small area whereas only one individual was found at the second location (**Figure 6**).

No plant species at risk listed by SARA, COSEWIC or in the Nova Scotia *Endangered Species Act* (NESA) were identified in the field during the two vegetation surveys.

In addition to the vascular plant surveys conducted, lichen surveys were conducted, with a focus on cyanolichens. Cyanolichens are reportedly sensitive to air quality changes (Richardson 1988) and are the only group of lichens given status rankings by the Nova Scotia Department of Natural Resources (NSDNR General Status Ranks of Wild Species 2010). Field surveys for cyanolichens were conducted by traversing through and around the proposed Project site, visiting all habitat types. An AMEC lichenologist examined potential substrates, such as tree trunks, branches, soil, and rock and recorded all cyanolichen species observed. Particular attention was paid to potential suitable habitat for cyanolichen species of concern, such as shaded, humid locations and mature red maples (*Acer rubrum*) growing in and around wetlands. A total of nine species of cyanolichen were detected during the field survey. Several additional non-cyanolichen species were also observed. None of these species have been assigned status ranks by NSDNR.

Mature balsam fir trees (*Abies balsamea*) on north-facing slopes were also examined as they may support the boreal felt lichen (*Erioderma pedicellatum*). This species is an epiphytic cyanolichen listed as endangered under both the SARA and the NESA and red-listed by NSDNR. The AMEC lichenologist consulted the boreal felt lichen predictive habitat mapping maintained by Nova Scotia Environment (Robert Cameron, NSE, pers. comm. April, 2010) to determine if there was any potential boreal felt lichen habitat on the site which would warrant further investigation. The mapping indicated there are no areas of potential habitat for this species on the site.

A single cyanolichen species of concern was detected on the site. A specimen of *Peltigera leucophlebia* was observed (Figure 6). This species is yellow-listed by NSDNR, indicating it is vulnerable to natural or anthropogenic events. ACCDC ranks this species as S4S5. A second uncommon lichen (though not a cyanolichen), *Ramalina thausta*, was also found on the site. ACCDC ranks this species as S2S3 (**Figure 6**).

3.4.2 Potential Environmental Effects

There is potential for the Project to interact with plant species of special concern. Wherever possible, Project components and activities will avoid the locations where plant species of special conservation status were identified. If and where avoidance is not possible, the plants may be lost. The EIS will assess the significance of the loss of individuals relative to the local population and to the prevalence of species locations outside the Project. Appropriate mitigation will be developed in consultation with NSDNR.

3.4.3 Proposed Work Plan

It is acknowledged that an ACCDC data request was not conducted prior to the 2010 field surveys. The ACCDC data request was conducted in December 2010, in advance of the overwintering bird survey. The search, which covered a radius of 100 km from the site, returned 157 rare or uncommon plant species⁴. The habitat requirements of these species will be compared to the habitats present in the Project area to determine if suitable habitat is present for these species. In instances where appropriate habitat is present for a particular species, that species will be considered potentially present and the suitable habitat in the Project area will be identified as a target for further

⁴ A second ACCDC data request was submitted in January 2014 using a 5.0 km radius around the geographic centre of the property. No terrestrial plants or animal species of conservation concern were identified within this radius. The data request returned four listed bird species: the barn swallow (COSEWIC "threatened/provincial "endangered"); common loon (provincial "may be at risk"); pine grosbeak (provincial "may be at risk") and common murre (provincial "secure").

investigation during future field surveys. These data will be used to carry out the environmental effects assessment in the EIS.

3.5 Wetlands

Wetlands are an important feature of the landscape and perform many biological, hydrological, socio / cultural and economic production functions which are of value to society. Wetlands provide habitat for a variety of plant and animal species, many of which depend on wetland habitats for their survival.

3.5.1 Existing Conditions

Prior to conducting field surveys for wetlands, the study team conducted a desktop study to identify potential wetland locations within the Project site using available information such as the Nova Scotia Wetland Database (NSDNR 2000), Nova Scotia Wet Areas Mapping (NSDNR 2009), and topographic mapping. Field surveys consisted of visiting all areas identified during the desktop study as known wetland locations as well as areas having the potential to contain wetlands. Areas identified as “dry” during the desktop study were also verified in the field to ensure there were no wetlands located in these areas.

The study team utilized standard wetland criteria to identify wetlands. To be considered a wetland, a site must meet the following three criteria:

- A majority of dominant vegetation species are wetland associated species;
- Hydrologic conditions exist that result in periods of flooding, ponding, or saturation during the growing season; and,
- Hydric soils are present.

The study team selected the methodology of the Canadian Wetland Classification System to identify wetland classes, forms and types (National Wetland Working Group 1997).

A total of 26 wetlands were identified and delineated within the Project site and along the proposed access road including six wetlands previously identified in the NSDNR Wetland Database and 20 additional field identified wetlands (**Figure 6**).

Table 3.1 Wetland Types and Size Identified on the Black Point Project Site

Wetland Number	Wetland Type	Wetland Area Within the Proposed Project Boundary (ha)	Total Wetland Area (ha)
1	Forested	1.16	1.42
2	Complex (coastal marsh, shrub swamp, forested, riparian shrub)	5.18	5.78
3	Fen, Shrub	0.46	0.46
4	Forested	0.19	0.19
5	Fen with Riparian Forest and Shrub Swamp	0.51	0.51
6	Bog / Forested	0.32	0.32
7	Riparian Forested	0.48	0.48
8	Riparian Forested (contiguous with WL 9)	2.17	2.17
9	Bog with Forested and Shrub Swamp (contiguous with WL 8)	8.09	8.09
10	Bog	0.65	4.62
11	Forested	0.08	0.08
12	Bog	8.98	8.98

Wetland Number	Wetland Type	Wetland Area Within the Proposed Project Boundary (ha)	Total Wetland Area (ha)
13	Fen	0.27	0.27
14	Forested	0.57	0.57
15	Complex (bog, riparian forested, shrub)	6.16	6.23
16	Fen, Disturbed	0.06	0.06
17	Bog bounded East and West by Forested and Riparian Shrub to the North (contiguous with WL 18)	10.36	11.69
18	Bog with Shrub to the East (contiguous with WL 17)	1.78	1.78
19	Bog	0.04	0.13
20	Forested	0.30	0.32
21	Bog with Shrub	0.06	0.74
22	Forested	0.02	0.07
23	Bog	0.01	0.04
24	Bog with Forested	0.03	0.15
25	Fen	0.19	0.19
26	Riparian Shrub	0.10	0.10
	Total	48.21	55.44

All wetlands were delineated in accordance with standard and accepted methods / protocols (i.e., US Army Corps of Engineers Wetlands Delineation Manual). The wetland survey crews used standardized wetland field data sheets to document the wetland information collected in the field, which included information on vegetation assemblages, inundation, wildlife and disturbance. Detailed habitat sketches and photographs were also taken for each wetland to document the wetland components (i.e., inflow, outflow, standing water, vegetation communities, etc.).

3.5.2 Potential Environmental Effects

To the extent possible, Morien will make every effort to locate Project components outside and away from wetland habitat; however, given the number of wetlands on the Project site and their locations, it is anticipated that some wetland habitat will be lost and / or altered as a result of the Project. In Nova Scotia, wetlands are protected under the *Activities Designation Regulations* made pursuant to the provincial *Environment Act* and are further managed and protected by the recently released Nova Scotia Wetland Conservation Policy (NSE 2011). With a few exceptions, as specified in the Policy, the loss or alteration of wetland habitat requires a Water Approval Permit. To support the application, a functional assessment of the wetland must be provided to establish the functional attributes of the wetland. In accordance with the Policy, wetland compensation will be required to compensate for the loss of wetland habitat and/or function. Through the permitting process, regulatory agencies typically enforce a hierarchy of mitigation: avoid, minimize and mitigate, and compensate. As such, significant environmental effects on wetlands are not anticipated provided that appropriate compensation for loss of wetland function is negotiated. Morien would like to involve local conservation groups and/or high school sciences classes in coordinating and implementing design and execution of the compensation plans where possible and appropriate.

3.5.3 Proposed Work Plan

In addition to the work already conducted, functional assessments will be conducted for all potentially affected wetlands, as required, to support the assessment of environmental effects as well as to support future applications for Water Approval.

3.6 Wildlife

Wildlife includes wildlife (i.e., birds, odonates, mammals and herpetiles) and wildlife habitat (e.g., managed / designated areas).

3.6.1 Existing Conditions

3.6.1.1 Birds

Bird surveys were conducted by AMEC during the times of the year when birds make the most intensive use of the area. Survey times were chosen based on known breeding and migration periods, and all habitats used by the targeted birds were surveyed at appropriate times of the year to maximize the quality and quantity of data obtained. Surveys were conducted at the time of day with the highest likelihood of detecting the target species (e.g., early morning for breeding passerines, and during the appropriate parts of the tidal cycle for shorebirds), in favourable conditions to maximize detection probability (low winds, no precipitation), and using ideal methods depending on the breed and season (i.e., point count, play back, observations). Bird species, abundance and geographical location were recorded during each of the site visits. Survey dates and primary targets were as follows:

- April 14th, 2010: owls and other early breeders;
- May 18th – 19th, 2010: main passerine migration and early breeders;
- June 22nd – 23rd, 2010: main passerine breeding;
- August 25th, 2010: early shorebird migration;
- September 23rd, 2010: main shorebird migration; and,
- January 18th and 19th, 2011: overwintering birds.

Two owl species were heard during the early morning owl survey in the southwest corner of the site: Northern Saw-whet Owl (*Aegolius acadicus*) and Barred Owl (*Strix varia*). The remaining surveys returned the following results:

- A total of 19 species were encountered during the day-time bird surveys in April;
- A total of 407 birds, representing 41 species were observed or heard during the May migration and early breeding surveys;
- A total of 240 birds, representing 46 species, were detected during the June breeding bird surveys;
- During the August 25 and September 23 surveys, five shorebird species were observed in small numbers feeding on the shores of the study area;
- An additional 20 species were also observed on the Project site during the fall surveys; and,
- A total of 16 species were heard or observed during the January overwintering bird survey.

Four species listed by NSDNR as Yellow or sensitive to anthropogenic or natural events were found on the site (Table 3.2). Another seven listed as S3 or lower for some part of the population or life history (i.e. migration or breeding) were found.

Table 3.2 Species of Concern / Sensitive Species Identified During Field Surveys

Common Name	Binomial	NSDNR Status	ACCDC Rank
Boreal Chickadee	<i>Poecile hudsonica</i>	Yellow	S3
Common Loon	<i>Gavia immer</i>	Yellow	S3B,S4N
Gray Jay	<i>Perisoreus canadensis</i>	Yellow	S3S4
Rusty Blackbird	<i>Euphagus carolinus</i>	Yellow	S2S3B
Greater Yellowlegs	<i>Tringa melanoleuca</i>	Green	S3B,S5M

Common Name	Binomial	NSDNR Status	ACCDC Rank
Red-breasted Merganser	<i>Mergus serrator</i>	Green	S3B,S5N
Semipalmated Sandpiper	<i>Calidris pusilla</i>	Green	S3M
Spotted Sandpiper	<i>Actitis macularius</i>	Green	S3S4B
Least Sandpiper	<i>Calidris minutilla</i>	Green	S1B,S5M
Semipalmated Plover	<i>Charadrius semipalmatus</i>	Green	S1S2B,S5M
Great Cormorant	<i>Phalacrocorax carbo</i>	Green	S3

3.6.1.2 Odonates

Odonates (dragonflies and damselflies) were surveyed on the site in June and July 2010 by local odonate expert Paul Brunelle, assisted by AMEC staff. Additional specimens were collected during August and September 2010 by AMEC staff, and added to Brunelle's report. A single odonate species of concern was observed during the 2010 field surveys. The spot-winged glider (*Pantala hymenaea*) is a large dragonfly species which is migratory in northeastern North America (Brunelle, 2011). It is listed as Yellow by NSDNR meaning it is sensitive to anthropogenic or natural impacts. Globally, the spot-winged glider is listed as G5, and sub-nationally as S5B. A specimen was observed near shallow bog pools in Wetland 12 engaging in mating behaviour. However, it is not known if such bog pools are suitable for larval development of the fast-growing larvae of this genus (Paul Brunelle, pers. comm 2010.).

3.6.1.3 Mammals

Mammal surveys were conducted simultaneously with surveys for other taxonomic groups and wetlands surveys on the site throughout the 2010 and 2011. All evidence of mammal species such as sightings, tracks, vocalizations, tufts of hair, scat, and skeletal remains were recorded. Mammals recorded during the surveys include: Red Squirrel, Eastern Chipmunk, American Beaver, North American Porcupine, Eastern Coyote, Black Bear, Short-tailed Weasel, Varying Hare, and White-tailed Deer. Other mammals such as Bobcat, Raccoon, and Red Fox are commonly present along with small prey species such as shrews, voles, and mice. The surveys returned no rare or sensitive mammal species.

Two species of marine mammals were observed by AMEC staff off the site during field surveys in 2010: the northern minke whale (*Balaenoptera acutorostrata*) and gray seal (*Halichoerus grypus*). Other marine mammal species are expected to occur in Chedabucto Bay, such as the long finned pilot whale (*Globicephala melas*), the fin whale (*Balaenoptera physalus*), the common dolphin (*Depphinus delphis*) and the Atlantic white sided dolphin (*Lagenorhynchus acutus*). The harbour seal (*Phoca vitulina*), harp seal (*Phoca groenlandicus*) and white hooded seal (*Cystophora cristata*) may also be present at certain times of the year.

No bats were observed during the 2010 and 2011 mammal surveys. However, a dedicated bat survey using bat sonar detection methods was not completed for the Project area. The Nova Scotia Bat Conservation (a partnership between NSDNR and Mersey Tobeatic Research Institute) has compiled bat sightings in the province and record four bat sightings within approximately 10 km of the Project area. A large bat concentration is identified in the Canso area (NSBC 2013). The little brown bat (*Myotis lucifugus*), northern myotis (*Myotis septentrionalis*) and the tri-coloured bat (*Perimyotis subflavus*) are listed as endangered by COSEWIC and are protected in Nova Scotia under the *Endangered Species Act*.

3.6.1.4 Herpetiles

Herpetile (reptile and amphibian) surveys were conducted simultaneously with surveys for other taxonomic groups and wetlands on the site throughout 2010 and 2011. All evidence of herpetile species such as sightings,

vocalizations, cast skins (snakes), skeletal remains, egg masses, or larval stages was recorded. Seven herpetiles species were identified, namely: Yellow Spotted Salamander, American Toad, Spring Peeper, Green Frog, Maritime Garter Snake, Northern Leopard Frog, and Bullfrog. The surveys returned no rare or sensitive herpetile species.

3.6.1.5 *Wildlife Habitat*

The Significant Species and Habitat Maps and the Restricted and Limited Land Use map maintained by NSDNR show a number of features in proximity to the Project area such as protected beaches, designated water supply areas and parks (see Section 3.8.1). The mapping also identifies two wilderness areas in proximity to the Project:

- Bonnet Lake Barrens Wilderness Area (6.9 km southwest); and,
- Canso Coastal Barrens Wilderness Area (1.7 km south and east).

In addition to the above, the entire coastline west to Guysborough and east to Canso is known to potentially have Harlequin Ducks, a designated species at risk (Mark Pulsifer, NSDNR Biologist, pers. comm. July 28, 2011). No Harlequin Ducks were observed during any of the field surveys conducted to date in support of the Project.

3.6.2 Potential Environmental Effects

Clearing of vegetation and grubbing of land for quarry development can result in the loss of wildlife and habitat and the disruption of wildlife species during critical life stages. To minimize these effects and to maintain habitat as long as possible, clearing will be kept to a minimum. Clearing activities will take place outside of the breeding season for most bird species (April to August), to the extent possible, to prevent the disturbance of migratory birds or their nests. If clearing is necessary during the breeding season, a contingency plan will be applied including nest surveys and exclusion of activities from active nesting areas to ensure compliance with *Migratory Birds Convention Act, 1994* (MBCA).

There is also the potential to negatively interact with migratory birds during project operation. Noise generated at the Project site will include blasting several times per week, rock transport to the plant, activities at the processing plant (primarily crushing and washing) and load-out to the waiting ship. These noise sources, as well as noise generated by the ships themselves, may negatively affect migration, feeding, nesting, breeding and other behaviours. Project lighting within the quarry, at the processing plant, and at the marine terminal also has the potential to interfere with migrating birds and negatively affect their health and life cycles.

The Project will not interact with the two Wilderness Areas due to the considerable separation distance of at least 1.7 kilometres.

3.6.3 Proposed Work Plan

As the EA proceeds, provincial and federal agencies (e.g., NSDNR and Canadian Wildlife Service) will be consulted regarding the results of the field surveys and the mitigation required to minimize environmental effects. Existing data sources and consultation with government officials and locals will provide additional information to support the assessment of marine mammals and bats.

3.7 Local Economy

3.7.1 Existing Conditions

The proposed Project is located in Guysborough County, NS. Guysborough County is located on the northeastern shore of mainland Nova Scotia. The county has a number of small rural coastal and island communities with

populations typically less than 300 people. Statistics Canada population data indicate the County was home to 8,143 residents in 2011.

Accounting for over half of the land area in Guysborough County, the Municipality of the District of Guysborough (MODG) is a large, economically diverse area whose economy incorporates the fisheries, aquaculture, agriculture, forestry, mining and oil and gas, tourism, as well as the public service sector. The MODG, which occupies the eastern portion of Guysborough County, includes three population centers: the towns of Mulgrave, Guysborough, and Canso.

Since the collapse of the ground fishery in the 1990s, significant changes have occurred in the population and economy of the region. Guysborough County as a whole has the fourth largest proportion of out-migration patterns in Nova Scotia (ACOA 2009). The Town of Canso, in particular, has experienced a dramatic population loss and shift in demographic profile. From 1996 to 2006, the population of the town declined 19%, from 1,127 to 915 compared to a population gain of 0.5% for the province as a whole (Gardner Pinfold 2011).

A telling indicator of how community demographics are changing is the number of children enrolling in local schools. Enrollment in schools has been declining in the Province of Nova Scotia for some time. From 1996 to 2006, school enrollment across the province dropped approximately 11%. The MODG saw a 19% drop over the same period while the Town of Canso outpaced both the province and the region with a decline in enrollment of nearly 30% (Gardner Pinfold 2011).

Another telling indicator of a community's economic health is labour participation rate. In 2001 Canso's labour participation rate was at 60.5% close to the provincial average of 61%, by 2006 the number of people participating in the job market dropped to 44%, a decline of nearly one-third from 2001 (Gardner Pinfold, 2011) which is indicative of significant out-migration and an aging population.

The rate of employment in the regions has also seen much volatility. The overall volatility in employment in the Town of Canso from 1996 to 2006 was reflected in notable changes across a number of key industries. The hardest hit sector over the ten-year period was manufacturing, which saw a near total loss of employment (-86%) attributable to the decline and closure of the local fish processing plant, the town's major employer. A number of other sectors experienced major declines in employment over the same period, including transportation and storage (-67%); other services (-63%); and accommodation, food and beverage (-50%) (Gardner Pinfold 2011). In consideration of the severity of the economic state of the Town of Canso, Town Council voted to dissolve Canso's status as an independent town in 2011.

Although unemployment in the region remains high, most employment comes from crab and lobster fishing; small scale forestry operations (e.g., Christmas tree farms); and the Milford Haven Corporation Home for Special Care in Guysborough. The Aulds Cove Quarry is the third largest employer in the Municipality, employing approximately 100 people. The area is also slated to host the Goldboro Liquefied Natural Gas Project which will provide a significant tax base to the region (MODG 2011).

3.7.2 Potential Environmental Effects

The proposed Black Point Quarry would provide many family-waged jobs to Guysborough and surrounding communities. Based on a study by economics firm Garner Pinfold, an estimated 155 persons would be directly and indirectly employed in Guysborough County during the site development phase which would include marine terminal and aggregate plant construction. An estimated 123 direct and indirect full-time jobs (60-100 full-time direct) would be created during the peak operation phase of the quarry with an estimated output of 7.5 million tonnes of material per year. Peak production is estimated to occur within approximately 10 years of quarry development. All employment estimates were determined by a third party consultant (Gardner Pinfold 2010).

Mining jobs pay a premium over many other occupations. In fact, according to Open File Report ME 2008-1 completed in May 2008 by Gardner Pinfold Consulting for NSDNR, mining ranks number one in Nova Scotia in terms of weekly wages paid relative to other resource sectors such as forestry, fisheries and tourism, averaging over \$1,000/week. Occupations that pay well above the average are considered family-wage based jobs, something every jurisdiction attempts to attract.

3.7.3 Work Plan

To complete the assessment of the effects of the Project on the local economy, the study team will conduct a desktop review and undertake stakeholder consultation to update and supplement work and research already completed.

3.8 Land and Resource Use

3.8.1 Existing Conditions

The Project area is located in Guysborough County, approximately 10 km west of Canso, along the shores of Chedabucto Bay. The Project area is bound to the north by Chedabucto Bay and to the south by a power transmission line. Provincial Route 16 runs parallel to the southern boundary of the site approximately 750 m away. Lands immediately surrounding the Project area are largely undeveloped. The adjacent communities of Half Island Cove and Fox Island along Route 16 are rural in character and low in population density. Residential development in the vicinity of the Project is relatively sparse, with no residential structures within 500 m of the site boundary, 11 within 1 km, and fewer than 50 within 2 km. The nearest house is located 690 m from the property boundary on the coast at the east end of Half Island Cove Road. The nearest residence on Route 16 is approximately 750 m from the property boundary. The separation between residences and blasting activity is even greater (and nowhere less than 800 m) considering the preliminary project layout depicted in **Figure 4**. For the first ten years or so of operation, the closest residence will be greater than 1.0 km from blasting since work will begin in the north end of the site and proceed in a southerly direction.

The land hosting the quarry is owned by the MODG, as per a recently approved land exchange with the Province (Grant No. 23711) and expropriation of two private land parcels. The land is currently zoned Heavy Industrial (M-2). The property is not now nor has it ever been used for a marine terminal. These lands have not been designated for use as a marine terminal by the MODG.

The natural beauty and wilderness of the Municipality are attractions for tourists and residents alike. There are a number of hiking trails and beaches, parks and wilderness viewing areas, museums, churches and historic sites (MODG 2011). Some of these areas, such as the Canso Coastal Barrens Wilderness Area and several protected beaches are located within 5.0 km of the proposed quarry property boundary. Recreational activity (trapping, ATV and snowmobile use) was observed on the Project site at the time of the winter bird survey in January 2011. The Significant Species and Habitat Maps and the Restricted and Limited Land Use map maintained by NSDNR show the following features in proximity to the proposed Project:

- Three private beaches protected under the Beaches Protection Act (Lower Half Island Cove 1.5 km west and Half Island Cove 2.7 km west, Fox Island Main 2.55 km east);
- Two Wilderness Areas: the Bonnet Lake Barrens Wilderness Area (6.9 km southwest) and the Canso Coastal Barrens Wilderness Area (1.7 km south and east);
- Designated Water Supply Area: Walsh or Wilkins Lake 4.5 km south and east;
- Natural Watershed Municipal Surface Water Supply 3.65 km south and east; and,
- Third Lake Operational Non-Designated Parks and Reserve 4.2 km south and west.

3.8.2 Potential Environmental Effects

The Project will be designed and implemented such that minimal adverse environmental effects to adjacent residential land use will occur. Due to the distance of the proposed Project site from most residences and groundwater users, and proposed tree buffers to be maintained around the site, impacts on existing and future adjacent land uses are not expected. All quarry activities will be conducted in accordance with the Pit and Quarry Guidelines.

The principal environmental effect on land use will be the inability of land to be used for forest resources harvesting, hunting, and recreational purposes. It is noted that the majority of the site is barren with mostly scrub type vegetation that would support minimal forest resource and limited hunting.

The Project is not anticipated to negatively interact with the features identified on the Significant Species and Habitat Maps and the Restricted and Limited Land Use map.

3.8.3 Proposed Work Plan

A reconnaissance of the Project site and surrounding properties will be conducted to determine current land and resource use in proximity to the Project site. Additional work (e.g., research and consultation) may be required to support the EA in order to obtain planning and land use information (e.g., watershed area designations) and to conduct interviews of regional and community planning officials. This data will be used to carry out the environmental effects assessment in the EIS.

3.9 Commercial Fisheries

3.9.1 Existing Conditions

Chedabucto Bay is a component of Northwest Atlantic Fishing Organization (NAFO) fishing division 4W along the Scotian Shelf. The Scotian Shelf comprises the main fishing grounds in Nova Scotia and has at least five zones supporting numerous stocks and sub-stocks of different fish species. The commercial groundfish industry in Nova Scotia is diverse and widespread. Although dramatic stock declines in the early 1990s have reduced landings and fish-based industry activity, there are bright spots in certain areas, as well as some signs of improvement in others (NSFA 2010). Approximately 20 different species are landed in the waters surrounding Nova Scotia. The main commercial species are haddock, cod, halibut, redfish, pollock, silver hake, American plaice, yellowtail flounder, winter flounder and grey sole. Lesser amounts of white hake, turbot, cusk, catfish (Atlantic Wolffish) and monkfish are landed frequently as by-catch (i.e., incidental catch when fishing for another species).

The lobster industry is the backbone of the Nova Scotia fishing industry and the main economic engine that drives the economy in many coastal communities (NSFA 2010). The Project area is located in Lobster Fishing Area (LFA) 29 which has a season that runs from May 1 to June 30. Snow crab is also fished in this area (Snow Crab Fishing Area 24).

The Scotian Shelf shrimp fishery takes place in waters off eastern Cape Breton and mainland NS, primarily in the Louisbourg, Canso and Misaine holes. In addition to the mobile shrimp fishery (i.e., mobile vessels that tow shrimp trawls along the ocean bottom), there is also an inshore trap fishery that uses baited wire mesh traps similar to a lobster fishery. This fishery was developed by inshore fishermen in Guysborough and Richmond Counties. Most of the 13 licences are concentrated in Chedabucto Bay (NSFA 2010).

The extent of recreational fisheries in the area is not known at this time.

3.9.2 Potential Environmental Effects

The Project has the potential to interact with commercial fish species and commercial fishing operations in the region. The concerns typically associated with projects of this nature are changes in commercial fish populations (i.e., direct mortality, loss or alteration of habitat and use), loss of gear, and loss of access to traditional fishing areas. In addition to the regulatory requirements protecting fisheries under the Fisheries Act, interactions with commercial fisheries may result in negative economic effects given that the industry provides a livelihood for a number of families in the region combined with the overall importance of fishing to the regional economy.

In July 2011, Morien met with the four fisherman who own the licenses in the Black Point area, and while they are concerned they will lose a portion of their license area they indicated that they are in general support of the proposed quarry project and asked to stay informed of the EA process (Mark Davies pers. comm. 19 August 2011).

3.9.3 Proposed Work Plan

A detailed review of commercial and recreational fisheries will be conducted so that potential project impacts can be assessed. This work will require consultation with provincial and federal agencies, as well as fishing associations and individual fishers. This review may include aerial surveys to provide oblique photos of lobster pots in the study area. Photos would be appropriately geo-referenced to ensure locations can be accurately plotted.

3.10 Archaeological and Heritage Resources

A historic background study was conducted by Davis MacIntyre & Associates Limited in July 2011 under Heritage Research Permit A2011NS67. Historical maps and manuscripts and published literature were consulted at Nova Scotia Archives and Records Management in Halifax. The Maritime Archaeological Resource Inventory, held at the Nova Scotia Museum's Heritage Division, was searched to understand prior archaeological research and known archaeological resources neighbouring the study area. A preliminary archaeological reconnaissance survey of the impact area was also conducted.

3.10.1 Existing Conditions

The history of human occupation in Nova Scotia has been traced back approximately 11,000 years to the Palaeo-Indian period or Sa'qewe'k L'nu'k (11,000 – 9,000 years before present or BP). The only significant archaeological evidence of Palaeo-Indian settlement in the province exists at Debert / Belmont in Colchester County. The Saqiwe'k Lnu'k period was followed by the Mu Awsami Kejikawe'k L'nu'k (Archaic period) (9,000 – 2,500 years BP) which was succeeded by the Woodland / Ceramic period or Kejikawek L'nu'k (2,500 – 500 years BP). The Woodland period ended with the arrival of Europeans and the beginning of recorded history (DMA 2011).

The initial phase of contact between First Nations people and Europeans, known as the Protohistoric period, was met with various alliances particularly between the Mi'kmaq and French. The Mi'kmaq inhabited the territory known as Mi'kma'ki or Megumaage, which included all of Nova Scotia including Cape Breton, Prince Edward Island, New Brunswick (north of the Saint John River), the Gaspé region of Quebec, part of Maine, and south-western Newfoundland. A historical Mi'kmaq presence has been well documented in Guysborough County and specifically in the vicinity of Canso, less than 15 kilometres east of the study area.

It is thought that the French began fishing off the coast of Nova Scotia as early as 1504 and possibly earlier (Hart 1877:9 in DMA 2011). Activity on land was coastal and seasonal, consisting of trade with the native Mi'kmaq and the use of beaches to dry fish for the long voyage back to France. The fishery continued to be profitable for centuries, supplying the French, English, and Basque seamen who sailed along these coasts. In 1518 Baron de Lery attempted to establish a colony in this new land. Finding himself unprepared for the extreme cold, he abandoned herds of cattle at nearby Canso as well as on Sable Island before returning to Europe with his fellow

colonists. The cattle did not survive the winter, due either to the harsh conditions or to hunting by native bands (Hart 1877:9 in DMA 2011).

Although the French had been controlling European settlement and trade in the seventeenth century, in 1713 the Treaty of Utrecht ceded Acadie, which included mainland Nova Scotia, to the English. Five years later, HMS Squirrel was sent to Canso to remove the French who were still successfully fishing in the area and despite the strong Acadian population in the mid-eighteenth century, English dominance continued to assert itself as the years wore on (Dawson 1988:40 in DMA 2011).

Prior to 1721, a British Government regulation decreed that all tracts of forest land containing trees suitable for ship masts should be set aside as Crown Reserves (Hart 1877:15 in DMA 2011). It is possible that this regulation is related to the surprising scarcity of land grants within the study area. Indeed, only two grants appear to have been made: the first to Michael Fogherty and the second to Peter James Lukeman (DMA 2011).

Until 1857 the “Stagecoach Road” between Crow Harbour and Canso ran along the coast, passing close to Fogherty Head and Black Point. The rocky nature of this road meant that passage in the summer by buggy or wagon was nearly impossible. However, it appears that in the 1870s at least two houses were located in or near the eastern end of the study area. When the new road was built farther inland it encouraged settlement along level and fertile ground off the hard coastline (Everett MacDuff pers. comm. 20 July 2011).

Oral history recounts that Black Point had a vibrant settlement in the late nineteenth century. The settlement included the Black Point School, and one oral report suggests that a Roman Catholic Church may have been located in the area (Everett MacDuff pers. comm. 20 July 2011, and Grant James, pers. comm. 12 July 2011). Unfortunately, no other sources have directly confirmed the presence of this church. The only clue that may corroborate a church having stood in the vicinity is a vital statistics record showing that Murdock McNeil and Bridget Eaton were married on July 2nd, 1891 at Black Point, Guysborough County under a Roman Catholic licence (Nova Scotia Historical Vital Statistics 1891).

Local residents also report that Martin Daley and his son Vincent were the last residents of Black Point. In his later years, Martin lived at nearby Fox Island or Fox Island Main during the week, working as a fisherman. On weekends, he would return to Black Point to live with his son. The two were farmers and fishermen, a type of dual employment that was not uncommon on the coast of Nova Scotia during the nineteenth and early twentieth century. Sometime after the 1930s, the Daley house and barn were demolished. Both were located in a meadow with a brook running down its centre, where one local resident reported pasturing his family horse in the summers (Everett MacDuff pers. comm. 20 July 2011).

Sometime after all of the residents of Black Point had moved to Fox Island Main or further afield, John Rhynold and his son reportedly flew a flag on Black Point in memorial to John’s mother, who was born at Black Point (Everett MacDuff pers. comm. 20 July 2011). Additionally, a descendent of the Lukeman family kept a cabin on his family property at Fogherty Head, and used to visit the site each year (Everett MacDuff pers. comm. 20 July 2011 and Anne Marie Rhynold pers. comm. 12 July 2011).

During the reconnaissance survey, no evidence of cultural activity was observed; however, the entire site was not accessed as is typical in a reconnaissance level survey (DMA 2011).

3.10.2 Potential Environmental Effects

A potential environmental effect of the Project on Archaeological and Heritage Resources would be the loss or destruction of any resource material. Based on the existing information for the area, the Project may interact with some areas considered to hold a high potential for documented and/or undocumented archaeological resources.

The inhospitable nature of the barrens suggests that little cultural activity, whether Pre-contact or historic, would have occurred in the central portion of the study area. However, the presence of the old road to Canso suggests that any historic settlement may have closely bordered this thoroughfare.

3.10.3 Proposed Work Plan

In addition to the work already conducted, the outlet of Fogherty Lake and the Barachois area will be surveyed. Both areas are predicted to be better accessed by water given the steep slope rising above the shore. The historic road, which is likely better accessed from the south, will be walked in its entirety, if possible, to determine if any archaeological resources can be found on either side of it.

3.11 Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons

3.11.1 Existing Conditions

The Project site does not include any First Nation Reserve Land although it is within Mi'kmaq traditional territory. The nearest First Nation community is Chapel Island, located on Cape Breton Island approximately 58 km north of the Project. By road Chapel Island is approximately 155 km from Black Point. On the mainland, the nearest First Nation community is Paq'tnkek composed of Pomquet - Paq'tnkek, Franklin Manor, and Summerside. Pomquet - Paq'tnkek #23 is located at Heatherton, 24 km east of Antigonish, approximately 68 km due west of the Project (approximately 90 km by road). Predictive modeling suggests that any First Nations activity, if present, would have been in proximity to the sparse fresh water resources in the area, such as the outlet of Fogherty Lake and the barachois pond that appears to have formed on the northeast coast of the study area, immediately south of Black Point (DMA 2011). At this time, it is not known whether any Aboriginal groups or persons hold commercial fishing licences in areas that could be affected by the Project.

A Mi'kmaw Ecological Knowledge Study (MEKS) was completed for the Project by Mi'kma'ki All Points Services, Inc. in January 2013. The study was completed according to the Mi'kmaq Ecological Knowledge Study Protocol (ANSMC 2007). To initiate the study, the authors alerted the Mi'kmaw Ethics Watch Committee to ensure compliance with the 1999 Mi'kmaq Research Ethics Protocol. Following this, a project information sheet was created and circulated with an introductory letter to the following organizations:

- The Union of Nova Scotia Indians;
- The Confederacy of Mainland Mi'kmaq;
- The Assembly of Nova Scotia Chiefs;
- The Native Council of Nova Scotia; and,
- Kwilmu'kw Maw-klusuaqn (KMK) or the Mi'kmaq Rights Initiative.

In addition, the MEK study authors:

- Issued an information bulletin to all 13 Nova Scotia First Nation Chiefs and Councils;
- Placed an article in the Mi'kmaq-Maliseet Nations News requesting public input to the MEKS;
- Placed article in the Guysborough Journal;
- Publicized the MEKS on the Mi'kma'ki All Points Services website (mikmaki.ca); and,
- Held a community meeting in Paq'tnkek, the closest (mainland) Mi'kmaw community to the Project to present the Project and solicit input from community members.

The MEKS consists of four main components: historical review / research, traditional use data (based on interviews), present day use (based on interviews and a site visit), and Mi'kmaq significant species survey (based on site visit).

The study defined a **regional study area** measuring approximately 40 km by 5 km, from Halfway Cove in the west to Canso in the east. The MEKS documented historical use of areas within regional study area, including islands and beaches in the Canso area, by the Mi'kmaw. Within the **Project area** itself, the MEKS noted:

*“harvesting of the following types of resources are being reported:
Cod, herring, mackerel, oyster and urchin fishing were indicated to occur along its shore.
With respect to terrestrial harvesting activities, moose, deer and goose hunting were identified, as well as the trapping of furbearers.
Plant resources harvested in this area consist of maple, various berry species, wild caraway seeds, and medicinal plants.”*

The study concluded that:

- (a) “there are no specific land claims pending within the regional study area;*
- (b) The permanent loss of some of (or access to) [medicinal plants] is not expected to significantly limit Mi'kmaw use of these resources;*
- (c) Because of the local nature of these [noise] impacts, their significance on local Mi'kmaw harvesting activities is expected to be limited;*
- (d) Effects [of dust and other airborne pollutants] on Mi'kmaw resource activities is expected to be limited; and,*
- (e) The significance of such potential impacts on the Mi'kmaw fisheries [from dust, accidental aggregate spillage and possible fuel, oil or waste discharge associated with cargo vessels] is undetermined”.*

The MEKS recommends an archeological survey (which has since been conducted), efforts aimed at minimizing the generation of dust and controlling its transport, and operations protocols to minimize the potential for accidental spillage of aggregate.

In summary, it appears that based solely upon the MEKS, the Project will require access to, use or occupation of, or the exploration, development and production of lands and resources currently used for traditional purposes by Aboriginal peoples.

3.11.2 Potential Environmental Effects

As noted above, the Project will require use of lands and resources that are reportedly used for traditional purposes by Aboriginal peoples. Given this, there is a potential for loss of access to wildlife and plant resources and potential harvesting areas. In addition, noise disturbance and dust from quarrying activities may adversely impact wildlife resources and depreciate the quality of local food and medicinal plants. There is also the potential for negative impacts to the marine environment from accidental aggregate spillage. Nevertheless, MEKS concludes that it is unlikely the Project will have any negative effects on traditional land use provided the recommended mitigation measures are implemented. The Project has the potential to bring positive changes to the Aboriginal socio-economic environment in the form of long term, well paying jobs for members of nearby First Nation Communities.

3.11.3 Proposed Work Plan

Under *CEAA 2012*, the EIS must assess how the Project will affect the current use of land and resources by Aboriginal persons for traditional purposes. This is normally achieved after consultation with the Aboriginal leadership. Morien intends to engage Mr. Chris Milley of AMEC Earth and Environmental who worked with Mi'kma'ki All Points Services of Shubenacadie, Nova Scotia to support consultation efforts with the Mi'kmaq.

The information collected as part of any engagement with Aboriginal communities will be reflected in the EA and will be used, along with the results of the MEKS, to carry out the environmental effects assessment in the EA as it relates to traditional use and any other concerns identified by the Aboriginal community.

3.12 Other Past, Existing, or Future Projects and Activities

3.12.1 Existing Conditions

Under *CEAA 2012* cumulative environmental effects of the Project in combination with other projects and activities that have been or will be carried out must be assessed.

3.12.2 Potential Environmental Effects

Environmental and socio-economic interactions of individual projects have the potential to overlap spatially and temporally to create a cumulative interaction. In some cases cumulative effects may interact in an additive fashion, creating an effect equal to the sum of the individual project effects. In other cases cumulative effects may interact synergistically, creating an effect greater than those of the individual projects. Cumulative effects may have important regional consequences in the context of large project development, or in the context of smaller projects, result in local, incremental changes.

3.12.3 Proposed Work Plan

The Project Team will research and consult as required to identify and select past, present and future projects and activities that, when combined with the Project, may result in overlapping or cumulative environmental effects. The cumulative environmental effects assessment requires a consideration of the temporal and spatial boundaries of the assessment and interactions among environmental effects of the Project and past, present and future projects and activities.

The assessment will involve estimating the overlap of Project-related environmental effects with potential environmental effects from other projects or activities that have or are being carried out or are currently being planned. The consideration of potential future projects and activities for cumulative effects assessment will be limited to certain and reasonably foreseeable projects and activities, and typically will not include speculative projects and activities. Projects and activities considered as being certain or reasonably foreseeable will have (at least) submitted applications for regulatory approval or have undertaken some advanced planning.

Generally, the evaluation of cumulative effects can be considered as the following sequence of steps:

- Identification of environmental and socio-economic effects of the Project;
- Identification of other projects / activities that could interact with Project related effects through consultation with municipal, provincial, and federal officials;
- Elimination of the effects of other projects and activities that are unlikely to act in combination with Project related effects;
- Identification of likely effects that could result from the interaction of Project related effects with other projects / activities and mitigation to avoid or minimize those effects; and,
- Evaluation of the significance of likely cumulative environmental and socio-economic effects.

The cumulative effects assessment for the Project will be undertaken in accordance with the CEA Agency's Operational Policy Statement *Addressing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012* and to the extent it remains applicable, Cumulative Effects Assessment Practitioners Guide (CEA Agency 1999).

4. Public and Stakeholder Involvement

The Black Point Quarry is expected to be a project of regional significance. As such, Morien will undertake a comprehensive and open communications campaign to engage and share information about the project with as many stakeholders as possible during the course of the EIS.

Since 2010, Morien has undertaken a number of one-on-one discussions with a variety of stakeholders including, but not limited to: NSDNR staff including the Minister and Deputy Minister and staff from the Land Services and the Mineral Resources Branches; municipal officials including the Warden, CAO, and councillors of MODG; the MODG Regional Development Authority; the Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO); the Paq'tnkek First Nations Chief; local fishermen; and a number of community residents. Table 4.1 lists the consultation events undertaken with various jurisdictions and other parties to date. In addition, Morien contacted the landowners and / or the heirs of the two former private land parcels in the Project area and was successful in acquiring, through quit-claim deeds, the interests of all identified heirs to the Lukeman lands.

Primarily, the discussions with the aforementioned stakeholders have pertained to matters associated with land rights, site access, and the nature of exploration and scientific work being undertaken in relation to the Project planning and design. Morien has also retained a Halifax-based public relations firm to provide guidance in the development and management of the communication campaign and to ensure consistent and accurate messaging.

Some of the tools Morien is considering to communicate the merits of the project include:

- A Community Liaison Manager to foster an open door atmosphere;
- A Project-specific web site to keep stakeholders current on all information and project specific material;
- Periodic newsletters to all stakeholders as new information becomes available;
- Community Liaison Committee (CLC) comprised of interested citizens to meet periodically to address community concerns and garner Project feedback; and,
- Regular stakeholder meetings throughout the permitting process to ensure all interested parties are hearing the information first hand from company officials.

Following submission of the Project Description document, Morien will hold an open house in the MODG or near the Project site. The open house will be advertised in local media while landowners in close proximity to the Project site will receive a personal invitation to attend. Potential stakeholders (e.g., local government representatives, environmental groups, recreational groups) will be mailed an open house notification letter and be invited to attend. Storyboards and information materials will be prepared for the open house, and representatives of the Proponent and their consultants will be present to discuss the Project with members of the public and stakeholders. Comments from the public and stakeholders on the Project will be considered in the EA.

Upon completion of the EA, Morien will host another open house to communicate the results of the EA to the public and stakeholders. Morien will also conduct an open house in the Paq'tnkek First Nation as part of the Aboriginal Engagement activities to present and discuss the results of the EA and to foster collaborative arrangements with First Nations' companies and Band Councils.

Table 4.1 Summary of Stakeholder Engagement Events to Date

Event and Party Contacted	Purpose	Date and Location	Number of Attendees	Issues Raised
Meeting with DFO	Discuss wharf design and compensation requirements	January 18 th , 2012 at BIO	4	None. Open discussion and transfer of information.
Meeting with 4 fishermen who have licenses in project area (1 has since been sold)	Discussed general project, location and potential impacts as well the fisherman gave input as to best location for the wharf	July 21, 2011, at store near Project site	6	Some concerns initially about loss of fishing grounds, but concerns were lessened once the smaller wharf footprint was discussed.
High school presentations	Inform students and their teachers about nature and scope of Project	October 12, 2011, at Canso and Guysborough high schools	Entire school in Canso ~75; junior & senior class at Guysborough ~50	Most questions were about employment opportunities and what skills would be needed.
Meeting with KMK Mining Table	Project presentation to the KMK	November 21, 2011, at Membertou Conf. Center, Sydney.	7	Discussion regarding the need for an MOU between Erdene (now Morien) and KMK, and who was to do the MEKS.
Telephone conversation with newspaper reporter	Reporter from the Antigonish Casket wanted info. on the project	January 4, 2012, via phone from Halifax Airport	2	Corey Leblanc sought project information, wanted to know why this location and where we were in the process.
Conversation with Brent Lombardo (area resident)	Discussed project while on plane to US	January 4, 2012	2	Provided contact information with people who could help with project such as Nancy O'Regan a Curriculum Coordinator with NSCC and others.
Meetings with MODG	Update Council on project status	Several between 2008-2011 at the municipality	~12	Wanted to stay informed on the project's progress/issues.
Consultations Since February 2012				
Private Lands Acquisition	Acquisition of private land parcels at Black Point	Numerous interactions via legal counsel from Feb 2012 to October 2013	~ 40	Contact heirs to the 2 private land parcels to purchase their interests, regular updates to MoDG
Agreement with MoDG	Negotiations with MoDG regarding development of quarry on Municipality lands	Numerous discussions and meetings from Jan. to Aug. 2013 at the municipality	Several representatives each from MoDG and Morien	Negotiate mutually agreeable terms for agreement.
Presentation to MoDG Council	Present update on Project status	March 13, 2013 at the municipality	15	None. Open discussion and information exchange.
Attended MoDG Council Meeting	Council decision on expropriation of private land parcels	October 9, 2013 at the municipality	MoDG Council and general public	Council voted in favour of expropriation for purpose of developing quarry at Black Pnt.
Site visits to Black point	Visit the site with potential	April 15-16, 2013;	11	None. Potential investors were

Event and Party Contacted	Purpose	Date and Location	Number of Attendees	Issues Raised
	investors / operating partner	September 23-24, 2013 at the Project site	including MoDG Councilor B. George and local fisherman B. Hendsbee	impressed by local support for the Project, including local fishermen.
Meetings with NSDNR	Meet with Lands Branch at NSDNR to discuss requirements for Crown Lease for Submerged Lands	January 2013, February 5, 2014 in Halifax (Hollis St.)	Gretchen Pohlkamp; Arlene d'Eon	Discussed requirements for acquiring Crown Lease for near-shore submerged lands for the construction of marine load-out facility
Interactions with CEAA	Several in-person meetings, phone conversations and emails to update on project status and projected date for submitting EA application	March 4, 2012 May 14, 2012 May-Aug. 2013 Sept. 4, 2013 Sept. 13, 2013 Jan-Feb 2014 in Halifax	Several CEAA representatives (V. Rodrigues, F. Kirstein, M. Atkinson, B. Cogle)	None. Information exchange and review of new federal legislation (CEAA 2012)
Teleconference with NS Environment	Discussion regarding federal-provincial harmonization for EA	Feb 5, 2014	H. MacPhail	Discussed numerous aspects of the project including impact and compensation for wetlands, harmonization process, project update, etc.
Multiple telephone calls with Helen MacPhail and Paul Keats, NSE; James Sandall, NSPI; Paul Colton and Brian Ross, NSTIR and John Dobson, NSDNR	Provided information regarding upcoming site drilling to further define resource estimate and to obtain approval to access the site	Feb 6-Feb26, 2014 from Halifax	6	None. For information purposes only
Meeting with Premier Stephn MacNeil and MLA Lloyd Hines	Introduce the Project and Project Proponents	Feb 18, 2014 in Halifax	6	Discussed the anticipated Project schedule and employment opportunities
Meeting with Laurent Jonart, Office of Aboriginal Affairs	Introduce the Project and Project Proponents	Feb 25, 2014, in Halifax	4	Discussed potential issues of interest to the various First Nation Communities
Inter-agency (federal and provincial) meeting	Present Project and Project Proponents, discuss work conducted to date, discuss draft Project Description	Feb. 26, 2014 in Halifax at the CEAA office	14 present, two on the telephone. Agencies included CEAA, NSE, OAA, DFO, TC, EC, HC, and NRCan	Discussed Project timelines and subjects required to complete the Project Description. Obtained guidance on moving into the Environmental Assessment process.
Twila Gaudet, KMK	Email correspondence to set a meeting time and place to present the Project	11/02/2014 24/02/2014 25/02/2014 26/02/2014 27/02/2014	2	Meeting date and time confirmed for March 11, 2014

5. Aboriginal Engagement

5.1 Community Engagement

Aboriginal engagement will be initiated early and will continue throughout the course of the EA process. The Proponent will initiate discussions regarding the Project with the Chiefs of the Bands which have the greatest opportunity to benefit from, and interact with the Project due to their proximity or historical relationship with the area: Paq'nkek Pictou Landing, Waycobah, and Potlotek. Discussions will also be held with the representative Tribal Councils and Provincial Tribal Organizations that provide support and program coordination for these First Nations.

During the engagement process, the Proponent will develop an understanding of the interests of the communities, through their representative Chiefs and Councils. All engagement activities will be undertaken in accordance with the principles and procedures established by the KMK and the United Nations Declaration on the Rights of Indigenous Peoples. The Proponent will work with provincial and federal government officials who will be conducting consultation with First Nations regarding the Project.

5.2 Aboriginal Traditional Knowledge and Traditional Use

As indicated in Section 3.11.1, the Proponent has completed an Aboriginal Traditional Knowledge Study/Traditional Use Study for the Project as a first step in engaging the Mi'kmaw people of the region. An Aboriginal Traditional Knowledge study is referred to as a Mi'kmaq Ecological Knowledge Study (MEKS) within the traditional territory of the Mi'kmaq.

Morien has engaged the services of Mr. Chris Milley, Senior Environmental Consultant, AMEC E & I, to undertake and coordinate the Aboriginal Community Engagement. Chris has a depth of experience with First Nations projects and resource harvesting activities in the region and is familiar with the communities and resource management issues in the project area. Mr. Milley will provide additional guidance to engaging with First Nations peoples in the area.

6. Summary and Next Steps

In summary, the proposed Black Point Quarry Project consists of the development and operation of a construction aggregate quarry and marine terminal on the south shore of Chedabucto Bay, Guysborough County, Nova Scotia. If approved, the Project will be developed on 354.5 ha of undeveloped land.

The proposed Project will undergo an environmental assessment pursuant to the *Canadian Environmental Assessment Act, 2012*. Key federal permits include authorization under the Fisheries Act and a *Navigable Waters Protection Act* Permit. Key provincial permits include Water Approvals for watercourse and wetland crossings / alterations and an Industrial Approval for operation.

The next key steps in the planning phase of the Project are to:

- Undertake consultation with relevant agencies, stakeholders, Aboriginal Peoples, and the public to inform all interested parties and to solicit input into the environmental assessment;
- Complete field and desktop studies, as described in Section 3, to support the EA; and,
- Compile the EIS and submit for regulatory review.

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Everett MacDuff, local historian, pers. comm. 20 July 2011.

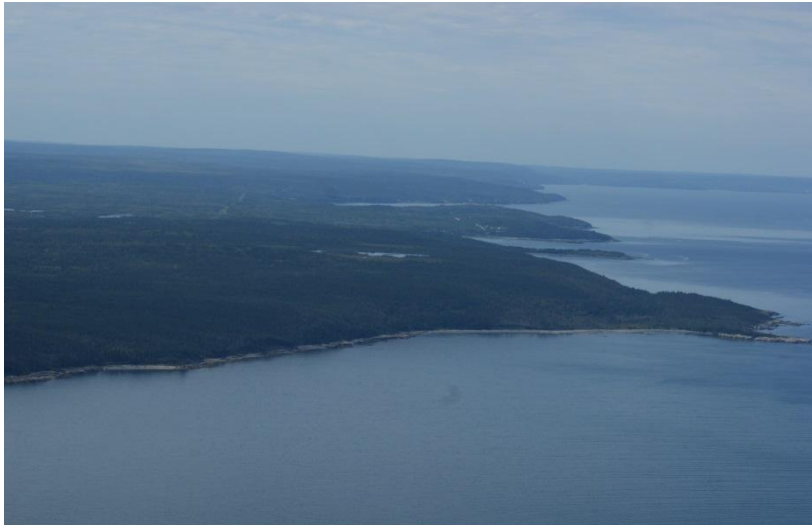
Grant, James, local historian, pers. comm. 12 July 2011.

Mark Davies, Morien Resource Development Corporation, pers. comm. August 2011.

Mark Pulsifer, Nova Scotia Department of Natural Resources Biologist, pers. comm. July 2011.

Robert Cameron, Nova Scotia Environment, pers. comm. April 2010 (in AMEC 2011).

Appendix A Site Photographs



Photograph 1 – Aerial Oblique of Black Point Looking West



Photograph 2 – Aerial Oblique of Project Area showing Fogherty Lake



Photograph 3 – Aerial Oblique Looking North Across Route 16



Photograph 4 – Project Area Typical Thin Soils and Vegetation Cover



Photograph 5 – Project Area Typical Thin Soils and Vegetation Cover



Photograph 6 – Wetland Area with Groundwater Well in Foreground



Photograph 7 – View of Fogherty Lake from Wetland Area



Photograph 8 - Birch Trees in Wetland



Photograph 9 – Outlet Creek from Fogherty Lake



Photograph 10 - Fogherty Lake

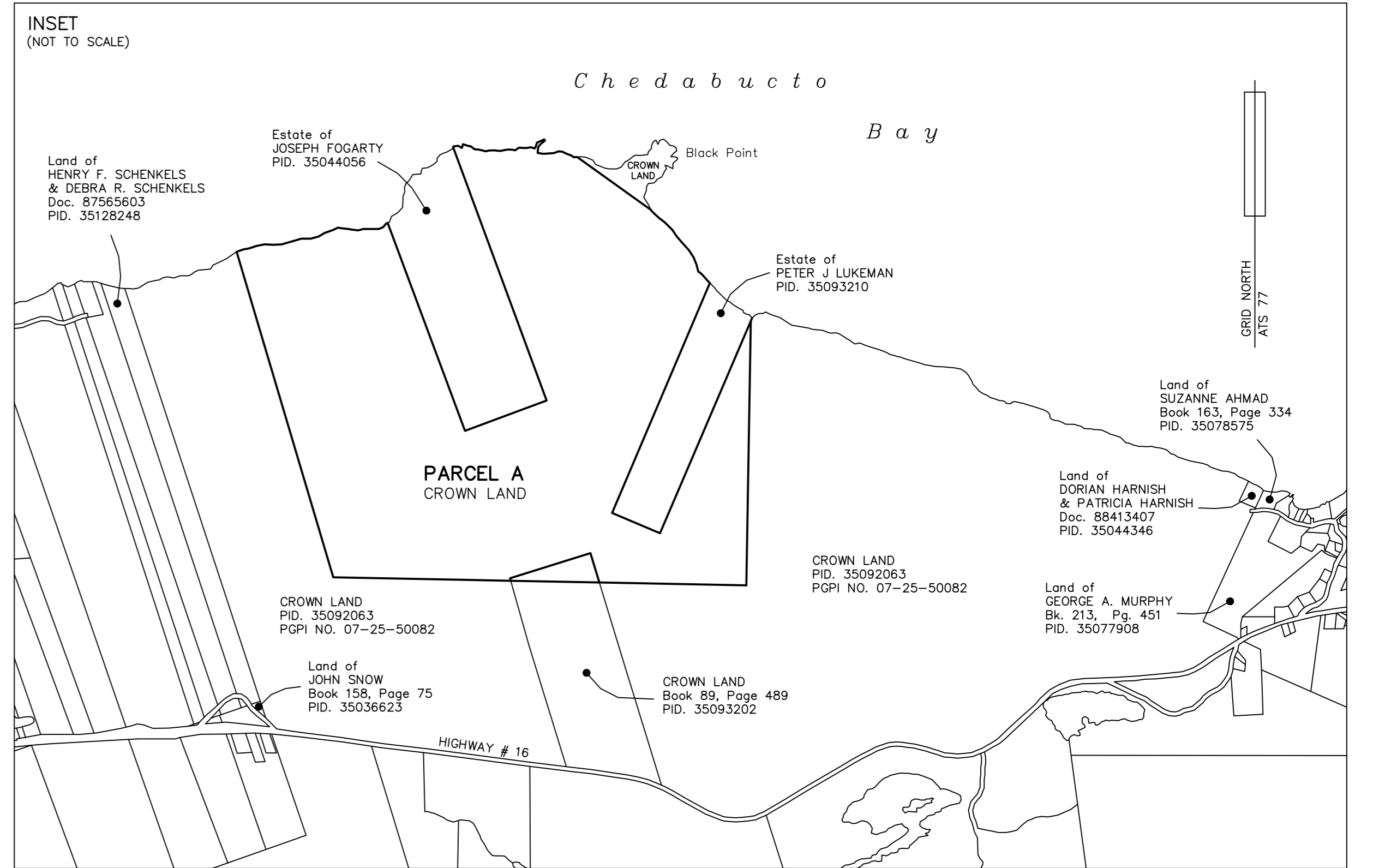


Photograph 11 – Fogherty Lake



Photograph 12 – Fogherty Lake

Appendix B Site Survey Plan



LEGEND:

NOVA SCOTIA COORDINATE MONUMENT	N.S.C.M.
SURVEY MARKER	SM
FOUND	FSM
PLACED	PI
WITNESS	WT
LANDS DEALT WITH BY THIS PLAN	---
THE LINE	---
REGISTRY OF DEEDS	---
RADIUS	R
ARC LENGTH CHORD	A, C
PLAN VALUES	(P)
MEASURED VALUES	(M)
FORESHORTENED LINE	---
UNDOCUMENTED POINT	UM
CALCULATED FROM PUBLISHED VALUES	PUB
ORDINARY HIGH WATER MARK	O.H.W.M.
TRAVERSE HUB	H
WOODEN POST	WP
METAL POST	MP
STONES	ST
PROVINCIAL GOVERNMENT PARCEL IDENTIFIER NUMBER	PGPI NO.
CALCULATED	(C)
TOTAL	(T)
LIMIT OF EASEMENT	(E)

- PLAN REFERENCES:**
- 1) PLAN OF SURVEY SHOWING PARCELS A AND B A PORTION OF LANDS OF HER MAJESTY THE QUEEN SIGNED BY J. EDWARD HANFEN, N.S.L.S., DEPARTMENT OF LANDS AND FORESTS FIELD PLOT NO. P-139/76.
 - 2) PLAN OF SURVEY SHOWING CERTAIN BOUNDARIES OF LANDS OF CANADIAN PIONEER ESTATES LTD. SIGNED BY JOHN J. DELOREY, N.S.L.S., DATED JUNE 3, 1987, LAND REGISTRATION OFFICE PLAN NO. 8460634.
 - 3) PLAN OF SURVEY SHOWING CERTAIN BOUNDARIES OF LANDS OF CANEC LAND DEVELOPMENTS INC. SIGNED BY JOHN J. DELOREY, N.S.L.S., DATED DECEMBER 1, 2008 AND REVISED MARCH 25, 2009, LAND REGISTRATION OFFICE PLAN NO. 93132331.
 - 4) ALL INTERIOR LAKES AND WETLANDS SHOWN ON THIS PLAN ARE GRAPHIC REPRESENTATIONS PRODUCED BY OVERLAYING FOX ISLAND PLANIMETRIC MAP NO. 11F/06-W1.
 - 5) SHORELINE OF CHEDABUCTO BAY PRODUCED FROM NOVA SCOTIA LAND INFORMATION SERVICE DIGITAL MAPPING MAP NAME GULFMAN POINT SHEET NO. 10453000100 AND MAP NAME FOX ISLAND MAIN SHEET NO. 10453000100 ORIGINAL PHOTOGRAPHY FOR BOTH PLANS OCTOBER/1989, REGIONAL PHOTOGRAPHY 2003, ALONG WITH GROUND TRUTHING AT VARIOUS POINTS ALONG THE ORDINARY HIGH WATER MARK.

- NOTES:**
- 1) ALL AZIMUTHS ARE GRID AND WERE DERIVED FROM NOVA SCOTIA COORDINATE MONUMENTS 1953 AND 10680 BASED ON THE NOVA SCOTIA 3° TRANSVERSE MERCATOR PROJECTION, ZONE 4, CENTRAL MERIDIAN AT 61°30' WEST LONGITUDE. ALL DISTANCES ARE GRID AND WERE DETERMINED BY MULTIPLYING THE HORIZONTAL GROUND DISTANCES BY THE COMBINED SCALE FACTOR OF 0.999999. NO ADJUSTMENT USED. COORDINATE VALUES DATED JULY 1978.
 - 2) THE FIELD TRAVERSE WAS NOT ADJUSTED AND A SCALE FACTOR WAS NOT APPLIED TO THE FIELD MEASUREMENTS.
 - 3) THE FIELD WORK WAS CARRIED OUT DURING THE PERIOD 4 JUNE TO 30 JULY 2009.
 - 4) ALL UNITS SHOWN ON THIS PLAN ARE METRIC VALUES UNLESS OTHERWISE STATED.
 - 5) A CONVERSION FACTOR 0.3048 WAS USED TO CONVERT IMPERIAL UNITS TO METRIC.
 - 6) CROWN GRANT INFORMATION TAKEN FROM INDEX SHEET NO. 112.
 - 7) THIS PLAN IS ONE OF A SERIES OF FOUR PLANS FIELD PLOT NOS. P-083/09-1 TO P-083/09-4 RELATED TO ORDER OF SURVEY S-046/09.

COORDINATE TABLE

Point	Northing	Easting	Description	Elevation
19533	5022687.527	4527027.474	N.S.C.M.(PUB)	96.54
10680	5021997.581	4527222.760	N.S.C.M.(PUB)	52.24
5001	5023353.228	4527407.486	BENCH MARK	56.89
5002	5022325.116	4527215.413	BENCH MARK	67.33
5003	5024250.326	4527407.486	BENCH MARK	30.85
5004	5024141.459	4527148.334	BENCH MARK	30.67
5005	5024045.214	4527008.546	BENCH MARK	6.42
5006	5024262.808	4528109.022	BENCH MARK	8.49
5007	5024268.231	4527918.944	BENCH MARK	6.03
5008	5023316.522	4527668.825	BENCH MARK	62.07
5009	5023298.586	4527751.955	BENCH MARK	58.84
5010	5022225.770	4527842.486	BENCH MARK	50.84
5011	5022255.890	4528430.853	BENCH MARK	49.97
5012	5022255.890	4528430.853	BENCH MARK	49.74
5013	5022262.700	4528105.944	BENCH MARK	61.07
5014	5022466.856	4528158.245	BENCH MARK	61.48
5015	5022302.440	4528437.312	BENCH MARK	66.80
5016	5023325.500	4528064.000	BENCH MARK	61.14
156	5023867.017	4528281.597	BENCH MARK	10.02
40	5023076.652	4527288.621	WELL	78.24

LANDMARK SURVEYS LIMITED
RR#1 STELLARTON, PICTOU COUNTY
PROVINCE OF NOVA SCOTIA

TIM WAMBOLDT SURVEYS
LOWER SACKVILLE, HALIFAX COUNTY
PROVINCE OF NOVA SCOTIA

PLAN OF SUBDIVISION SHOWING
PARCEL A, PARCEL B
AND EASEMENT EA-1
UPPER FOX ISLAND
GUYSBOROUGH COUNTY, NOVA SCOTIA
PGPI NOS. 07-25-50082 & 07-25-00322

SCALE 1 : 5000

SURVEYOR'S CERTIFICATE

I, J.W. ROSS, Nova Scotia Land Surveyor, hereby certify that the survey represented by this plan was conducted under my supervision and that the survey and plan were made in accordance with the Nova Scotia Land Surveyors Act and the regulations made thereunder.

Dated this 4th day of March, 2010.

..... N.S.L.S.

DRAWN BY: JMC DATE: MARCH 4, 2010
INDEX SHEET: 112 RESOURCE MAP: 11F/06-W2, W1
CLFS: G-43 C4530611, C4535611

ORDER OF SURVEY: S-046/09
FIELD PLOT P-083/09-4

