PEI-NB Cable Interconnection Upgrade Project – VOLUME 1 Project Description

Job No. 121811475

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Executive Summary

PEI Energy Corporation (PEIEC), with Maritime Electric Company, Limited (MECL) acting as the construction agent, is proposing to complete a cable interconnection upgrade within the Northumberland Strait, between the provinces of Prince Edward Island (PEI) and New Brunswick (NB). The intent of the proposed PEI-NB Cable Interconnection Project ("the Project") is to meet the growing demand for electricity on PEI and supplement aging infrastructure.

Project activities will be carried out over a 16 month period in three distinct geographic regions; PEI, NB and in the Northumberland Strait. Project activities within the Northumberland Strait include the laying of two submarine cables between landfall locations in Cape Tormentine, NB, and Borden-Carleton, PEI. Project activities in PEI consist of the expansion of the existing substation in Borden-Carleton and construction of a cable landfall site. Project activities in NB consist of upgrades to the existing substation in Memramcook, construction of a landfall site and cable termination site in Cape Tormentine and the installation of overhead transmission lines between the cable termination site in Cape Tormentine and the substation in Memramcook.

To better facilitate review, this document is divided into four volumes as follows:

- Volume 1 (this volume) is the introductory chapter, outlining Project specifics and EIA methodology.
- Volume 2 addresses Project activities and potential environmental effects within the land-based environment in PEI.
- Volume 3 addresses Project activities and potential environmental effects within the land-based environment in NB.
- Volume 4 addresses Project activities and potential environmental effects within the marine-based environment in the Northumberland Strait.

This document, in its entirety, is intended to fulfill requirements for an environmental impact assessment (EIA) for three distinct regulatory regions. Land-based Project activities within PEI (Volume 2) are pursuant to section 9(1) of the PEI *Environmental Protection Act* (PEI *EPA* 2012). Land-based Project activities within NB (Volume 3) are pursuant to schedule A of the NB *Environmental Impact Assessment Regulations* (NB *EIAR* 2013) under the NB *Clean Environment Act* (NB *CEA* 2014). As the submerged land within the Northumberland Strait is federal Crown land, it is subject to requirements under section 67 of the *Canadian Environmental Assessment Act, 2012* (*CEAA 2012)*.

The EIA process is intended to support and better define the Project through early consideration of potential environmental effects as well as mitigation measures. The EIA process considers issues and concerns identified through engagement with Aboriginal groups, stakeholders, the public and regulatory agencies. Project-related engagement activities have been ongoing since the summer of 2014, with public consultation and Aboriginal engagement focused on the EIA commencing in summer 2015.

Valued components (VCs) are Project-associated environmental attributes that have been identified by Aboriginal persons, regulatory agencies, scientists, key stakeholders and/or the public to be of particular interest or value. The EIA process identifies and assesses potential adverse environmental effects of the Project on the identified VCs.

VCs evaluated in this EIA include:

- Atmospheric Environment
- Groundwater Resources
- Freshwater Environment
- Terrestrial Environment
- Marine Environment
- Land Use
- Commercial, Recreational and Aboriginal Fisheries
- Socioeconomic Environment
- Heritage Resources
- Other Marine Users
- Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons

The assessment methods include an evaluation of the potential environmental effects for each VC that may arise from Project components and activities as well as from effects of the environment on the Project and accidental events. The evaluation of potential cumulative effects considers whether there is potential for the residual environmental effects of the Project to interact cumulatively with the residual environmental effects of other past, present, or future (i.e., certain and reasonably foreseeable) physical activities in the vicinity of the Project.

Project activities and components assessed in the PEI and NB volumes include potential effects from site preparation for land based transmission lines, physical construction of land based transmission lines, landfall construction, upgrading of electrical substation, inspection and energizing of transmission lines, cleanup and re-vegetation of transmission corridor, emissions, and wastes, transportation, employment and expenditure, energy transmission, vegetation management, infrastructure inspection, maintenance and repair, access road maintenance, decommissioning and reclamation. Project activities and components assessed in the marine volume include potential effects from site preparation, installation of the submarine cables, inspection and energizing of the submarine cables, emissions and wastes, marine transportation, energy transmission (presence of the Project), infrastructure inspection and maintenance, transportation and decommissioning. These activities reflect the scope of the Project and represent physical activities that may occur throughout the life of the Project forming the basis of the effects assessment.

Mitigation is proposed to reduce or eliminate adverse environmental effects. Most potential Project effects will be addressed by standard mitigation measures and best management practices outlined in the relevant Environmental Protection Plans (EPPs). With the implementation of the proposed mitigation measures, adverse residual environmental effects of routine Project activities and components are predicted to be not significant for all VCs.

The assessment considers potential environmental effects for each VC that may arise through Accidents, Malfunctions, or Unplanned Events. For land-based Project activities, the scenarios considered include fire, hazardous material spill, vehicle accident, wildlife encounter, erosion prevention and/or sediment control failure, major loss of electricity and discovery of a heritage resource. For marine-based Project activities, these scenarios include fire, hazardous material spill and vessel accident. Prevention, mitigation and response measures are outlined to reduce the probability of an upset scenario occurring, and to limit adverse environmental effects in the unlikely event of occurrence.

In summary, the Project is not likely to result in significant adverse residual environmental effects, including cumulative environmental effects, provided that the proposed mitigation is implemented.

Abbreviations

CEAA	*Canadian Environmental Assessment Act*
CRA	Commercial, Recreational or Aboriginal
DFO	Fisheries and Oceans Canada
DP	Dynamic Positioning
EIA	Environmental Impact Assessment
EMF	Electromagnetic Field
EMP	Environmental Management Plan
EPA	Energy Purchase Agreement
ft	Feet
GHG	Greenhouse Gas
HDPE	High-density polyethylene
H-Frame	Horizontal Frame
km	Kilometre
kV	Kilovolt
LAA	Local Assessment Area
LiDAR	Light Detection and Ranging
MBCA	*Migratory Birds Convention Act*
MECL	Maritime Electric Company, Limited
mG	Milligauss
MHPE	Medium- density Polyethylene
MW	Megawatt
NB	New Brunswick
NB *CEA*	New Brunswick *Clean Environment Act*
NB Power	New Brunswick Power
NBDELG	New Brunswick Department of Environment and Local Government
NPP	Navigation Protection Program
PDA	Project Development Area
PEI *EPA*	Prince Edward Island *Environmental Protection Act*
PEIDCLE	Prince Edward Island Department of Community, Land and Environment
PEIEC	Prince Edward Island Energy Corporation
PWGSC	Public Works and Government Services Canada
RAA	Regional Assessment Area

RoW	Right-of-way
SAR	Species at Risk
SCDI	Strait Crossing Development Inc.
SOCC	Species of Conservation Concern
TROV	Trenching Remotely Operated
VC	Valued Component

1.0 INTRODUCTION

Prince Edward Island Energy Corporation (PEIEC), with Maritime Electric Company, Limited (MECL) serving as construction agent, proposes to upgrade the electrical power interconnection between PEI and NB.

PEIEC is proposing to develop a new high voltage electrical cable interconnection across the Northumberland Strait, between PEI and NB. Two parallel high voltage submarine cables (138 kV) capable of carrying up to 180 MW are proposed as the main power conduit; approximately 57 km of new land-based right-of-way (RoW) is also needed for construction and operation of an overhead transmission line in NB (see Figure 1.1).

1.1 OVERVIEW OF THE PROJECT

PEIEC (the project proponent) proposes to develop an electrical power transmission system between PEI and NB. The PEI-NB Cable Interconnection Upgrade Project (the "Project") includes construction and operation of a high voltage alternating current transmission system with the following primary components:

- two 180 megawatt, 138 kilovolt submarine cables
- two landfall sites (where the submarine cable trenches are brought ashore)
- two termination sites (for converting submarine cables to overhead transmission lines or substation)
- three-phase, 138 kilovolt transmission lines within NB
- expansion of the existing MECL substation in Borden-Carleton, PEI
- upgrading of the New Brunswick Power Corporation (NB Power) substation in Memramcook, NB

The Project will span three geographic regions (Figure 1.1) including:

- Prince Edward Island – a landfall site and termination site will be located adjacent to the expanded MECL substation in Borden-Carleton.
- The Northumberland Strait – two high voltage alternating current submarine cables will span approximately 16.5 km from Cape Tormentine to Borden-Carleton.
- New Brunswick – a landfall site and termination site will be constructed in Cape Tormentine as well as approximately 57 km of overhead transmission lines within new and existing easements to the existing NB Power substation in Memramcook.

1.2 PROPONENT INFORMATION

Key proponent information for this environmental assessment includes the following:

Project Title:	PEI-NB Cable Interconnection Project
Prince Edward Island Energy Corporation Chief Executive Officer:	Ms. Kim Horrelt
Project Proponent and Principal Contact Person for this report:	Prince Edward Island Energy Corporation Mr. Mark Victor, P.Eng. Senior Engineer P.O. Box 2000, 11 Kent Street Charlottetown, PE C1A 7N8 Tel: (902) 368-6098 Fax: (902) 894-0290 Email: mevictor@gov.pe.ca
Proponent's Construction Agent and Principal Contact Person for this report:	Maritime Electric Company, Limited Mr. Ron LeBlanc, P.Eng. Manager, Production and Energy Supply Tel: (902) 629-3610 Fax: (902) 629-3630 Email: leblanc@maritimeelectric.com
Environmental Consultant and Principal Contact Person for this report:	Stantec Consulting Ltd. Mr. Dale Conroy, M.Sc. Senior Associate, Environmental Services 165 Maple Hills Avenue Charlottetown, PE C1C 1N9 Tel: (902) 566-2866 Fax: (902) 566-2004 Email: dale.conroy@stantec.com

PEIEC was established as a Provincial Crown Corporation in December 1978. PEIEC is responsible for pursuing and promoting the development of energy systems and the generation, production, transmission and distribution of energy, in all its forms, on an economic and efficient basis for PEI. The affairs of PEIEC are overseen by a board of directors appointed by the Lieutenant Governor in Council.

The PEIEC mandate is:

- to develop and promote the development of energy systems and the generation, production, transmission, and distribution of energy in all its forms on an economic and efficient basis
- to provide financial assistance for the development, installation, and use of energy systems
- to coordinate all government programs in the establishment and application of energy systems in the Province

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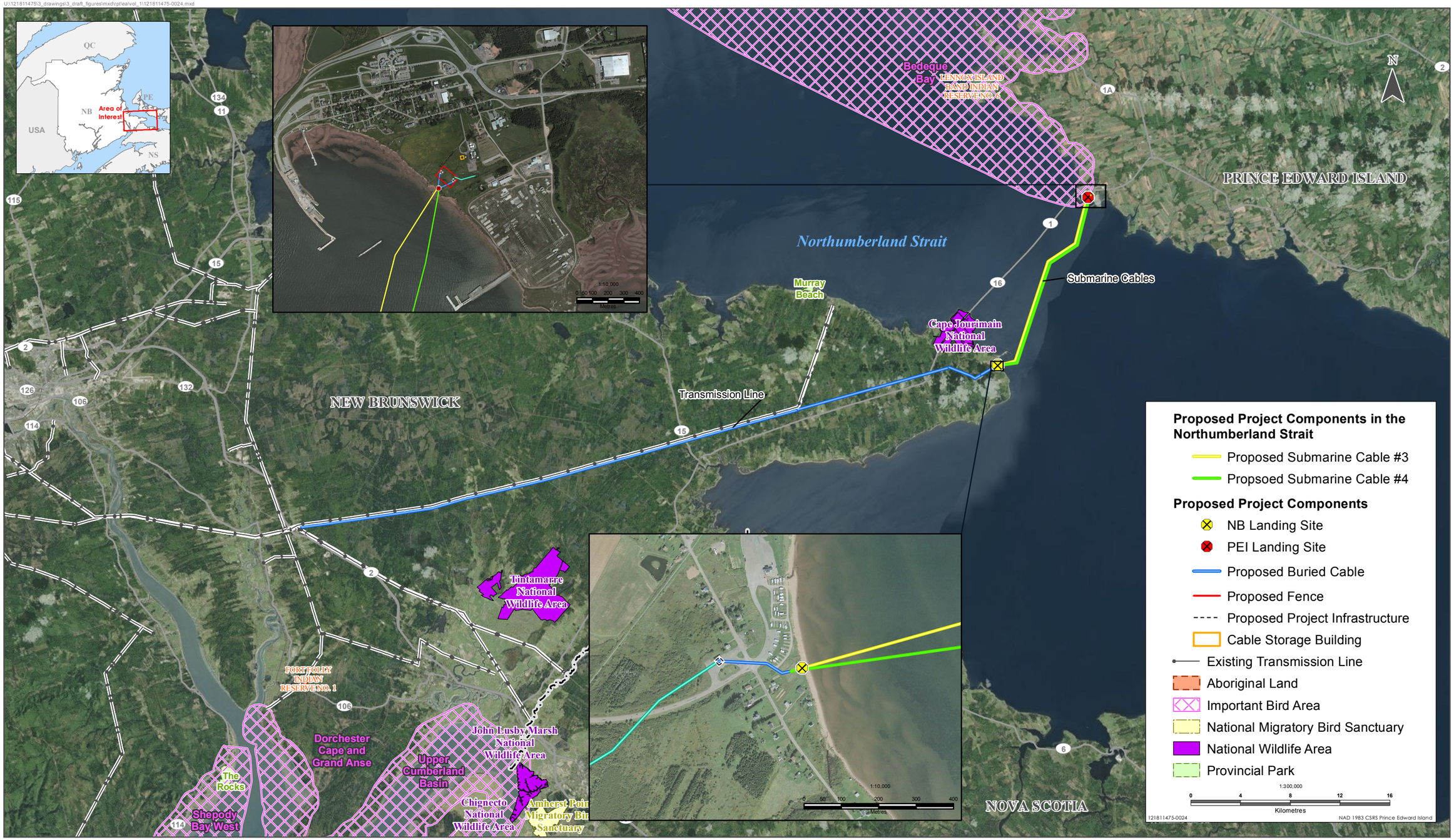

Sources: Base Data - Natural Resources (2011).Project Data from Stantec or provided by NB Power / MECL. Imagery - ArcGIS Map Service World Imagery, PEI Government (2010), Natural Resources (2011),

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Stantec

121811475 - PEI-NB Marine Cable Interconnection - Maritime Electric Company Limited

General Project Overview

Figure 1.1

Specific to electricity supply, PEIEC has developed and operates three wind farms in the Province with a collective capacity of 73.5 MW, and it oversees the management and operation of the existing cable interconnection through an interconnection lease agreement with MECL.

MECL is an indirect, wholly owned subsidiary of Fortis Inc. and operates under the provisions of PEI's *Electric Power Act* and the *Renewable Energy Act*. The company owns and operates a fully integrated system providing for the generation, transmission and distribution of electricity to approximately 77,000 customers throughout PEI. MECL's head office is in Charlottetown, and its generating facilities are located in Charlottetown and Borden-Carleton. MECL has contractual entitlement to energy from the Point Lepreau Generating Station in NB and purchases energy from the mainland power grid through two existing submarine cables under the Northumberland Strait.

The proposed Project will consist of two 180 MW submarine cables, with high voltage alternating current, and overland transmission and related components that will connect PEI with the electrical system of NB. MECL is construction agent of the Project and will design, engineer, construct, commission, operate and maintain the Project within PEI and the Northumberland Strait. The New Brunswick Power Corporation (NB Power) will design, engineer, construct, commission, operate and maintain the land-based components in NB.

1.3 NEED FOR THE PROJECT

MECL owns and operates generating facilities located in Charlottetown and Borden-Carleton. Typically, less than 1% of the annual electricity consumed in PEI is produced from on-Island, oil-fired generation. Approximately 15% of the electric energy is supplied by the Point Lepreau Nuclear Generating Station in NB and an additional 25% is from the purchase of Island-generated wind energy. The remainder of the power consumed in PEI is supplied by NB Power through an Energy Purchase Agreement (EPA). The electricity sourced through the EPA comes from a variety of sources within NB and the Northeastern United States. Both the Point Lepreau and EPA electricity is transferred to PEI via two existing submarine cables under the Northumberland Strait. In 1977, two 100 MW cables were installed to meet the peak electrical demand of 95 MW and to allow for growth. PEIEC is proposing to install two new 180 MW submarine cables in order to meet the need of PEI's future peak electrical demand. Currently, the peak electrical demand is 260 MW and growing; the most recent peak load forecast is estimated to be 354 MW in 2022 (PEIEC 2014). The existing cables are 38 years old and prudent planning must consider their eventual end-of-life.

The growing demand for electricity on PEI and the access to uninterrupted, cost-effective electricity is critical to an acceptable standard of living and sound provincial economy. The capacity limitations of the existing cables are beginning to increase the energy supply cost for Island utilities; without an upgrade to the PEI-NB interconnection system, additional on-Island generation will be required. In addition to supplementing aging infrastructure and increasing supply capacity to PEI, the Project will improve the reliability of electrical power supply to the Island. The existing cables will continue to operate until the end of their service life, and will serve mostly as a backup once the upgrade is complete.

1.4 ENVIRONMENTAL PLANNING AND MANAGEMENT

Both MECL and NB Power employ company-specific Environmental Protection Plans (EPPs) and Health and Safety Policies which will be used as reference during land-based work in their respective regions. The Project-related work on PEI will be conducted according to MECL's Health, Safety, and Environmental Policy, which follows a series of best work practices, employee training, waste management, preventative maintenance, environmental performance audits, and regulatory compliance. MECL will follow their approved EPP for High Powered Transmission Construction in PEI for the Project prior to the initiation of construction activities in PEI. The Project-related work in NB will be conducted according to the NB Power Transmission Environmental Management System, which is consistent with the ISO 14001 Environmental Management Standard, and NB Power's Corporate Sustainable Development Policy. NB Power will follow their EPP for NB Power Corporation Transmission Facilities prior to the initiation of construction activities in NB. A Project-specific EPP will be created to address marine activities and any identified Accidents, Malfunctions, and Unplanned Events that are not addressed in the company-specific EPPs.

Environmental protection procedures and measures will be observed and employed throughout the life of the Project. MECL will be responsible to ensure installation, maintenance, inspection and monitoring of environmental protection control measures during operation of all PEI infrastructure, including the submarine cables. NB Power will be responsible to ensure installation, maintenance, inspection and monitoring of environmental protection control measures during operation of the NB infrastructure.

1.5 PURPOSE AND ORGANIZATION OF THE DOCUMENT

The intent of this document is to provide the results of the environmental impact assessment (EIA) carried out to satisfy the regulatory requirements of the Project under three jurisdictions:

- Section 9(1) of the PEI *Environmental Protection Act* (PEI *EPA* 2012)
- Schedule A of the NB *Environmental Impact Assessment Regulation* (NB *EIAR* 2013) under the NB *Clean Environment Act* (NB *CEA* 2014)
- Section 5 of the *Canadian Environmental Assessment Act, 2012* (*CEAA 2012*)

The EIA document is presented as four volumes to facilitate regulatory review within each geographic Project location. These include:

- Volume 1 (this volume) provides a description of the overall Project and an overview of EIA approach and method
- Volume 2 provides a description of the land-based Project activities and potential environmental effects within PEI
- Volume 3 provides a description of the land-based Project activities and potential environmental effects within NB
- Volume 4 is a description of the marine-based Project activities and potential environmental effects within the Northumberland Strait

1.6 PROPERTY OWNERSHIP

The Project will develop lands within PEI and NB and includes the submerged lands of the Northumberland Strait. The total Project area covers an area of approximately 568.7 ha. The provincial governments of NB and PEI have jurisdiction over the intertidal zones in both provinces; MECL will apply for provincial easements in the foreshore zones. The submerged lands of the Northumberland Strait below the foreshore zone are federal crown land under management of Public Works and Government Services Canada (PWGSC). A government authorization for installation and operation of the submarine cables on the seabed of the Northumberland Strait is required and will include input from both provincial governments in NB and PEI, as well as PWGSC.

MECL currently owns the land required for Project infrastructure in PEI. Land easements will be required for the transmission line corridor in NB. The corridor runs largely along an existing transmission line RoW between Melrose and Memramcook, Westmorland County, NB. The corridor between Melrose and Bayfield, NB, follows an existing, unused easement of approximately 12 km.

1.7 FUNDING

Fifty million ($50M) in funding has been granted through federal funding made available by Infrastructure Canada's Green Infrastructure Fund. The remainder of the Project will be financed by the PEI Government.

1.8 REGULATORY FRAMEWORK

1.8.1 Provincial Jurisdiction

Based on the PEI *EPA* and the NB *Environmental Impact Assessment Regulation* (NB EIA Regulation), under the NB *Clean Environment Act* (NB *CEA*), an environmental impact assessment is required to be conducted in both provinces. A scoping document outlining the Project activities and proposed scope of the EIA for the Project activities was submitted to the Prince Edward Island Department of Communities, Land and Environment (PEIDCLE) on November 18, 2014 and the New Brunswick Department of Environment and Local Government (NBDELG) on January 6, 2015.

1.8.1.1 Prince Edward Island

The framework for environmental impact assessments being carried out in PEI is set out in Section 9 of the PEI *EPA*.

The interpretation of the Act is provided in section 1 of the Act. The term "undertaking" is interpreted to include any project which: (i) may cause the emission or discharge of any contaminant into the environment; (ii) have an effect on any unique, rare, or endangered feature of the environment; (iii) have a significant effect on the environment or necessitate further development which is likely to have a significant effect on the environment; or (iv) cause public concern because of its real or perceived effect or potential effect on the environment.

The construction and operation of a high voltage power transmission line is considered to be an undertaking.

Section 9(1) of the Act states that "no person shall initiate any undertaking unless that person first files a written proposal with the Department and obtains from the Minister written approval to proceed with the proposed undertaking."

Section 9(2) of the Act states that the Minister, in considering a proposal submitted pursuant to Section 9(1), may require the proponent to carry out an EIA and to submit an environmental impact statement (EIS); and to notify the public of the proposed undertaking and to provide opportunity for the public to comment.

Based on the requirement of the Act, an EIA is required for the Project in PEI and must be submitted to the Minister for approval. The PEI Environmental Impact Assessment Guidelines (PEIDELJ 2010) has been used to guide this part of the EIA.

A Watercourse, Wetland and Buffer Zone Activity Permit will also be required in PEI following the EIA review to enable the Project to be carried out.

1.8.1.2 New Brunswick

The Project is an "undertaking" pursuant to Schedule A of the New Brunswick *Environmental Impact Assessment Regulation—Clean Environment Act*, ("EIA Regulation") which includes:

> *"(d) all electric power transmission lines exceeding sixty-nine thousand volts in capacity or five kilometres in length."*

The EIA Regulation requires that the proposed construction, operation, modification, extension, abandonment, demolition or rehabilitation of undertakings listed in Schedule A of the EIA Regulation must be registered. Following registration, the Minister of NBDELG will determine if the Project can proceed under certain conditions ("determination review"), or if a more detailed EIA ("comprehensive review") is required. Should a Comprehensive Review be required, an extensive review and assessment process with public consultation requirements would be required. The EIA report that is submitted as the EIA Registration is planned to be sufficiently comprehensive so that a comprehensive review would not be required. A Guide to Environmental Impact Assessment in New Brunswick (NBDELG 2012) will be used as a reference guideline.

Specific permits or approvals (e.g., Watercourse and Wetland Alteration Permits) are likely to be required in NB following the EIA review to enable the Project to proceed.

1.8.2 Federal Jurisdiction

Canadian Environmental Assessment Act, 2012

The federal requirements for conducting an environmental assessment are described in the *Canadian Environmental Assessment Act*, 2012 (*CEAA 2012*) and the Regulations Designating Physical Activities

(SOR/2012-147). The Act and the regulations identify the physical activities that are "designated projects" subject to *CEAA 2012*, and may require environmental assessment by the Canadian Environmental Assessment Agency (the CEA Agency) or by the Canadian Nuclear Safety Commission (CNSC) or by the National Energy Board (NEB).

A new transmission line may be considered a designated project and be subject to requirements as described in *CEAA 2012* depending on the length of the transmission line and the magnitude of the voltage. As per the Regulations Designating Physical Activities under *CEAA 2012,* transmission lines that are more than 75 km of length within new RoW and have a voltage of more than 345 kV are considered designated projects. As the new electrical transmission line is to be less than 75 km in length on a new RoW and is limited to 138 kV of voltage, this Project is not considered a designated project under the Regulations Designating Physical Activities and an environmental assessment under *CEAA 2012* is not required.

Section 67 of *CEAA 2012* sets the framework for the environmental review of projects being carried out on federal land that are not considered designated projects under the Regulations Designating Physical Activities. As the seabed of the Northumberland Strait is federal crown land it is subject to requirements under section 67 of *CEAA 2012*. Section 67 states "*an authority must not carry out a project on federal lands, or exercise any power or perform any duty or function conferred on it under any Act of Parliament other than this Act that could permit a project to be carried out, in whole or in part, on federal lands, unless:*

(a) The authority determines that the carrying out of the project is not likely to cause significant adverse environmental effects; or
(b) The authority determines that the carrying out of the project is likely to cause significant adverse environmental effects and the Governor in Council decides that those effects are justified in the circumstances under subsection 69(3)."

An environmental review under section 67 of *CEAA 2012* is therefore being carried out within the context of this EIA particularly focused on the Northumberland Strait portion of the Project (Volume 4)

Navigation Protection Act

According to the Navigation Protection Program (NPP), this Project may be classed as a designated works under the *Navigation Protection Act.* A self-assessment of the Project against the provisions of the Minor Works Orders for Submarine Cables – Power and Telecommunication and the Aerial Cables– Power and Telecommunication indicates the Project will be excluded from authorization under the NPP provided the following conditions are met for submarine cables:

"7. (1) Submarine cables that are only for power or telecommunication purposes are established as a class of works for the purposes of subsection 5.1(1) of the Act if
(a) the works lie on or under the bed of the navigable water;
(b) the works do not extend vertically above the bed of the navigable water more than

(i) in the case of a navigable water of less than 15 m in depth, when measured from the ordinary high-water mark, 5% of the depth of the water when measured from the ordinary high-water mark, or
(ii) in any other case, 1 m;

(c) the works are not across the entrance to any port, including any marina;
(d) the works are not in a dredged channel or area with maintained depth; and
(e) the works are not in an area that is identified as an anchorage area on a Canadian Hydrographic Service or National Oceanic and Atmospheric Administration chart."

And provided the following conditions are met for aerial cables:

"6. (1) Aerial cables that are over or across a navigable water and that are only for power or telecommunication purposes, and the associated structures and equipment, are established as a class of works for the purposes of subsection 5.1(1) of the Act if

(a) the width of the navigable water at the site of the crossing is less than 30 m when measured from the ordinary high-water mark on one side of the navigable water to the ordinary high-water mark on the other side;
(b) the works are not over or across a lake or tidal waters;
(c) the works are not over or across a canal that is accessible to the public;
(d) the works do not include towers or poles within the area between the ordinary high-water marks on each side of the navigable water; and
(e) the works meet the requirements of section 5.3.3.2 of Overhead Systems, CAN/CSAC22.3 No. 1-10, as amended from time to time."

Fisheries Act

Section 35(1) of the federal *Fisheries Act* states "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 (CRA) fishery, or to fish that support such a fishery". Marine-based activities for the Project have the potential to result in serious harm to fish, although a determination will be required from Fisheries and Oceans Canada (DFO).

Section 36(3) states "subject to subsection (4), no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water".

Deleterious substances are defined by the *Fisheries Act* as: a) any substance that, if added to any water, would degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water, or (b) any water that contains a substance in such quantity or

concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it would, if added to any other water, degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water.

Disposal at Sea

Ocean disposal permits will be obtained (if necessary) from Environment Canada under the Disposal at Sea provisions of the *Canadian Environmental Protection Act* if any marine construction activities are determined to require disposal of approved waste materials at sea (e.g., trenching for the submarine cables).

Migratory Birds Convention Act

The *Migratory Birds Convention Act* (*MBCA*) protects and conserves migratory bird populations, individuals, and their nests within all lands in Canada.

Enabled under the *MBCA*, section 6 of the Migratory Birds Regulations states that without the authorization of a permit, the disturbance, destruction, or taking of a nest, egg, nest shelter, eider duck shelter, or duck box of a migratory bird, or possession of a migratory bird, carcass, skin, nest, or egg of a migratory bird are prohibited.

As there are no authorizations to allow construction-related effects on migratory birds and their nests, best management practices and guidelines are used to facilitate compliance with the *MBCA*.

Species at Risk Act

The federal *Species at Risk Act (SARA)* is administered by Environment Canada with the intent to protect species from extirpation or extinction as a result of human activity. The purpose of provisions under *SARA* are to prevent species of conservation concern (SOCC) from becoming threatened or endangered and to allow for recovery of species who are considered threatened, endangered or extirpated.

Section 32(1) states "*no person shall kill, harm, harass, capture or take an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species*".

Section 33 states "*no person shall damage or destroy the residence of one or more individuals of a wildlife species that is listed as an endangered species or a threatened species, or that is listed as an extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada*".

2.0 PROJECT DESCRIPTION

2.1 PROJECT LOCATION

The Project will take place in three distinct geographic regions, with Project locations in PEI, NB and along and within the Northumberland Strait. The Project location within PEI includes a cable landfall site and MECL substation located along the southwestern shore of PEI in Borden-Carleton, approximately 1 km east of the Confederation Bridge. The Project location within NB includes a cable landfall site along the northeastern shore of NB in Cape Tormentine, located approximately 3 km east of the Confederation Bridge. A transmission line will extend between Cape Tormentine and Memramcook approximately 57 km southwest of the landfall site through new and existing easements. The Project location within the Northumberland Strait is approximately 16.5 km in length, extending between landfall sites in Borden-Carleton and Cape Tormentine.

Three assessment areas are used to facilitate the assessment process. The Project Development Area (PDA) is the immediate area of physical disturbance associated with construction and operation of the Project. The Local Assessment Area (LAA) is defined as the maximum area where Project-specific environmental effects can be predicted and measured with a reasonable degree of accuracy and confidence. The Regional Assessment Area (RAA) is defined as the area within which Project-related environmental effects may overlap or accumulate with the environmental effects of other projects or activities that have been or will be carried out.

The PDA for NB is 225.6 ha in area and includes the existing substation in Memramcook where upgrades to the existing substation will occur within the substation footprint; a 40 km long, 30 m wide transmission line RoW from Memramcook to Melrose and a 17 km long, 60 m wide transmission line RoW from Melrose to Cape Tormentine; a cable termination site; and a 10 m easement around cable lines from high water to the cable termination site.

The PDA for the Northumberland Strait is a 220 m wide corridor extending approximately 16.5 km between Borden-Carleton and Cape Tormentine. This includes the 10 m wide disturbance area for each submarine cable and the 200 m separation distance between the two cable trenches. The actual area of physical disturbance during construction is approximately 33 ha.

The PDA for PEI is 1.1 ha in area and includes 5 m around each of the cables, the cable storage building, the substation expansion (including the cable termination site and substation control building) and a fence line around the expanded substation. The PDA also includes a short span of overhead transmission line that will connect the substation to the existing transmission line grid.

Delineation of LAA and RAA are specific to the valued components (VCs) being assessed and will be included in each respective volume of the EIA document.

2.2 DESCRIPTION OF MAJOR PROJECT INFRASTRUCTURE

This section includes further description of the major Project components.

2.2.1 Transmission Lines

Transmission lines constructed as part of the Project will be designed and built to the same standard as existing high voltage transmission lines in NB and PEI.

Transmission lines in NB will be built as per NB Power specifications, which are constructed in accordance with CSA Standard C22.3 Design Criteria for Overhead Systems, and will include wood pole H-Frame structures installed to a height of 75 ft (approximately 23 m). The span between H-Frame structures is expected to be 200 m. Approximately 57 km of land-based transmission line corridor construction will be required within NB, originating in Memramcook and terminating in Cape Tormentine. Energy transmission will occur through 138 kV three phase overhead transmission lines. The proposed transmission lines will tie into NB Power's existing substation in Memramcook and the termination site in Cape Tormentine.

Approximately 40 km of the 57 km of transmission line corridor in NB will be new build construction adjacent to existing twinned transmission lines between Memramcook and Melrose. The remaining 17 km of transmission line corridor between Melrose and Cape Tormentine will be new build construction within a combination of new and existing easements on which there is no existing transmission line. This 17 km section of transmission line will be twinned (i.e., duplicate lines running in parallel).

A short span of transmission line is needed to connect the substation in Borden-Carleton, PEI, to the existing transmission line. This is considered part of substation upgrades and is addressed in this volume under Section 2.4.1.5.

2.2.2 Cable Termination Sites

Cable termination sites at Cape Tormentine, NB and Borden-Carleton, PEI, are required to transition from cable to overhead transmission. The termination site on the NB side of the Northumberland Strait will be located approximately 200 m from the shore in Cape Tormentine and is required to transition from submarine cable to overhead transmission line.

The cable termination site on the PEI side of the Northumberland Strait will be on land approximately 300 m from shore within the expanded substation in Borden-Carleton and is required to transition from submarine cable to substation. Both termination sites will consist of a riser pole, ground grid, overhead switches and perimeter fencing.

The termination site in Cape Tormentine will have the appearance of a small substation. A climate-controlled metering building will be constructed at this location to house weather sensitive equipment. The building will be located inside the fence at the termination site and will cover a footprint of approximately 18 m^2 (3.5 m x 5 m).

2.2.3 Cable Landfall Sites

The submarine cables will make landfall at Cape Tormentine, NB and within Borden-Carleton, PEI. MECL currently owns the property chosen for the landfall site in PEI. The Cape Tormentine Community Development Corporation currently owns the property chosen for the landfall site in NB. The specific landfall sites will be selected during the engineering and design process. There may be a concrete box structure constructed to facilitate landfall in Cape Tormentine.

The trenches will continue from the seafloor through the intertidal zone and onto land and will be up to 2 m in depth. In Cape Tormentine, the cables will remain buried in one single trench from the cable landfall site to the termination site. In Borden-Carleton, the cable trenches diverge to a point of approximately 10 m apart at the cable landfall site and continue within two separate trenches to opposite sides of the upgraded substation.

Up to 200 m of trenching will be required at Cape Tormentine to connect the cable to the riser station at the termination site. Part of the proposed route may include trenching through a paved section of Route 955.

More trenching is required at Borden-Carleton with 300 m of trenches required to connect the two trenches to the termination site within the expanded substation.

2.2.4 Twin Submarine Cables

Two submarine cables transmitting 360 MW combined at 138 kV each will be installed under the seabed of the Northumberland Strait. Each cable will be solid dielectric, three-core cable with galvanized steel armour and a medium- or high-density polyethylene (MHPE or HDPE) jacket. Transmission of electricity is through three copper conductors sheathed in lead in the cable interior. Oil is not used as an insulator in the chosen cable design. The cable is insulated with cross-linked polyethylene (XLPE) which is made from high density polyethylene and contains cross-linked bonds in the polymer structure creating a highly durable material.

The two cables will be installed under the seabed in separate trenches, up to 200 m apart. The cables will be buried, where possible, to protect the cables from interactions with commercial fishing gear, anchors, ice scour and erosion. If burial is not possible, concrete mattresses or similar protection methods will be used for cable protection. The method of excavation within the marine environment will include trenching with excavators in water depths up to 2 m, and a trenching remotely operated vehicle (TROV) with a saw cutter for the remaining sections. There will be no fishing exclusion zones around the cables. Once the cables have been installed, it is anticipated that navigation charts will be updated.

2.2.5 Substation Upgrades

As a result of the additional electrical power transmitted between Memramcook and Borden-Carleton, upgrades and expansions are required to the Memramcook, NB substation and Borden-Carleton, PEI substation.

The Memramcook, NB substation upgrade will be designed and built by NB Power in accordance with applicable national standards. The upgrade will consist of the addition of one new 138 kV line termination point and requires a single circuit breaker, disconnect switches, instrument transformers, protection and control and telecommunications equipment to comply with current standards. The upgraded substation will cover an approximate area of 1,300 m^2 (30 m x 43.3 m) and be enclosed by a fence.

The upgrades to the Borden-Carleton substation will include expansion of the substation into a breaker-and-a-half scheme (i.e., one spare breaker for every two circuits). Weather sensitive equipment will be housed in a substation control building to be built on site. The climate-controlled building will cover a footprint of approximately 125 m^2 in area (18 m x 7 m) and will house the station service for the substation as well back-up batteries and a generator. The substation will be designed so that it can be expanded to accommodate potential future transmission, generation or cable connections.

To allow for on-site storage of four 250 m spools of spare cable, a climate-controlled cable storage building will be constructed adjacent to the existing storage building in Borden-Carleton. The building will be one-story and cover a footprint of approximately 400 m^2 in area (20 m x 20 m). Access will be through a main access door and the building will be built with a removable roof for crane access to the spools. As the building will be temperature-controlled, an on-site back-up diesel generator will be installed to maintain power to the building in the event of a power disruption.

The substation expansion and building construction will be completed within lands owned by MECL.

2.3 PROJECT ALTERNATIVES

2.3.1 Alternatives to the Project

The generation of power within PEI is considered as an alternative to importing electricity from NB. PEI currently has several commercial-scale wind power operations which supply power; however, current energy demand on PEI is estimated at 260 MW and growing, and wind power may not be present when an energy demand is greater than 200 MW, which is the capacity of the existing cables. Using existing PEI infrastructure, power supply in excess of 200 MW during low-wind conditions would be supplied by oil-fired generators. Oil-fired generators are expensive to operate and are not considered an economically feasible alternative to the Project. Construction of large-scale power generation facilities within PEI is not considered economically feasible when compared to the cost of importing electricity from off-Island, and is therefore not included as an alternative to the Project.

2.3.2 Alternative Project Methods

Several alternative routes have been considered for the proposed transmission cable between PEI and NB. The consideration of a non-submerged cable route was made possible with the construction of the Confederation Bridge in 1997; this option was not possible when the existing submarine cables were installed. The following alternative routes were considered and include both submerged and non-submerged options.

Non-submerged options are as follows:

- routing of cable(s) through utility corridor (utilidor) along the interior of the Confederation Bridge, or
- routing of cable(s) along the exterior of the Confederation Bridge

Submerged options are as follows:

- burial of single submarine cable versus dual cables
- burial of submarine cable(s) immediately adjacent to existing cables, or
- alternate landing locations in Wood Islands or West Point, PEI

Project weighting factors identified by MECL include year-round accessibility for repair, lower capital cost of transmission capacity, lower operating cost and lower risk of physical damage by external factors. The non-submerged option of routing the cable along the interior of the Confederation Bridge was considered the most desirable of all potential proposed 'utilidor' alternatives; however, after conducting a feasibility study, this option was ruled out.

When assessing the non-submerged option of attaching the cable to the exterior of the Confederation Bridge, this proposed alternative was found to be the same cost as a submarine cable installation, but an assessment of positive attributes completed by MECL found the submarine installation option to be most desirable.

Upon choosing a submerged cable design, several alternative options were considered. A dual cable installation was chosen to satisfy future energy requirements, as a single cable would not have the transmission capacity to provide sufficient power to PEI once the existing cables reach the end of their useful service life. Burial of the submarine cables adjacent to the existing cables would reduce the environmental effects as it is a previously disturbed area with existing infrastructure, but this proposed alternative does not protect against the disruption of power service in the event of an accidental anchor drag, fishing-related cable damage or equipment failure at the landing sites.

Alternate cable installation and landing locations in both Wood Islands and West Point, PEI, were considered. Both cable path length, substrate type and ice scour protection are factors in choosing new cable and landing locations. A minimum path length and soft substrate (i.e., sand/silt) for cable burial are desirable as the cable is expected to be laid in a continuous manner with no section joints and buried to protect against fishing gear, anchor drag and ice scour. The spanning location of the Confederation Bridge follows the shortest distance between PEI and NB within the Northumberland Strait. The current route was chosen as the majority of the substrate is made up of sand and silt with smaller amounts of clay and gravel.

For the purpose of ensuring redundancy, new landing sites have been chosen in NB and PEI. This is to ensure against damage or loss of all four submarine cables should an unexpected event occur at a landing site. Based on the age of existing transmission line infrastructure from Memramcook to Melrose and the need for redundancy, new transmission line will be constructed between Melrose and Memramcook to accommodate the installation of the new submarine cables. The new transmission line from Melrose to Bayfield will follow an existing easement purchased in the 1960's by NB Power. Two

options were originally considered for the transmission line route from Bayfield to Cape Tormentine. The preferred route was selected based on constructability, accessibility and environmental constraints.

2.4 DESCRIPTION OF PROJECT PHASES AND ACTIVITIES

A general overview of the Project activities to be undertaken is presented in this section. The description includes activities during construction, operation, and decommissioning and abandonment phases (Table 2.1). These key Project phases and activities are representative of the activities that have the potential to interact with the environment.

Table 2.1 Description of Project Phases, Activities and Physical Works

Project Phase	Activity Category	Project Activities and Physical Works
Land-Based Infrastructure - Prince Edward Island And New Brunswick		
Construction	Site Preparation for Land-Based Transmission Lines in NB	The Project-related activities associated with preparing the RoW, access roads, and staging areas for physical construction, including: • clearing • grubbing (if necessary) • construction of temporary water crossing (where necessary)
	Physical Construction of Land-Based Transmission Lines in NB	The physical construction of the land-based transmission lines associated with the Project, including: • assembly of structures and installation of structures • stringing of conductors, including overhead ground wires • installation of guy wires and anchors (where necessary)
	Landfall Construction (similar in both NB and PEI)	The physical construction of the submarine cable landfall includes: • trenching • installation of cables • construction of termination site in NB (riser pole, revenue metering, control building, ground grid, fence, and overhead switches) • installation of shoreline protection
	Upgrading of Electrical Substation (NB)	Upgrades at the electrical substation in NB include: • installation of protection and controls • installation of telecommunications equipment • connection of transmission lines
	Expansion of Electrical Substation (PEI)	The expansion of the electrical substation includes: • site preparation (grubbing/grading/leveling) • installation of electrical components • construction of termination site • connection of transmission line
	Inspection and Energizing of the Transmission Lines	• inspection of infrastructure • energizing of Project

Table 2.1 Description of Project Phases, Activities and Physical Works

Project Phase	Activity Category	Project Activities and Physical Works
	Clean-Up and Re-vegetation of the Transmission Corridor	• removal of temporary infrastructure • stabilization and reconstruction of disturbed areas
	Emissions and Wastes	Emissions and wastes arising from construction activities, including: • release of air contaminants to the atmosphere (e.g., combustion gases from vehicles and heavy equipment, and the generation of airborne dust, (i.e., fugitive dust from roadways and construction activities)) • sound emissions (e.g., from construction activities or from vehicle/equipment movements) • vibration • surface runoff • solid waste disposal
	Transportation	The activities associated with the transportation of goods, materials, and personnel to and from the Project site during construction, including: • transportation of equipment, supplies and materials • transportation of personnel to and from the Project site
	Employment and Expenditure	The activities associated with Project-related employment and expenditures associated with construction of the Project, including: • purchase of equipment, supplies, and materials • employment and incomes
Operation	Energy Transmission	• transmission of electricity
	Vegetation Management	• mechanical and/or chemical vegetation management
	Infrastructure Inspection, Maintenance and Repair (Transmission Lines and Substations)	• periodic inspection and preventative maintenance of infrastructure
	Access Road Maintenance	• vegetation management • regrading or resurfacing of access roads as necessary
	Emissions and Wastes	Emissions and wastes arising from maintenance activities, including: • release of air contaminants to the atmosphere (e.g., fugitive dust from on-site vehicle movements, combustion gas emissions from vehicles and heavy equipment) • sound emissions (e.g., equipment operation, and vehicle movements) • electromagnetic fields from transmission of power in lines and cables • surface runoff • solid waste disposal

Table 2.1 Description of Project Phases, Activities and Physical Works

Project Phase	Activity Category	Project Activities and Physical Works
	Transportation	The activities associated with the transportation of goods, materials, and personnel to and from the Project site during operation, including: • transportation of materials and personnel for vegetation maintenance • transportation of materials and personnel for inspection, maintenance, and repair of infrastructure
	Employment and Expenditure	The activities associated with Project-related employment and expenditures associated with operation of the Project, including: • purchase of equipment, supplies and materials for maintenance • employment and incomes
Decommissioning and Abandonment	Decommissioning	The activities associated with the decommissioning of Project components and facilities at the end of their service life, including: • decommissioning and removal of equipment • removal of buildings and structures
	Reclamation	The activities associated with RoW reclamation, re-vegetation and clean-up at the end of their service life.
	Emissions and Wastes	Emissions and wastes arising from decommissioning and abandonment, including: • fugitive dust and combustion gases during decommissioning activities • sound emissions from decommissioning activities
	Employment and Expenditure	The activities associated with Project-related employment and expenditures associated with decommissioning and abandonment, including: • purchase of equipment, supplies and materials • employment and incomes
Marine-Based Infrastructure - Northumberland Strait		
Construction	Site Preparation for Submarine Cable	• trenching for landing approach (near shore)
	Installation of the Submarine Cable	• trenching for cable installation • laying of cable • infilling of cable trench in the near-shore • alternate protection
	Inspection and Energizing of the Submarine Cable	• inspection of infrastructure • energizing of Project

Table 2.1 Description of Project Phases, Activities and Physical Works

Project Phase	Activity Category	Project Activities and Physical Works
	Emissions and Wastes	Emissions and wastes arising from construction activities, including: • release of air contaminants to the atmosphere (e.g., emissions from marine vessels and equipment) • sound and vibration emissions (i.e., atmospheric and underwater sound from construction activities) • solid waste disposal (e.g., construction materials, spoils, and/or rocks) • ballast water discharge
	Marine Transportation	• movement of marine vessels
Operation	Energy Transmission	• transmission of electric power
	Infrastructure Inspection, Maintenance and Repair	• periodic inspection and preventative maintenance of infrastructure
	Emissions and Wastes	Emissions and wastes arising from operation activities, including: • electromagnetic fields • solid waste disposal
Decommissioning and Abandonment	Decommissioning	The activities associated with the decommissioning of Project components and facilities at the end of their service life, including: • decommissioning and abandonment of submarine cables • reclamation as necessary
	Emissions and Wastes	Emissions and wastes arising from decommissioning, including: • combustion gas emissions • sound emissions • solid waste disposal
	Marine Transportation	The activities associated with the transportation of goods, materials, and personnel during decommissioning and abandonment, including: • transportation of equipment, supplies and materials • transportation of personnel

2.4.1 Land-Based Infrastructure Construction - PEI and NB

Land-based construction activities will begin immediately following government approval of the EIA and the receipt of all necessary permits and authorizations. The following is a brief description of land-based construction activities that are typical for construction of high voltage transmission lines. These activities will be managed by MECL and NB Power in accordance with each company's Environmental Protection Plan (EPP).

2.4.1.1 Site Preparation for Land-based Transmission Lines

Site preparation for overhead transmission lines in NB will be required for the entire 57 km of overhead transmission line corridor in NB. The following Project works are required to prepare the land for installation of the overhead transmission infrastructure:

- upgrades of temporary and/or permanent access roads
- clearing of the transmission line corridor
- grubbing of areas for pole placement (if necessary)
- construction of temporary watercourse crossings (if necessary)
- removal and stockpiling of topsoil and overburden
- grading and leveling in advance of installation of the overhead transmission infrastructure

Erosion and sedimentation control practices will be implemented with all physical works to reduce erosion of exposed areas and sedimentation of surface water. Dust control measures will be taken, where necessary, during site preparation to minimize the potential environmental effects of fugitive dust to offsite locations.

2.4.1.1.1 Overhead Transmission Line Corridor Clearing

Vegetation clearing will be conducted for the transmission line corridor within NB and, where necessary, for access roads, staging areas, and substation upgrades.

Access will be required in some locations to allow transportation of construction equipment, materials, and personnel. Existing access points and roads will be used where possible.

Staging areas will be used for temporary placement of construction materials (e.g., poles, conductors and hardware) in the vicinity of the construction area. Staging areas will be situated to avoid environmentally sensitive areas, such as rare plants, wetlands, watercourses, and their buffers. They will be easily accessible, located to reduce potential traffic hazards, and will be located away from developed areas in order to reduce noise and dust concerns. Sites requiring little or no modification, such as forestry landings or harvested fields, will be used for temporary staging areas, where possible. If staging areas are to be located on private property, agreements will be signed with the individual landowners. Security fencing may be placed around the site. Following construction, staging area sites will be returned to their pre-construction condition.

The majority of clearing activities will be conducted with harvesting equipment; however, within 30 m of a watercourse or wetland, clearing will be conducted by hand. Hand clearing may also be required in areas of medium to high archaeological potential. To prevent disturbance of migratory birds and their nests, the timing of clearing will be planned for outside of the breeding bird season for most species (April 1 to August 31) to the extent possible.

Cleared merchantable timber will become the property of the contractor and any remaining cleared vegetation will be stockpiled and/or chipped on site.

2.4.1.1.2 Overhead Transmission Line Corridor Grubbing (if required)

Grubbing will include the removal and disposal of stumps and roots that remain after clearing, where necessary. Grubbing will be conducted using a root rake or similar equipment that is able to remove the roots and stumps of cleared vegetation and leaves the topsoil for salvage. The grubbing will be limited to the footprints of the overhead transmission line structures. Grubbing may be required at the location of the transmission line termination sites, depending on foundation requirements. If grubbing is required, archaeological surveys will be required in medium and high potential areas.

2.4.1.1.3 Construction of Temporary Watercourse and Wetland Crossings (if required)

Access along the overhead transmission line corridor may be interrupted by watercourses and wetlands. Crossing of watercourses or wetlands is required if no other existing means of access is available. To cross watercourses or wetlands, temporary structures will be constructed to eliminate fording. The methods for the construction of temporary watercourse or wetland crossings will depend on the crossing width and length of the span required, hydrology, environmental sensitivities, and engineering considerations. The following includes a list of options for crossing watercourses and wetlands:

- use of existing structures, where feasible
- use of temporary structures where existing/permanent crossings are not available (e.g., temporary bridges, brush mats, swamp mats). Temporary structures, if needed, will be designed and installed in accordance with applicable provincial and federal guidelines. Structures will be removed when construction is complete and any disturbance caused as a result of the structures will be quickly rehabilitated to original conditions.

2.4.1.2 Construction of Land-based Transmission Lines

Transmission lines constructed as part of the Project will be designed and built to the same standards as existing high voltage transmission lines in NB.

Transmission lines in NB will be built as per the CSA Standard C22.3 Design Criteria for Overhead Systems and will consist of wood pole H-Frame structures installed to a height of 75 ft (approximately 23 m). The span between H-Frame structures is expected to be 200 m. Approximately 57 km of land-based transmission line corridor construction will be required within NB, originating in Memramcook and terminating in Cape Tormentine.

A short span of transmission line is needed to connect the substation in Borden-Carleton, PEI, to the existing transmission line. This is addressed in this volume under Section 2.4.1.5.

2.4.1.2.1 Assembly and Installation of Structures

The assembly of structures includes transportation of materials to the site, excavation of the pole location, pole placement, and backfilling of excavated material.

Installation of transmission line structures will require an excavation of two holes approximately 1 m in diameter and approximately 2.5 to 3 m deep. Based on these dimensions, there will be 4.0 to 4.8 cubic metres (m^3) of excavated material for each structure. An excavator will be used to excavate the majority of the pole locations. The assembly of structures will take place on-site at structure locations. The disturbance area around the structure site for construction equipment operation, structure assembly, and structure installation activities will be limited to the corridor. Compacted native soil disturbed during the auguring process will be used to fill the sides of the excavations. Should additional backfill material be required for the new structures, it will be obtained from a provincially approved local source.

Precise structure locations have yet to be determined; they will be based on a number of physical and environmental surveys. Structure locations will avoid watercourses, wetlands, and any other environmentally sensitive areas where possible.

2.4.1.2.2 Installation of Guy Wires and Anchors

Although specific information regarding anchor requirements for guy wires at angle structures has yet to be determined, Helix anchors, rock anchors and/or log anchors may be used depending on structure location.

It is anticipated that Helix (screw type) anchors will be used predominantly for the Project. Helix anchors are best suited for soil conditions having limited load bearing characteristics and/or in wet areas. This type of anchor is comprised of a steel shaft and helices that are screwed into the ground to a calculated depth. The helices transfer the stress of the load evenly across the soil. These anchors are easier to install, require little to no site preparation, do not result in excavated material, and can be withdrawn and reused.

Rock anchors will be required in areas where bedrock is present and screw type anchors are not feasible. Wedge style anchors and grouted rock anchors are typical rock anchor configurations. Grouted rock anchors are best suited for areas of fractured bedrock and will most likely be used. Bedrock is drilled to a specific depth and the grouted rock anchor is installed and backfilled with grout to the surface, preventing the anchor from pulling back through the bedrock while under tension.

Log anchors may be used as required. Log anchors will be installed in soft areas (e.g., wetlands, bogs) or at structure locations under high tension. Log anchors consist of a 1.2 to 1.8 m section of pole that is typically buried lengthwise 2.4 m underground. Tension cables are attached to anchor rods through logs and structures; the excavation is then backfilled and the soil compacted.

2.4.1.3 Landfall Construction (NB and PEI)

The submarine cable will make landfall at Cape Tormentine, NB and within Borden-Carleton, PEI. The specific landfall sites will be selected during the engineering and design process. Trenching is required in the backshore area as the submarine cables will remain buried on land until the cables reach the landfall termination sites in both PEI and NB. In Cape Tormentine, the cables will converge from two separate trenches in the marine environment and be buried in a single trench on land. Cables will

converge to a single trench when approaching the landfall site in Borden-Carleton but will diverge after landfall and approach the substation in two separate trenches.

2.4.1.3.1 Trenching

Excavation requirements for trenching are dependent on geotechnical conditions within the identified landing sites. Trenches on land will be excavated to a depth of 2 m.

In NB, there will be up to 200 m of excavation from the high-water mark to the landfall termination site. The shoreline consists of a sandy beach area with a gradual embankment, resulting in an elevation difference of 1 m from beach to land. No bedrock was identified on-site; the trench will be excavated 2 m into the overburden. If the cable route crosses Route 955 in Cape Tormentine, trenching in this area will involve removal and reinstatement of paved areas.

In PEI, there will be approximately 300 m of excavation from the high-water mark to the landfall termination site. The shoreline here consists predominantly of bedrock outcrops with a steep embankment, resulting in a vertical elevation difference of 2.5 m from beach to land. The backshore area of the proposed cable route cuts through former agricultural land. With the presence of bedrock, specialized excavation equipment (e.g., ripper tooth or hydraulic rock breaker) may be required to excavate to a depth of 2 m below grade.

2.4.1.3.2 Installation of Cable

At the landfall site in Cape Tormentine the two cables will be installed in a single trench with a minimum separation of 5 m. In Borden-Carleton, the cables will land about 10 m apart and continue to the substation in separate, 2 m wide trenches. The land-based trenches will be partially filled with thermal sand and warning tape and boards will be installed above the cable. Warning tape and boards serve as indication that a power cable is present below if excavation is required in the area

At the landfall site in Cape Tormentine the two cables will be installed in a single trench with a minimum separation of 5 m. The cables will converge to a single trench with a minimum cable separation of 5 m when approaching landfall in Borden-Carleton but will diverge to two separate trenches on land. The land-based trenches will be partially filled with thermal sand and warning tape and boards will be installed above the cable. Warning tape and boards serve as indication that a power cable is present below if excavation is required in the area.

2.4.1.3.3 Installation of Shoreline Protection

The embankment at the landing sites in NB and PEI is susceptible to erosion from ice and wave action. Efforts will be focused on protecting the cable from becoming exposed due to shoreline erosion.

Coastal erosion assessments were carried out in 2015 at both landing sites. These assessments included a site visit and a review of historical aerial photography for the area. Both landing sites are susceptible to erosion; however, the landing site in PEI had a greater rate of soil erosion than the site in NB.

The design of the shoreline protection will be part of the geotechnical work for the landfall construction and details from the coastal erosion assessments will be used to inform the design.

2.4.1.3.4 Termination Site Construction (NB)

Cable termination sites at Cape Tormentine, NB and Borden-Carleton, PEI, will be required to transition from cable to overhead transmission. The termination site in Borden-Carleton is located within the expanded substation and is addressed in Section 2.4.1.5.

The termination site in Cape Tormentine will be located approximately 200 m from the shore and will consist of a riser pole, overhead termination structures, ground grid, fence, and overhead switches.

A climate-controlled metering building will be constructed inside the fence of the cable termination site to house weather-sensitive equipment. Building and termination site foundation designs will depend on the results of geotechnical studies and environmental conditions.

2.4.1.4 Upgrading of Electrical Substation (NB)

As a result of the additional electrical power transmitted between Memramcook and Borden-Carleton, upgrades are required to the Memramcook, NB substation. The new upgrade will be designed and built by NB Power. Ground disturbance will be required for the foundations of the circuit breakers, switches and instrument transformers and the installation of the ground grid. No additional land clearing is required to complete the expansion.

2.4.1.4.1 Connection of Transmission Lines

Upon completion of the upgrades to the substation, the overhead transmission lines originating from Cape Tormentine will be connected to the substation breakers. This connection will occur within the footprint of the existing substation and complete the connection to the grid for the transmission of electric power.

2.4.1.5 Expansion of Electrical Substation (PEI)

The expansion of the Borden-Carleton substation will include reconfiguring and expanding the substation and the construction of a cable storage building, substation control building and termination site. As the termination site for the submarine cable will be located within the substation, it will be considered part of the substation expansion for the purpose of this assessment. A short span of transmission line is required to connect the substation to the existing transmission line grid in Borden-Carleton. As this span is limited in length to one or two single wooden poles, it is also considered part of the substation expansion for the purpose of this assessment. The substation will be designed so that it can be further expanded to accommodate potential future transmission, generation or cable connections.

2.4.1.5.1 Site Preparation (grubbing/grading/leveling)

The lands surrounding the current electrical substation are owned by MECL, the expansion of the electrical substation and building construction will occur entirely within these lands. Grubbing is not expected to occur as ground vegetation is limited. Extensive grading is not anticipated for the expansion and construction work. The footprint of the cable storage building will cover an area of approximately 400 m^2 and the footprint of the substation control building will cover an area of approximately 125 m^2. Limited ground disturbance may be required for the construction of the foundations for the circuit breakers, the installation of the ground grid and perimeter fencing. No land clearing is required to complete the work.

2.4.1.5.2 Installation of Electrical Components

Substation upgrades will include configuring the substation into a breaker-and-a-half scheme. This will require nine circuit breakers, high voltage bus structures, transformers, switchgear, a ground grid, and perimeter fencing.

Concrete footings will be required for structures within the expanded substation, including circuit breakers and incoming high voltage bus structures. Concrete pads will be required for any buildings installed. A fence is planned to be installed around the substation perimeter, with fence poles requiring footings as well. These upgrades will require approximately 9,600 m^2 of land.

2.4.1.5.3 Connection of Transmission Lines

To facilitate the connection of the substation in Borden-Carleton to the existing grid in PEI, a short span of transmission line will be constructed. This span is single-pole construction and consists of one to two poles spanning a distance of approximately150 m from the substation to the existing transmission line.

2.4.1.6 Inspection and Energizing of the Project

Following the installation of Project components, line inspections will be conducted by MECL and NB Power staff from the ground and potentially from the air to ensure the line is ready for service. Any deficiencies discovered during these patrols will be corrected prior to energizing (commissioning) the cables and transmission lines.

2.4.1.7 Clean-up and Re-vegetation

In areas where soil disturbance due to construction may cause erosion, measures will be taken to stabilize the affected area. Such measures may include trimming and back blading, mulching, seeding, and fabric placement. Erosion control used during construction will be maintained until such time as the disturbed ground has been adequately stabilized with vegetation.

2.4.1.8 Emissions and Wastes

2.4.1.8.1 Air Contaminants

Releases of air contaminants to the atmosphere will consist mainly of combustion gases from the operation of on-site construction equipment and large trucks used to deliver equipment to the site. There may be some fugitive dust generated as a result of excavation activities. The predominant source of greenhouse gases (GHGs) will be from fuel combustion in heavy equipment and trucks. Nominal quantities of GHGs will be released from clearing. During construction, air contaminants may be released from the following activities:

- fuel combustion in heavy equipment during clearing and site preparation (e.g., excavators, dozers)
- fuel combustion in passenger vehicles moving to and from the site, as well as on-site
- fuel combustion in trucks transporting equipment and material
- dust from site preparation activities (e.g., land clearing and grading)
- dust from vehicle and equipment movements on unpaved roads
- dust from loading and unloading of overburden and topsoil
- dust from stockpiling of overburden and topsoil

Topsoil and overburden stockpiled during construction will be seeded and re-vegetated periodically. The generation of airborne dust from these sources is therefore considered to be nominal. Topsoil and overburden are transferred by trucks to stockpiles. While material handling may generate dust, it is assumed that the material is wet and that minimal dust is generated.

The emissions will remain largely confined to the Project area and the immediately adjacent areas, as these activities will be transient (i.e., carried out to install one part of the line, then moving on to another area) and will be of short duration.

2.4.1.8.2 Sound and Vibration Emissions

Sounds emissions and vibration will result from the operation of heavy equipment and from transportation vehicles on Project access roads. Similar to air contaminants, noise will remain largely confined to the corridor and the immediately adjacent areas, and will be transient.

2.4.1.8.3 Surface Runoff

Site run-off from precipitation events will be carefully managed. Watercourse and wetland alteration mitigation measures (e.g., erosion and sedimentation control measures) will be employed during construction, and ground disturbance will be limited outside the required construction zones. Management of site run-off will employ best practices such as containment ditches, and silt curtains to avoid or mitigate potential environmental effects to watercourses.

2.4.1.8.4 Solid Waste Disposal

There will be disposal of some general construction wastes such as wood, steel, cardboard or other packaging, and other construction wastes. These materials will be disposed at approved construction and demolition disposal sites. Merchantable timber from site clearing will be sold, and remaining brush will be stockpiled. No burning of waste will be carried out during construction. Soil and overburden will be stockpiled for future use in reclamation activities. MECL and NB Power, or its contractors, will re-use or recycle waste materials where possible, and dispose of other wastes at approved facilities.

Any liquid hazardous materials (e.g., waste oils and lubricants) generated by contractors on-site will be collected and disposed of using approved hazardous materials collectors.

2.4.1.9 Transportation

Construction and trucking activities will vary from month to month during construction, depending on what components are being constructed and the stage of construction. Road traffic generated during construction will be comprised of:

- trucks (transportation of construction equipment and materials, and various services)
- passenger vehicles (construction workers' automobiles, SUVs, vans and pick-ups)
- buses (construction workers)

2.4.1.10 Employment and Expenditure

The construction workforce will be accommodated in nearby lodgings within NB and PEI, Project camps will not be constructed for the Project. A variety of management, accounting and payroll, engineering and construction personnel will be required during construction. These workers may be employed by NB or PEI- based construction or engineering firms. Specialists from within Canada or abroad may be employed to advise or construct unique aspects of the Project.

2.4.2 Land-Based Infrastructure Operation – PEI and NB

During the operation of the land-based infrastructure (overhead lines, substations and buildings), routine activities will be performed to ensure reliability of the network. Activities expected during operation include energy transmission, vegetation management, infrastructure inspection, maintenance and repair, access road maintenance and transportation of people or materials. These activities have the potential to produce emissions, solid waste, and employment and expenditures. These activities are described in the following sections.

2.4.2.1 Energy Transmission

Following construction, the transmission lines will be energized and will begin transmitting electricity. Energy transmission will occur through 138 kV three phase overhead transmission lines from the substation in Memramcook to the landing site in Cape Tormentine. On PEI the electric energy will be transferred from the substation in Borden-Carleton to the MECL grid via overhead transmission lines.

The transmission lines will be operated continually for the life of the Project. Routine inspections and maintenance will ensure minimal interruptions to this activity.

2.4.2.2 Vegetation Management

NB Power and MECL will be responsible for maintaining the RoW for vegetation control and to permit suitable access to the transmission lines during emergencies and for regularly scheduled inspections and maintenance. Routine inspections will be conducted to facilitate the safe and reliable operation of the transmission lines, and to minimize the risk of potential hazards such as fires or electrocution caused when trees grow too close to energized transmission lines. NB Power and MECL will restrict the growth of trees and brush along the lines through their vegetation management program to avoid interruptions to electric service caused by overgrown or fallen vegetation. The clearances were developed from the Canadian Electrical Code for safe and reliable operation of high-voltage lines. Manual, mechanical, and chemical methods will be used to control vegetation along the RoW. The frequency of vegetation management depends upon the growth rate, but is normally carried out every five to seven years.

2.4.2.3 Infrastructure Inspection, Maintenance, and Repair

NB Power and MECL will conduct the required maintenance of the transmission lines so that it operates in a safe and reliable manner according to the Canadian Electrical Code. Regular ground and aerial line inspections will be performed by maintenance staff.

Maintenance inspections will be completed to check for the deterioration of conductors, poles, hardware and insulators, and identify maintenance requirements. These inspections will assist in identifying potential for weakened support structures and foundations, as well as changes in terrain that may affect structure stability. Aerial inspections and/or ground patrols will be performed periodically. Ground patrols will be performed using existing adjacent road access and will therefore avoid fording of watercourses or disturbance to wetlands. Additional inspections may be carried out in the event of an emergency (e.g., ice or wind storm). Inspection results will be provided to NB Power and MECL operational personnel who are responsible for planning and scheduling maintenance work.

2.4.2.4 Access Road Maintenance

Access roads will use existing adjacent road access where possible. New access roads will avoid sensitive areas (e.g., wetlands, water crossings) where possible. General access road maintenance activities will be carried out by third parties during the summer months, with the assistance of NB Power or MECL and may include:

- bridge or culvert maintenance
- litter pick-up
- road repairs
- snow removal and ice control
- traffic sign installation and repairs
- traffic signal maintenance
- vegetation control

2.4.2.5 Emissions and Wastes

During operation, the Project has the potential for the release of solid waste, air contaminants and noise during inspection, maintenance and repair. Electromagnetic fields will be generated during the transmission of energy. Surface runoff may occur within the transmission corridor, substations and termination sites.

2.4.2.5.1 Air Contaminants

During operation, air contaminants may be released from the following activities:

- fuel combustion in mobile equipment
- fuel combustion in on-site back-up power generators
- fuel combustion in passenger vehicles
- dust from the movement of vehicles and equipment on unpaved roads

An on-site diesel generator will be used as a back-up power supply for the cable storage building to ensure required interior temperatures are maintained during unplanned power outages. It is assumed that the use of back-up power generation will be infrequent and of a short duration.

The emissions will remain largely confined to the Project area and the immediately adjacent areas, as these activities will be transient (i.e., carried out to install one part of the line, then moving on to another area) and will be of short duration.

2.4.2.5.2 Sound Emissions

Sound emissions and vibration will result from the operation of heavy equipment and from transportation vehicles on Project access roads. Similar to air contaminants, noise will remain largely confined to the corridor and the immediately adjacent areas, and will be transient.

2.4.2.5.3 Surface Runoff

Surface runoff will be managed through the grading of the RoW and the use of best-management-practices such as erosion and sedimentation controls. An erosion and sedimentation plan will be incorporated into the Project EPP.

Management of site run-off will employ best practices, such as containment ditches, to avoid or mitigate potential environmental effects to watercourses.

2.4.2.5.4 Electromagnetic Fields

The transmission of energy through overhead lines is anticipated to result in the generation of electromagnetic fields (EMFs). The strength of the EMF is dependent on the distance from the source and the amount of power being transferred through the cable. Within North America EMF is generally measured in units of milligauss (mG). Typical EMF levels range from 30 - 35 mG directly under a 138 kV transmission line (BC Hydro nd). EMF levels drop to 0.5 to 2 mG at a distance of 25 m. Health Canada

has not established national guidelines on EMF exposure levels based on the lack of sufficient scientific evidence to conclude that exposure cause health problems for the public (Health Canada 2009). The construction of the overhead lines will be in accordance with good utility practice and CSA Standard C22.3 for Overhead Systems (CSA 2015).

2.4.2.5.5 Solid Waste Disposal

There will be disposal of some general operational wastes such as wood, steel, cardboard or other packaging. These materials will be disposed of at approved disposal sites. No burning of waste will be carried out during operation. Soil and overburden will be stockpiled for future use in reclamation activities. MECL and NB Power, or its contractors, will re-use or recycle waste materials where possible, and dispose of other wastes at approved facilities.

Any liquid hazardous materials (e.g., waste oils and lubricants) generated by contractors on-site will be collected and disposed of using approved hazardous materials collectors.

2.4.2.6 Transportation

Once commissioning activities are completed, the Project operation and the traffic generated will be low and fairly uniform.

Road traffic generated during the operation phase of the Project will be comprised of:

- passenger vehicles (NB Power and MECL pick-ups)
- support vehicles for transport of equipment, and various services for transmission line inspection, maintenance and repair, and vegetation management

2.4.2.7 Employment and Expenditure

The operation workforce will be limited and originate from within NB and PEI; Project camps will not be required for the operation of the Project. A variety of management, accounting and payroll, engineering and construction personnel will be required during operation. These workers may be employed by NB or PEI based construction or engineering firms, NB Power or MECL. Specialists from within Canada or abroad may be employed to advise or construct unique aspects of the Project during operation.

2.4.3 Land-Based Infrastructure Decommissioning and Abandonment – PEI and NB

During the decommissioning and abandonment of land-based infrastructure, expected activities consist of either on-site demolition or removal and disposal, recycling or selling of Project infrastructure. These activities are described in the following sections.

2.4.3.1 Decommissioning

Transmission lines are designed, operated, and maintained to provide safe and efficient service over the long-term. If lines need to be decommissioned, the conductors are removed, structures dismantled, and the corridor left to re-vegetate naturally.

While decommissioning or abandonment of the Project is not currently envisioned, the Project will at some point be decommissioned or rebuilt at the end of its useful service life, in accordance with the applicable standards and regulations current at that time. A decommissioning and abandonment plan to be developed for the Project, at the end of its service life, will specify the procedures that will be followed with respect to the decommissioning, removal, and disposal of site infrastructure and for site remediation based on the requirements current at that time. The decommissioning and abandonment plan will also contain measures to achieve targeted environmental goals.

Most of the site infrastructure will be decommissioned and removed. Removable assets will be removed and sold or disposed of prior to or concurrent with their dismantling.

Access roads, power supplies, water management structures, and other utilities, will be decommissioned unless required for care and maintenance of the site during closure and post-closure. On-site power supplies and utility poles no longer needed will be decommissioned and removed from the site to approved off-site facilities. The main electrical transmission lines supplying power to the site will be retained until the site is fully reclaimed. At this point, the lines may be decommissioned and reclaimed.

Above-ground structures will be removed, sold or recycled to an approved off-site facility. All below-ground structures will remain in place and reclaimed as part of the site reclamation.

Following removal of the assets, foundations will be broken or blasted down to or below ground level, where possible, and then backfilled to create natural-looking landforms. Other surplus materials (e.g., sheet metal, insulation, roofing material, and other waste industrial construction materials) will be recycled or disposed of at an approved off-site facility. Chemicals, waste products, and potentially hazardous materials will be disposed of according to local requirements.

During the decommissioning work, an investigation will be conducted to determine the presence, if any, of contamination from accidental spills and long-term use of hazardous materials. Any incidents identified will be remediated according to practices approved by NBDELG or PEIDCLE.

2.4.3.2 Reclamation

Reclamation will involve the restoration of the Project site to as near natural conditions as feasible. In general, disturbed areas of the site will be graded and shaped. Slopes will be graded to merge naturally into adjacent undisturbed areas. Grading may include decommissioning ditches and other water management structures that are no longer needed, or enhancing them to provide natural swales for channelling surface water into nearby watercourses. Former building sites, foundations and laydown areas will be capped with overburden.

2.4.3.3 Emissions and Wastes

The quantities of emissions and wastes during decommissioning and abandonment are expected to be low. Emissions of air contaminants and noise may occur during decommissioning and abandonment activities from the movement of heavy equipment and vehicles on-site as demolition occurs and as materials are hauled to and from the Project site, as well as from reshaping of the landscape. These are not expected to be substantive. There are no known solid waste materials expected from the decommissioning and abandonment phase beyond disposal of decommissioning materials as described above.

2.4.3.4 Transportation

Transportation needs during decommissioning and abandonment will be modest and will vary depending on the activity being carried out at the time. Although specific details of the decommissioning phase and associated transportation requirements are not fully defined at this time, it is expected Project activities and requirements during this phase will be similar to or less than those during the construction phase.

2.4.3.5 Employment and Expenditure

Employment and expenditure during decommissioning and abandonment will be modest and will vary depending on the activity being carried out at the time. Decommissioning will require limited contractor and Project personnel to dismantle all equipment and facilities associated with the Project. Reclamation will see limited contractor and Project personnel to restore areas of the site to near pre-Project conditions. Expenditure associated with these activities will be relatively limited in comparison to that occurring annually during operation.

2.4.4 Marine-Based Infrastructure Construction - Northumberland Strait

Marine-based construction activities will begin following government approval of the EIA and the receipt of all necessary permits and authorizations. The following is a brief description of marine-based construction activities that is currently proposed for the installation of submarine cable. These activities will be managed by MECL and NB Power (if necessary) in accordance with their company-specific EPPs.

2.4.4.1 Trenching for Landing Approach

The landing approach extends from a water depth of 12 m to the high-water mark in the intertidal zone. As ice scour is of concern in this area, trench depth requirements increase from 1 m to 2 m. Trenching in the shallower or near-shore areas (up to 12 m depth) will be done using specialized marine excavators and barge-mounted cranes; otherwise, trenching is done using a trenching ROV (TROV) with a saw cutter.

2.4.4.2 Trenching for Cable Installation

The two cables will be installed in separate trenches, up to 200 m apart. The trenches will be excavated up to 1 m below grade where water depth exceeds 12 m and 2 m below grade in shallower or near-shore areas. The cable location in the near shore environment will be pre-trenched several months prior to cable installation and the trenches will be cleared of any in-filled sediment prior to laying of the cable. The method of excavation within near shore environment will involve trenching with specialized marine excavators and cranes from a barge in water depths up to 12 m, where possible, and a TROV for the remaining marine sections. The trenches will range in width from less than 1 m to 5 m. The area of disturbance from the TROV is expected to be limited to a 10 m wide corridor, centred on each cable.

If trenching is not feasible due to bedrock, concrete mattresses or alternate protection measures will be used to protect the cable.

Fishing exclusion zones around the cables are not planned. It is anticipated that once the cables have been installed, navigation charts will be updated to show cable locations and resulting notices sent out to mariners.

2.4.4.3 Laying of Cable

Laying of the cable will be done using a cable-laying vessel. The vessel will be capable of accommodating the installation crew and have sufficient deck space for the cable. Linear cable tensioners will be used to provide the specified amount of tension on the cable. The cable will be placed on the marine bed on top of the planned trench location. Once both cables are placed on the marine bed, the TROV will be submerged from a separate vessel. The TROV will be moved into the correct position and trenching and laying of the cable in the trench will be completed simultaneously. To ensure the cable is laid in the correct location within the corridor a dynamic positioning (DP) system will be used during the laying of cable. In the near shore environment, cables will be laid directly into the pre-excavated trenches.

2.4.4.4 Infilling of Cable Trench

The land-based cable trench will be infilled with the originally excavated material immediately after cable installation. Trench infilling will extend from land into the near-shore environment to a water depth of up to 2 m, where possible. In waters deeper than 2 m, the trench will be left to infill naturally over time.

2.4.4.5 Ice Scour Protection

Ice scour protection is necessary for shallow, near-shore sections of cable (i.e., waters less than approximately 12 m depth). Protection will consist of cable burial beneath the influence of ice scour. The cable is to be buried at a trench depth of 2 m, extending from the foreshore to a water depth of 12 m.

2.4.4.6 Inspection and Energizing

Physical inspection of submerged infrastructure will be completed using an underwater dive team or ROV. Energizing of the cable will take place only after physical and electrical inspections have been completed.

2.4.4.7 Emissions and Wastes

2.4.4.7.1 Air Contaminants

Releases of air contaminants to the atmosphere will consist mainly of combustion gases from the operation of marine construction vessels and smaller vessels used to deliver equipment to the site. The predominant source of greenhouse gases (GHGs) will be from fuel combustion in marine vessels, generators and trenching equipment.

The emissions will remain largely confined to the Project area and the immediately adjacent areas, as these activities will be transient (i.e., carried out to install one part of the line, then moving on to another area) and will be of short duration.

2.4.4.7.2 Sound and Vibration Emissions

Sound emissions and vibration will result from the operation of the cable laying vessel during trenching, cable laying and trench infilling and from the smaller vessels transporting equipment to site.

Sound and vibration emissions will remain largely confined to the Project area and the immediately adjacent areas, and will be of short duration.

2.4.4.7.3 Solid Waste Disposal

There will be disposal of some general construction wastes such as wood, steel, cardboard or other packaging, and other construction wastes. These materials generated during cable installation will be returned to shore for proper disposal.

2.4.4.7.4 Ballast Water Discharge

Ballast waters from marine vessels will be managed in accordance with Canada's *Ballast Water Control and Management Regulations*.

2.4.4.8 Marine Transportation

The Northumberland Strait is predominantly used by commercial fishers with additional uses including coastal recreation, marine transportation, submarine power and communication cables and road transportation via the Confederation Bridge. The Bridge provides year round access between PEI and NB. At the closest point, the proposed cable comes within 500 m of the bridge. The cable passes near the port of Borden-Carleton in PEI, and the old Northumberland Ferry Terminal in Cape Tormentine, NB. Project vessels will transit the Northumberland Strait during the construction period which is scheduled

for the ice free months. The Project-related vessels will abide by the guidelines, restrictions and navigation channels described within the *Guidelines for Navigation Under the Confederation Bridge* (Transport Canada 2009) and Northumberland Strait Traffic. Vessels over 20 m are required to maintain contact on marine very high frequency (VHF) Channel 12 (Vessel Traffic Regulating) and Channel 16 (Distress, Safety and Calling of Marine Vessels).

2.4.5 Marine-Based Infrastructure Operation - Northumberland Strait

Routine operation activities for the submarine cable are described in the following sections.

2.4.5.1 Energy Transmission, Infrastructure Inspection and Maintenance

Following construction, the submarine cable will be energized and will begin transmitting electricity.

Inspections of the cable will be performed periodically to maintain cable integrity and reliability. The frequency of maintenance requirements will be determined following installation and commissioning. These inspections will also identify any areas that require additional protection from scouring. Video inspections are typically performed by a diving contractor. Multi-beam and side-scan sonar surveys may be conducted, as required.

2.4.5.2 Emissions and Wastes

2.4.5.2.1 Electromagnetic Fields

Submarine cables have the potential to produce electromagnetic fields (EMFs) during energy transmission. The strength of the EMF depends on the distance from the source and the amount of power being transferred through the cable. Within North America, EMF is generally measured in units of milligauss (mG). Natural sources of EMF include the earth's geomagnetic field which ranges from 300 to 700 mG (Normandeau 2011). The amount of EMF released from similarly sized cables buried 1 m below the seabed ranged from 78.5 mG directly above the seabed to 2.2 mG, at a distance of 10 horizontal metres from the cable, respectively (Normandeau 2011).

2.4.5.2.2 Solid Waste Disposal

There will be disposal of some general inspection wastes such as food scraps, cardboard or other packaging. These materials generated during cable inspection will be returned to shore for proper disposal.

2.4.6 Marine-Based Infrastructure Decommissioning and Abandonment - Northumberland Strait

During the decommissioning and abandonment of the submarine cable, expected activities consist of either removal and disposal, or abandonment of the submarine cables in place. These activities are described in the following sections.

2.4.6.1 Decommissioning

The life of the Project is projected to be 40 years, at which time it may be decommissioned; however, it may operate for an indefinite time with ongoing repair and refurbishment. If decommissioning activities are determined to be necessary, they will be completed in accordance with the applicable regulations at that time. Regulations will dictate either the abandonment or removal of the submarine cable, with abandonment being the most likely option at that time.

2.4.6.2 Emissions and Wastes

Emissions and wastes during decommissioning and abandonment are expected to be comparable to those that will occur during construction of the Project. Emissions of air contaminants and noise may occur during decommissioning and abandonment activities from the movement of vessels and associated machinery as work is conducted and as materials are moved to and from the Project area. There are no known solid waste materials expected from the decommissioning and abandonment beyond the submarine cable, as discussed above.

2.4.6.3 Marine Transportation

Transportation needs during decommissioning and abandonment will vary depending on the activity being carried out at the time. Although specific details of the decommissioning phase and associated transportation requirements are not fully defined at this time, it is expected Project activities and requirements during this phase will be similar to or less than those during the construction phase.

2.5 PROJECT SCHEDULE

Construction of the Project is expected to begin in early 2016, following receipt of all necessary permits, approvals and authorizations. A 16 month construction period is anticipated, with an expected operation date of all infrastructure by June 2017. Key timelines are outlined in Table 2.2 below.

Table 2.2 Key Project Timelines

Project Activity	Starting Date
Land-Based Construction – PEI	
Pre-trenching (including landfall site construction)	September-October 2016
Substation upgrade (including buildings and termination site)	July-September 2016
Commissioning of land-based Project components in PEI	December 2016
Land-Based Construction – New Brunswick	
Clearing of RoW from Melrose to Cape Tormentine and access road upgrades	March-April 2016
Melrose to Cape Tormentine transmission line construction	May-September 2016
Pre-trenching (including landfall site construction)	September-October 2016
Termination site construction	July-September 2016
Substation upgrades	Fall 2016

Table 2.2 Key Project Timelines

Project Activity	Starting Date
Clearing of RoW from Memramcook to Melrose	September-December 2016
Melrose to Memramcook transmission line construction	December 2016-May 2017
Commissioning of land-based Project components in NB (excluding transmission line from Memramcook to Melrose)	December 2016
Commissioning of transmission line from Memramcook to Melrose	June 2017
Marine-Based Construction – Northumberland Strait	
Near-shore pre-trenching in PEI and NB	May-July 2016
Clearing of infill from near-shore pre-trenching in PEI and NB	October 2016
Laying of submarine cables	October-November 2016
Energizing and commissioning of the cable interconnection	December 2016
Project commissioning	June 2017

Operation of the Project will begin immediately following construction. The useful service life of the Project, with applicable maintenance, is 40 years or more with ongoing refurbishment and repair.

2.6 ACCIDENTS, MALFUNCTIONS, AND UNPLANNED EVENTS

Accidents, Malfunctions, and Unplanned Events are upset events, conditions or occurrences that take place outside of routine planned Project activities. These could occur at any point during the Project due to a variety of factors, including but not limited to, abnormal operating conditions, wear and tear, human error or equipment failure. While unpredictable, many Accidents, Malfunctions, and Unplanned Events may be prevented or managed through good planning, design, equipment selection, hazard analysis and corrective action, emergency response planning, and mitigation.

Accidents, Malfunctions, and Unplanned Events specific to the Project have been outlined for this assessment based on the experience and professional judgment of the Study Team. Selection criterion focuses on credible events that have a reasonable probability of occurring during Project activities and may result in significant environmental effects in relation to identified VCs. Occupational health and safety implications of the identified events are not considered in the assessment, and will be addressed under NB Power and MECL's respective health and safety policies and EPPs. An assessment of specific Accidents, Malfunctions, and Unplanned Events and potential interactions with VCs will be included for each relevant VC.

2.6.1 Identification of Accidents, Malfunctions, and Unplanned Events

The following Accidents, Malfunctions, and Unplanned Events have been selected for consideration in this assessment and are described in greater detail in the following sections:

Fire: Includes a fire in a Project component or facility during construction and operation. The focus is on the consequence and not the mechanism by which it occurs.

Hazardous Material Spill: Spills of fuel, petroleum products, and/or other chemicals used on-site or in Project components during construction and operation.

Vehicle/Vessel Accident: Project-related vehicle accidents that could occur on road transportation networks or within marine environment during construction and operation.

Wildlife Encounter: Includes human interaction with wildlife and wildlife interaction with Project components that could occur during construction and operation.

Erosion Prevention and/or Sediment Control Failure: Temporary failure or loss of effectiveness of erosion prevention and/or sediment control measures that may result in erosion and/or the accidental release of sediment into the environment during construction. The focus is on the consequence and not the mechanism by which it occurs.

Major Loss of Electricity: Includes a major loss of electricity due to failure or loss of transmission line or cable during operation. The focus is on the consequence and not the mechanism by which it occurs.

Discovery of a Heritage Resource: The discovery of a previously undiscovered heritage or archaeological resource that could occur during construction and to a lesser extent during operation.

2.6.1.1 Land-Based Activities

2.6.1.1.1 Fire

A fire during construction or operation of land-based Project activities could affect the operation of Project infrastructure and the use of heavy equipment and support vehicles. Fire may also impact Project infrastructure, including substations, termination sites, and transmission line infrastructure, and could result in infrastructure damage and a temporary loss of electricity.

2.6.1.1.2 Hazardous Material Spill

The use of heavy equipment and support vehicles during construction and operation of land-based Project activities could result in a hazardous material spill. A hazardous material spill could occur due to equipment malfunction, wear and tear, line rupture, error in material transfer or vehicle accidents when using hydraulic equipment and gasoline and/or diesel powered vehicles on-site. If a hazardous material loss was of a significant volume it could affect aspects of the surrounding environment, including wildlife species and groundwater and freshwater sources.

2.6.1.1.3 Vehicle Accident

Vehicles and heavy equipment will be used during land-based Project activities. Excavators, large trucks, cranes, and vegetation removal equipment are expected to be used during construction. Operation requires removal of vegetation, transmission line repair and transport of crew. Vehicle accidents occurring during Project activities could result in the damage to or loss of equipment or infrastructure, and have the potential to cause the injury or mortality of a wildlife species.

2.6.1.1.4 Wildlife Encounter

As some land-based Project activities will be conducted within wildlife habitat, wildlife encounters are possible. Human interaction with wildlife during Project activities could include the use of construction or vegetation management equipment within wildlife habitat. Wildlife interaction with the Project during operation could result in injury or mortality of bird species and temporary power disruption.

2.6.1.1.5 Erosion Prevention and/or Sediment Control Failure

Erosion prevention and sediment control measures will be implemented during land-based Project activities that involve the opening of ground. Should a temporary failure occur, it may result in an increase of erosion and/or sediment export from the area. If a pathway exists for sediment-laden water to reach a wetland, stream or other water body, there is potential for sediment to impact the Freshwater Environment.

2.6.1.1.6 Major Loss of Electricity

A major loss of electricity constitutes the failure of or damage to transmission line that could result in the loss of electricity for an extended period of time. Regardless of the mechanism by which it occurs, a major loss of electricity would result in service disruption to PEI and would require infrastructure repair and the use of alternate energy sources for the duration of the event.

2.6.1.1.7 Discovery of a Heritage Resource

The discovery of a heritage resource could occur during the construction of land-based Project activities and could result in a temporary disruption of work. As minimal land disruption is expected during operation, the probability of discovering a heritage resource is generally limited to the construction phase.

2.6.1.2 Marine-Based Activities

2.6.1.2.1 Fire

A fire during any phase of marine-based Project activities could affect the use of support vessels and other equipment. Large vessels and trenching equipment will be used during construction, and operation activities within the Northumberland Strait and fire could result in the loss of equipment and support vessels.

2.6.1.2.2 Hazardous Material Spill

The use of trenching equipment during construction and support vessels during both construction and operation of marine-based Project activities could result in a hazardous material spill due to equipment malfunction, wear and tear, line rupture, error in material transfer or vessel accidents. The newly installed cables are solid dielectric cables with no oil present in the cable interior; therefore, damage to the cables, if incurred, would not result in the release of oil.

2.6.1.2.3 Vessel Accident

Vessels will be used during both construction and operation of marine-based Project activities. Vessel accidents during Project activities could result in loss of equipment or a release of hazardous materials to the surrounding environment. If a vessel were to strike a marine species it could result in the injury or mortality of the marine species.

3.0 EIA METHODS, CONSULTATION AND ENGAGEMENT, AND SCOPING

3.1 EIA METHODS

An overview of the methods for conducting this EIA is provided in this section. The EIA has been completed using the methodological framework developed by Stantec to meet the requirements of federal and provincial jurisdictions in Canada (including Section 9(1) of the PEI *EPA*, Schedule A of the NB *EIA Regulation,* and Section 5 of *CEAA 2012*). These methods are based on a structured approach that:

- focuses on issues of greatest concern
- considers the issues raised by the public and stakeholders
- integrates engineering design and programs for mitigation and follow-up into a comprehensive environmental planning process

The EIA focuses on specific environmental components (called valued components or VCs) that are of particular value or interest to regulatory agencies, the public, and other stakeholders. VCs are broad components of the biophysical and human environments that, if altered by the Project, may be of concern to regulatory agencies, Aboriginal persons, resource managers, scientists, and/or the general public. It is noted that "environment" is defined to include not only biological systems (air, land, and water) but also human conditions that are affected by changes in the biological environment.

The Project-related environmental effects are assessed using a standard framework for each VC, with tables and matrices used to facilitate and support the evaluation. Residual Project-related environmental effects (i.e., those environmental effects that remain after the planned mitigation measures have been applied) are characterized for each individual VC using specific analysis criteria (i.e., magnitude, geographic extent, duration, frequency, reversibility, and context). The significance of residual Project-related environmental effects is then determined based on pre-defined standards or thresholds (i.e., significance rating criteria).

Cumulative environmental effects consider the residual environmental effects of the Project with the residual environmental effects of other physical activities (i.e., where there is overlap between the residual effects of other physical activities and those of the Project). An overlap of residual effects may occur and the potential for this is assessed to determine if they could be significant. As the Project is not a designated project under *CEAA 2012* and a cumulative effects assessment is not required under provincial EIA Regulation, the cumulative effects assessment will be conducted at a high-level for each Project location.

The environmental effects assessment methodology involves the following generalized steps.

- Scope of Assessment – This involves the scoping of the overall assessment, including the selection of VCs; description of measurable parameters; description of temporal, spatial, and administrative/technical boundaries; definition of the parameters that are used to characterize the Project-related environmental effects; and identification of the standards or thresholds that are used to determine the significance of environmental effects. This step relies upon the scoping undertaken by regulatory authorities; consideration of the input of the public, stakeholders, and First Nations (as applicable); and the professional judgment of the Study Team.
- Existing Conditions – Establishment of existing (baseline) environmental conditions for the VC. In many cases existing conditions expressly and/or implicitly include those environmental effects that may be or may have been caused by other past or present projects or activities that have been or are being carried out.
- Assessment of Project-Related Environmental Effects – Project-related environmental effects are assessed. The assessment includes descriptions of how an environmental effect will occur, the mitigation and environmental protection measures proposed to reduce or eliminate the environmental effect, and the characterization of the residual environmental effects of the Project. The focus is on residual environmental effects (i.e., the environmental effects that remain after planned mitigation has been applied). All phases of the Project are assessed (i.e., construction, operation), as are Accidents, Malfunctions, and Unplanned Events. The evaluation also considers the Effects of the Environment on the Project. For each VC, a determination of significance is then made, based on the identified significance criteria.
- Assessment of Cumulative Environmental Effects – Cumulative environmental effects are identified in consideration of other past, present or future physical activities, for all phases of the Project (i.e., construction, operation). The cumulative environmental effects of the Project in combination with other past, present, or future projects or activities that have been or will be carried out are then evaluated. This assessment will be conducted at a high-level for each Project location.
- Determination of Significance – The significance of residual Project-related and cumulative environmental effects is then determined, in consideration of the significance criteria that have been established for each VC.
- Recommendations for Follow-up – Monitoring and follow-up to verify the environmental effects predictions or to assess the effectiveness of the planned mitigation are recommended, where applicable.

3.2 CONSULTATION AND ENGAGEMENT

The consultation and engagement plan and summary of initial results in support of this EIA is described in the following sections. Consultation and engagement will take place at various points during the EIA process. As some activities will take place after registration and submission of the EIA, these results will be updated as needed.

Issues concerning the Northumberland Strait will be addressed within the consultation and engagement programs for each provincial jurisdiction.

3.2.1 Public

Details of public consultation requirements, approach and key issues raised are outlined by region in the following sections. Upon completion of public consultation requirements, a summary report of findings will be compiled.

3.2.1.1 Approach

3.2.1.1.1 Prince Edward Island

Requirements for public consultation are outlined in the PEI Environmental Impact Assessment Guidelines (PEIDELJ 2010) and apply to EIA processes undertaken in PEI, with the exception of those projects on an exclusion list. There are two levels of public consultation. The required level of public consultation is Level II, as determined by the environmental assessment coordinator.

A Level II public consultation applies to projects that may be of interest to the public and have a potential for environmental consequences. Requirements for a Level II public consultation are as follows:

- a minimum of one public information session held in the vicinity of the proposed Project area

Specific details and timeframes for public consultation activities are provided in the guidelines.

The majority of public consultation activities in PEI will take place after the registration and submission of the EIA.

3.2.1.1.2 New Brunswick

A Guide to Environmental Impact Assessment in New Brunswick (NBDELG 2012) outlines the requirements for public consultation for EIA processes undertaken in NB. For all Projects within NB, the following requirements apply:

- a notice of registration to be posted on the NBDELG website
- a copy of the registration document deposited at the NBDELG office for public review and made available to any member of the public at request

As this Project is large in scale, the following additional requirements are required:

- a public notice placed in a minimum of one local and/or provincially circulated daily newspaper
- a copy of the registration document made available at two public locations in the vicinity of the proposed Project area
- a minimum of one public information session held in the vicinity of the proposed Project area

Specific details and timeframes for public consultation activities are provided in the guidelines.

3.2.1.2 Activities and Key Issues Raised to Date

3.2.1.2.1 Prince Edward Island

Details of public consultation activities and key issues raised in PEI are shown in Table 3.1. This section outlines activities completed up to the submission of the EIA document.

Table 3.1 Summary of Public Consultation in PEI and Key Issues Raised to Date

Public Consultation	Information Provided/Key Issues Raised
Public Open House July 27, 2015 Royal Canadian Legion Branch No. 10 240 Main St, Borden-Carleton, PE C0B 1X0	• Project schedule • method of cable installation • potential impact to fishery and compensation plan

3.2.1.2.2 New Brunswick

Details of public consultation activities and key issues raised in NB are shown in Table 3.2. This section outlines activities completed up to the submission of the EIA document.

Table 3.2 Summary of Public Consultation in NB and Key Issues Raised to Date

Public Consultation	Information Provided/Key Issues Raised
Public Open House July 21, 2015 Royal Canadian Legion Branch No. 89 1215 Royal Rd, Memramcook, NB E4K 1Y3	• Project schedule • method of cable installation • land easements from property owners
Public Open House July 22, 2015 Royal Canadian Legion Branch No. 81 72 Route 955, Cape Tormentine, NB E7M 2A8	• Project schedule • method of cable installation • timeline for the land easements and process • impact on the fishery

3.2.2 Stakeholders

Stakeholders are identified by the Study Team as individuals or groups that may have interest in or be affected by the Project, including government agencies, local groups and adjacent property owners. Aboriginal Rights Holders are addressed in a separate section.

3.2.2.1 Key Stakeholders

Key Stakeholders, as identified by the Study Team, are shown in Table 3.3.

Table 3.3 Identification of Key Stakeholders by Region

Stakeholders Within PEI	
Provincial	**Municipal and Community-Based**
• PEI Department of Communities, Land and Environment • PEI Department of Transportation, Infrastructure and Energy • PEI Department of Education, Early Learning and Culture	• PEI Fishermen's Association • PEI Aquaculture Alliance • Borden Town Council • local fishers • property owners in the vicinity of the Project
Stakeholders Within New Brunswick	
Provincial	**Municipal and Community-Based**
• New Brunswick Department of Natural Resources • New Brunswick Department of Transportation and Infrastructure • New Brunswick Department of Energy and Mines • New Brunswick Department of Public Safety • New Brunswick Department of Agriculture, Aquaculture and Fisheries	• New Brunswick Federation of Snowmobile Clubs • New Brunswick All-Terrain Vehicle Federation • The NB Trails Council • Beaubassin Planning Commission • Village of Memramcook and Village of Port Elgin • Petitcodiac Watershed Alliance • Northumberland Fishermen's Association • Maritime Fishermen's Union • local fishers • property owners in the vicinity of the Project
Federal Stakeholders	
• Environment Canada • Transport Canada • Fisheries and Oceans Canada • Public Works and Government Services Canada	

3.2.2.2 Approach

3.2.2.2.1 Prince Edward Island

Stakeholder consultation within PEI has been and will continue to be accomplished through meetings and written communication with the identified stakeholders. Communication with stakeholders will be updated as the EIA process progresses.

3.2.2.2.2 New Brunswick

As per guidelines, stakeholders within NB, including elected officials, must be made aware of the Project and be given an opportunity to ask questions and/or raise concerns (NBDELG 2012). This may be achieved through the following:

- holding an information session or meeting for stakeholders
- being present at a regularly scheduled stakeholder meeting to provide information concerning the Project
- sending Project information to stakeholders via a letter or information flyer

Landowners and/or residents that may be affected by Project activities should be notified about the Project in writing. A report detailing all public notification activities must be submitted to NBDELG 60 days after registration of the Project.

3.2.2.2.3 Federal

Stakeholder consultation with federal bodies has been and will continue to be accomplished through meetings and written communication with the identified stakeholders. Communication with stakeholders will be updated as the EIA process progresses.

3.2.2.3 Activities and Key Issues Raised to Date

3.2.2.3.1 Prince Edward Island

Details of stakeholder consultation activities and key issues raised in PEI are shown in Table 3.4. This section outlines activities completed up to the submission of the EIA document.

Table 3.4 Summary of Key Issues Raised by Stakeholders During Pre-consultation in PEI

Stakeholder Consultation	Information Provided/Key Issues Raised
Provincial	
PEI Provincial Cabinet Ministers Briefing May 1, 2014	• initial Project overview provided • requested more information as project details become available
Opposition Briefing May 2, 2014	• initial Project overview provided • requested more information as project details become available
PEI Department of Environment, Labour and Justice (currently PEIDCLE) Scoping Letter Sent November 18, 2014 P.O. Box 2000, Charlottetown PE C1A 7N8	• key issues raised in response to the scoping letter has been reviewed by the Study Team and addressed within the EIA where applicable
PEI Department of Communities, Land and Environment Meeting June 2, 2015 PEIDCLE Offices 11 Kent Street, Charlottetown PE C1A 7N8	• request that aquaculture group(s) be informed about the Project
Municipal and Community-Based	
Borden Town Council Meeting May 1, 2014 and September 14, 2015 Borden-Carleton, PE	• initial Project overview provided • requested more information as project details become available

Table 3.4 Summary of Key Issues Raised by Stakeholders During Pre-consultation in PEI

Stakeholder Consultation	Information Provided/Key Issues Raised
PEI Fishermen's Association Annual General Meeting May 2, 2014 Royal Canadian Legion Branch No. 2 69 Ellis Ave, O'Leary PE C0B 1V0	• presented an overview of the proposed submarine cable Project during their AGM • effects of cable on marine fish and potential loss of fishing grounds
PEI Fishermen's Association Executive Meeting July 14, 2015 PEIFA Offices 420 University Avenue, Suite 102 Charlottetown, PE C1A 7Z5	• Project schedule • method of cable installation • how to best communicate to fishers • impact on the fishery • discussed Project specifics and requested an information session with all members • agreed to send letters to all members to notify of upcoming information session
PEI Fishermen's Association Information Session July 24, 2015 Royal Canadian Legion Branch No. 2 69 Ellis Ave, O'Leary PE C0B 1V0	• information session was provided • proposed dates for installation in the strait • method of cable installation • impact to the fishers

3.2.2.3.2 New Brunswick

Details of the stakeholder consultation activities in NB and key issues raised are shown in Table 3.5. This will be updated as the EIA process progresses.

Table 3.5 Summary of Key Issues Raised by Stakeholders in NB

Stakeholder Consultation	Information Provided/Key Issues Raised
Provincial	
New Brunswick Department of Environment and Local Government Meeting June 26, 2014 Marysville Place 20 McGloin Street, Fredericton NB E3B 5H1	• introduction of Project • discussion of potential regulatory approaches for the environmental approvals required • identification of potential stakeholders
New Brunswick Department of Environment and Local Government Meeting September 12, 2014 Marysville Place 20 McGloin Street, Fredericton NB E3B 5H1	• Project update • discussion on potential timelines for EIA submission • First Nations engagement must be considered
New Brunswick Department of Environment and Local Government Scoping Letter Sent January 6, 2015 NBDELG, Marysville Place 20 McGloin Street, Fredericton NB E3B 5H1	• Key issues raised in response to the scoping letter has been reviewed by the Study Team and addressed within the EIA where applicable.

Table 3.5 Summary of Key Issues Raised by Stakeholders in NB

Stakeholder Consultation	Information Provided/Key Issues Raised
New Brunswick Department of Tourism, Culture and Heritage Meeting January 14, 2015 Archaeological Services Offices, Andal Building 225 King Street, Fredericton, NB E3B 1E1	• discussion regarding Archaeological Services proposal
New Brunswick Department of Tourism, Culture and Heritage Meeting May 14, 2015 Archaeological Services Offices, Andal Building 225 King Street, Fredericton, NB E3B 1E1	• Project update • summary of results of the archaeological assessment performed on the proposed route in 2014 • discussion of the proposed mitigation measures to be implemented during construction for elevated potential areas
New Brunswick Department of Natural Resources, New Brunswick Department of Energy, Aboriginal Affairs Secretariat, New Brunswick Department of Agriculture, Aquaculture and Fisheries Meeting August 18, 2015	• Project overview • update on consultations with First Nations communities • Department of Agriculture, Aquaculture and Fisheries asked that they be advised on future discussion with the Fishermen's Union
Municipal and Community-Based	
Cape Tormentine Community Development Corporation July 30, 2014 Cape Tormentine	• discussion regarding potential cable landing sites
Land Owner Notification Registered letters sent in early August 2014	• registered letters were sent to land owners identified by NB Power to have land within the proposed RoW • initial Project overview provided • request made for access to property to conduct preliminary environmental field studies
Maritime Fishermen's Union Annual General Meeting July 28, 2015 Bouctouche Golden Age Club, NB 25 Church Street, Bouctouche, NB E4S 2Z5	• review of the Project during AGM • Project schedule • proposed method of cable installation • compensation plan should fishery be affected • concerns over siltation due to cable installation • post-construction monitoring of marine environment
Maritime Fishermen's Union Meeting August 5, 2015 Shemogue Golden Age Club 15 Shemogue Rd, Port Elgin, NB E4M 1C2	• proposed method of cable installation • compensation plan should fishery be affected • Confederation Bridge as an option • post-construction monitoring of marine environment • EMF and thermal effects on fish
Cape Tormentine Community Development Corporation August 16, 2015 Royal Canadian Legion Branch No. 81 72 Route 955, Cape Tormentine, NB E7M 2A8	• Project update and schedule • impact or restrictions on campground • discussion on easement requirements

3.2.2.3.3 Federal

Details of federal stakeholder consultation activities and key issues raised are shown in Table 3.6. This will be updated as the EIA process progresses.

Table 3.6 Summary of Key Issues Raised by Federal Stakeholders

Stakeholder Consultation	Information Provided/Key Issues Raised
Department of Fisheries and Oceans Meeting May 6, 2015 Department of Fisheries and Oceans Office 343 Université Avenue, Moncton, NB E1C 9B6	• Provided Project overview • concerns raised regarding local fisheries • clarification of cable installation/operation details • DFO requested that the marine section discuss how quickly the marine bed will return to pre-construction state
Public Works and Government Services Canada Scoping Report Sent April 17, 2015 PWGSC 1713 Bedford Row, Halifax, NS B3J 3C9	• Key issues raised in response to the scoping report have been reviewed by the Study Team and addressed within the EIA where applicable.
Public Works and Government Services Canada Meeting April 15, 2015 PEIEC Offices 11 Kent Street, Charlottetown, PE C1A 7N8	• clarification and discussion regarding federal Project requirements
National Energy Board Scoping Letter April 2015 NEB 517 Tenth Avenue SW, Calgary, AB T2R 0A8	• Confirmation requested that NEB is not a regulator for the Project and that the Project is not subject to the federal environmental assessment process under *CEAA 2012*.
Public Works and Government Services Canada Meeting with the NB Department of Natural Resources, the NB Department of Energy, the NB Aboriginal Affairs Secretariat and the PEI Aboriginal Affairs Secretariat Conference call on July 29, 2015	• First Nations consultation was discussed • ownership of submerged lands was raised
Transport Canada NPP Officer Meeting Phone conversation on August 27, 2015	• reviewed minor works definitions and guidelines • additional information requested by TC • initial determination was that the submarine cable Project would be designated a minor works
Public Works and Government Services Canada Meeting with the Department of Fisheries and Oceans, Environment Canada, Transport Canada, the NB Department of Environment and Local Government, the PEI Department of Environment, Land and Communities, the PEI Energy Corporation, NB Power, MECL and Stantec In-person and video conferencing on August 28, 2015	• presented proposed method for submarine cable installation and proposed timelines • EC mentioned that trenching may require disposal at sea permit • DFO will evaluate EIA and determine if there is potential for serious harm to CRA fisheries • discussed Navigation Protection Program minor works triggers and recommended that discussions

Table 3.6 Summary of Key Issues Raised by Federal Stakeholders

Stakeholder Consultation	Information Provided/Key Issues Raised
Atlantic Technology Centre 90 University Avenue, Charlottetown, PE C1A 4K9	resume after draft EIA is submitted
Environment Canada Meeting Phone conversation on September 24, 2015	• discussion of sediment data collected to date • EC requested additional information on sediment and potential sources of contamination in the areas of the trenching.

3.2.3 Aboriginal Rights Holders

Aboriginal Rights Holders are identified by the Study Team as First Nations bands or representative First Nations assemblies or groups that may have interest in or interaction with Project components. This includes associated government departments within the applicable regions.

Table 3.7 Identification of Aboriginal Rights Holders and Associated Government Departments by Region

Aboriginal Rights Holders and Associated Government Departments Within PEI
• Mi'kmaq Confederacy of PEI • Abegweit First Nation • Lennox Island First Nation • PEI Department of Education, Early Learning and Culture
Aboriginal Rights Holders and Associated Government Departments Within New Brunswick
• The Assembly of First Nations' Chiefs in New Brunswick • Indian Island First Nation • Fort Folly First Nation • Elsipogtog First Nation • Madawaska Maliseet First Nation • St. Mary's First Nation • Woodstock First Nation • Oromocto First Nation • Tobique First Nation • Kingsclear First Nation • New Brunswick Department of Tourism Heritage and Culture • New Brunswick Aboriginal Affairs Secretariat

3.2.3.1 Approach

3.2.3.1.1 Prince Edward Island

Consultation with Aboriginal Rights Holders and associated government departments in PEI has been and will continue to be accomplished through meetings and written communication with the identified groups. Communication with the identified groups will be updated as the EIA process progresses.

3.2.3.1.2 New Brunswick

As per guidelines, Aboriginal Rights Holders and associated government departments must be made aware of the Project and be given an opportunity to ask questions and/or raise concerns (NBDELG 2012). This may be achieved through the following:

- holding an information session or meeting for stakeholders
- being present at a regularly scheduled stakeholder meeting to provide information concerning the Project
- sending Project information to stakeholders via a letter or information flyer

Communication with Aboriginal Rights Holders will be completed as the EIA process progresses. This section outlines activities completed up to the submission of the EIA document.

3.2.3.2 Activities and Key Issues Raised to Date

3.2.3.2.1 Prince Edward Island

Details of Aboriginal Rights Holders consultation activities and key issues raised in PEI are shown in Table 3.8. This will be updated as the EIA process progresses.

Table 3.8 Summary of Key Issues Raised by Aboriginal Rights Holders in PEI

Rights Holder Consultation	Information Provided/Key Issues Raised
Formal First Nation Consultation Letter Sent March 15, 2015 Recipients: Lennox Island First Nation Abegweit First Nation	• Letter sent to both bands under the Mi'kmaq Confederacy of PEI as formal notification of consultation on the Project.
Mi'Kmaq Confederacy of PEI Meeting April 27, 2015 Mi'Kmaq Confederacy of PEI Office Suite 501, 199 Grafton Street, Charlottetown, PE C1A 1L2	• questions on the monitoring of cable to detect malfunction • confirmation that EIA will consider fishery • clarification of cable installation/operation details • potential employment opportunities
Mi'kmaq Confederacy of PEI Letter Sent July 31, 2015	• Letter from Stantec forwarded to the Mi'kmaq Confederacy of PEI by PEIEC providing information on Project.

3.2.3.2.2 New Brunswick

Details of Aboriginal Rights Holders consultation activities and key issues raised in NB are shown in Table 3.9. This section outlines activities completed up to the submission of the EIA document.

Table 3.9 Summary of Key Issues Raised by Aboriginal Rights Holders in NB

Rights Holder Consultation	Information Provided/Key Issues Raised
The Assembly of First Nations' Chiefs in NB Meeting June 29, 2015 Assembly of First Nations Chiefs' of NB Head Office P.O. Box 296, Station A Fredericton, NB E3B 4Y9	• effects of EMF on fish at various depth • need for TEK study • A more detailed project description was requested for the NB side (i.e., amount of clearing, jobs, schedule, etc.).
The Assembly of First Nations' Chiefs in NB and Elsipogtog First Nation Letter Sent July 18, 2015	• A letter was sent to the Assembly of First Nations' Chiefs and Elsipogtog First Nation in accordance with the Interim Consultation Protocol. The letter included a Project description, map and a formal notification to consult.
First Nations Consultations Indian Island Band Office July 20, 2015 Indian Island Band Council Office 61 Island Drive, Indian Island, NB E4W 1S9	• Project impact and scheduling • amount of clearing associated with the transmission line • amount of Crown land affected • EMF on fish • bridge as an alternative • job opportunities • TEK study
First Nations Consultations Fort Folly July 21, 2015 Fort Folly Health Office P.O. Box 1007, Dorchester, NB E4K 3V5	• Project overview and as right holders concerns about Project impact and timing • wanted to review traditional hunting grounds areas and potential impact • job opportunities • TEK study
The Assembly of First Nations' Chiefs in NB Phone call July 28, 2015	• A call was made to the Assembly of Chiefs of NB to inquire if contact had been with Elsipogtog First Nation and whether or not a meeting had been arranged.
The Assembly of First Nations' Chiefs in NB Email sent July 31, 2015	• draft Project Description sent via email
Non-members of the Assembly of First Nations' Chiefs in NB Letter Sent August 25, 2015 <u>Recipients:</u> Madawaska Maliseet First Nation St. Mary's First Nation Woodstock First Nation Oromocto First Nation	• A letter was sent to the non-members of the Assembly of First Nations' Chiefs in NB in accordance with the Interim Consultation Protocol. The letter included a Project description, map and a formal notification to consult.
The Assembly of First Nations' Chiefs in NB Email sent August 27, 2015	• An email was sent to the Assembly of First Nations' Chiefs in NB regarding the need to discuss the budget associated with a TEK study as well as potential dates for open houses at Fort Folly and Indian Island.

Table 3.9 Summary of Key Issues Raised by Aboriginal Rights Holders in NB

Rights Holder Consultation	Information Provided/Key Issues Raised
Non-members of the Assembly of First Nations' Chiefs in NB Sent September 3, 2015 Recipients: Tobique First Nation Kingsclear First Nation	• A letter was sent to the non-members of the Assembly of First Nations' Chiefs in NB in accordance with the Interim Consultation Protocol. The letter included a Project description, map and a formal notification to consult.

3.2.4 Summary of Consultation Activities to Date

3.2.4.1 Public

Public Open Houses were held in both PEI and NB to inform the public of the proposed Project and to record any key issues raised by the public. Open Houses were held in communities nearest to proposed Project infrastructure; in Borden-Carleton, PEI, location of the cable landfall site and MECL substation expansion, and in both Cape Tormentine, NB, location of the cable landfall site, termination site and starting point for transmission line infrastructure, and Memramcook, NB, end point of transmission line infrastructure and location of the NB Power substation upgrade. Method of cable installation (addressed in Section 2.4.4) and impact to the fishery (addressed in Volume 4, Section 3.2) were key issues raised in both PEI and NB. Landowners in NB that attended the Open Houses were informed of the land easement process for transmission line construction.

3.2.4.2 Key Stakeholders

Scoping documents were sent to provincial and federal regulators to outline the proposed Project and request input on Project components. Responses from regulatory bodies identified additional key stakeholders and regulation pertaining to the Project, as well as key areas of focus for the EIA process. Key issues raised in response to the scoping documents have been addressed within the EIA, where applicable. Information on impacts of trenching within the Northumberland Strait can be found in Volume 4. EMF and potential effects on marine species is addressed in Volume 4, Section 3.1. Mitigation measures to be implemented during construction for high archaeological potential areas in NB are addressed in Volume 3, Section 3.5. The effects of climate on Project infrastructure in PEI is addressed in Volume 2, Section 4.3. Based on concerns regarding sediment generation in the marine environment, the method of trenching was re-evaluated by MECL and PEIEC and a TROV with a saw cutter will be used in lieu of plowing or water jetting.

Landowners potentially affected by the transmission line RoW were identified and sent a personal letter by registered mail in early August 2014. The letter provided information about the Project and requested permission to conduct preliminary environmental field studies. Follow-up calls were made by NB Power representatives to those landowners that did not respond. Key issues raised by landowners were addressed at Open Houses in NB.

Fishery stakeholders in both PEI and NB were informed of the proposed Project through meetings and information sessions. Impact to the fishery was the key issue raised by fishery stakeholders in both provinces. Marine-related issues are addressed within Volume 4; Marine Environment and CRA Fisheries are addressed in Sections 3.1 and 3.2, respectively. The concerns associated with the timing of marine construction was re-evaluated by MECL and PEIEC and the installation of the submarine cables is now planned for October and November of 2016 after the Fall lobster fishery.

3.2.4.3 Aboriginal Rights Holders

The Mi'kmaq Confederacy of PEI and the Assembly of First Nations' Chiefs in NB were primary contact points for Aboriginal rights holders in PEI and NB, respectively. Formal consultation notice letters were sent to Abegweit First Nation and Lennox Island First Nation, both members of the Mi'kmaq Confederacy of PEI, notifiying the Chiefs of the proposed Project and providing an opportunity for comments. The purpose of consultation and engagement initiatives have been to provide Aboriginal communities with information about to the proposed Project (e.g., description, regulatory framework, schedule and construction practices) and to identify current use of lands and resources for traditional purposes by Aboriginal persons within the Project area. Bands that were identified as non-members of the Assembly of First Nations' Chiefs in NB were contacted separately and informed of Project details via letter, email or meeting. Although, to date, no specific resource locations have been identified within the Project Area in NB, some individuals have expressed interest in the consultation process. This interest is expected to lead to Aboriginal community meetings in Fort Folly and Indian Island in fall 2016. EIA volumes addressing EMF, CRA fisheries and trenching within the Northumberland Strait are detailed in above sections. Information on Project employment in NB is addressed in Volume 3, Section 3.4. Information on Project employment in PEI is addressed in Volume 2, Section 3.2.

3.2.5 Future Consultation and Engagement

The Project Team will continue to work with anyone who expresses issues or concerns associated with the proposed Project. Additional First Nations engagement activities will be undertaken as outlined above. Both the NB Power and MECL company website will continue to be used as a tool to inform and provide regular updates to the general public.

As per notification requirements in NB, notices will be published in local NB newspapers informing the public that the Project has been registered with the NBDELG and identifying the locations where the EIA document can be viewed. In addition, Open Houses in both PEI and NB will be held to provide the public with an opportunity to provide input and express their concerns.

3.3 SCOPE OF THE ASSESSMENT

The potential environmental effects of the Project are assessed in the EIA. The scope of assessment includes all activities necessary for the construction and operation of the Project. Environmental effects will be assessed separately for each Project location (PEI, NB and the Northumberland Strait) for each phase of the Project (i.e., construction, operation, decommissioning and abandonment), where relevant, as well as for credible Accidents, Malfunctions, and Unplanned Events. The assessment will be conducted within defined assessment boundaries (spatial, temporal, administrative, and technical) and

in consideration of defined residual environmental effects rating criteria aimed at determining the significance of the environmental effects. The EIA considers measures that are technically and environmentally feasible that would mitigate significant adverse environmental effects of the Project.

3.3.1 Scope of Project

The Project under assessment involves the development of a high voltage alternating current transmission system within the Northumberland Strait, between PEI and NB. For the purpose of this assessment, the Scope of the Project includes the following Project activities:

- construction of transmission lines within NB
- construction of landfall sites in PEI and NB
- upgrading of the NB Power substation in NB
- expansion of the MECL substation in PEI
- construction of termination sites in PEI and NB (for converting submarine cables to overhead transmission lines or substation)
- installation and operation of two submarine cables within the Northumberland Strait

3.3.2 Factors to be Considered

While this Project is not considered a designated Project under *CEAA 2012*, the framework pursuant to section 19 of *CEAA 2012*, is used as a tool to guide the assessment process.

The EIA must take into account the following factors:

- the environmental effects of the physical activity (as it is not a designated project), including the environmental effects of malfunctions or accidents that may occur in connection with the Project
- comments from the public
- mitigation measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the Project
- the requirements of the follow-up program in respect to the Project
- the purpose of the Project
- alternative means of carrying out the Project
- any change to the Project that may be caused by the environment

3.3.3 Scope of Factors to be Considered

The scope of the factors to be considered focuses the assessment on the relevant issues and concerns. As per section 5(1) of *CEAA 2012*, the environmental effects that are to be taken into account in relation to an act or thing, a physical activity, a designated project, or a project are:

> *(a) a change that may be caused to the following components of the environment that are within the legislative authority of Parliament:*
>
> *(i) fish as defined in section 2 of the Fisheries Act and fish habitat as defined in subsection 34(1) of that Act,*

(ii) aquatic species as defined in subsection 2(1) of the Species at Risk Act,
(iii) migratory birds as defined in subsection 2(1) of the Migratory Birds Convention Act, 1994, and
(iv) any other component of the environment that is set out in Schedule 2 of [CEAA 2012];

(b) a change that may be caused to the environment that would occur

(i) on federal lands,
(ii) in a province other than the one in which the act or thing is done or where the physical activity, the designated project or the project is being carried out, or
(iii) outside Canada; and

(c) with respect to Aboriginal peoples, an effect occurring in Canada of any change that may be caused to the environment on

(i) health and socio-economic conditions,
(ii) physical and cultural heritage,
(iii) the current use of lands and resources for traditional purposes, or
(iv) any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

Certain additional environmental effects must be considered under Section 5(2) of *CEAA 2012* where the carrying out of the physical activity, the designated project, or the project requires a federal authority to exercise a power or perform a duty or function conferred on it under any Act of Parliament other than *CEAA 2012*. This is the case for the Project, as PEIEC will require a Subsea Use Agreement from PWGSC - Real Property Branch pursuant to the *Federal Real Property and Federal Immovables Act* to occupy the seafloor of the Northumberland Strait. Therefore, the following environmental effects are also considered:

(a) a change, other than those referred to in paragraphs (1)(a) and (b), that may be caused to the environment and that is directly linked or necessarily incidental to a federal authority's exercise of a power or performance of a duty or function that would permit the carrying out, in whole or in part, of the physical activity, the designated project or the project; and
(b) an effect, other than those referred to in paragraph (1)(c), of any change referred to in paragraph (a) on

(i) health and socio-economic conditions,
(ii) physical and cultural heritage, or
(iii) any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

Provincial legislation may not necessarily be limited to the factors outlined in *CEAA 2012*, as presented above, and may include a broader definition of interaction of the Project with the surrounding environment. Both the PEI *EPA* and the NB *Environmental Impact Assessment Regulation* and the relevant provincial guidelines will be used in addition to guidance from *CEAA 2012*.

3.3.4 Selection of Valued Components

The selection of VCs was carried out in consideration of:

- regulatory issues, guidelines, and requirements
- knowledge of the Project, its components and activities
- knowledge of existing conditions where the Project will be located
- issues raised by regulatory agencies, the public, Aboriginal groups and stakeholders
- the scope of factors to be considered in the EIA as determined by applicable regulatory authorities
- the professional judgment of the Study Team

The following 11 VCs were selected to facilitate a focused and effective EIA process that complies with government requirements and supports public review:

- Atmospheric Environment
- Groundwater Resources
- Freshwater Environment
- Terrestrial Environment
- Marine Environment
- Land Use
- Commercial, Recreational and Aboriginal Fisheries
- Socioeconomic Environment
- Heritage Resources
- Other Marine Users
- Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons
- The rationale for including these VCs, and the factors to be considered in this EIA are shown in Table 3.10

Table 3.10 Selected Valued Components

Valued Component (VC)	Rationale for Inclusion as a VC	EIA Volume			Factors to be Considered
		Volume 2	Volume 3	Volume 4	
		PEI	NB	Northumberland Strait	
Atmospheric Environment	Project-related emissions of particulate matter, combustion gases, and sound may affect the Atmospheric Environment and/or be perceptible to nearby receptors. Construction-related noise has been noted as a concern in PEI due to the expansion of the substation in the town of Borden.	✓	✓	✓	• ambient air quality • greenhouse gases (GHGs) • sound quality
Groundwater Resources	The Project may overlap or run adjacent to wells. There may be public concern regarding potential interactions with drinking water. NB guidelines for linear facilities require assessment of effects on groundwater quality.	✓	✓		• groundwater quality
Freshwater Environment	The Project will span and/or run adjacent to watercourses. Interactions with fish and/or fish habitat, however unlikely, could occur because of potential crossing and/or proximity to these watercourses.	✓	✓		• freshwater fish and fish habitat • surface water quality
Terrestrial Environment	The Project may be located in or adjacent to wildlife habitat. Therefore, there are potential interactions with terrestrial wildlife species (wildlife including birds, mammals, and herptiles; flora), as well as wildlife habitats including wetlands, and any local species of conservation concern, or species at risk.	✓	✓		• plant and wildlife (including bird) species and communities, and their habitats, including wetland habitats • species of conservation concern (i.e., *Species at Risk Act* Schedule 1 species; Committee on the Status of Endangered Wildlife in Canada listings) and any species of concern of PEIDCLE or NBDELG

Table 3.10 Selected Valued Components

Valued Component (VC)	Rationale for Inclusion as a VC	EIA Volume			Factors to be Considered
		Volume 2	Volume 3	Volume 4	
		PEI	NB	Northumberland Strait	
Marine Environment	The Project will interact with the Marine Environment through installation of cables across the Northumberland Strait and with construction in the coastal environments where the cable makes landfall. There has also been concern raised regarding the interaction between fish and shellfish and electromagnetic fields (EMF) emitted from the subsea cable.			✓	• marine fish and fish habitat, including shellfish • species of conservation concern (i.e., *Species at Risk Act* Schedule 1 species; Committee on the Status of Endangered Wildlife in Canada listings) and any species of concern of PEIDCLE or NBDELG
Land Use	The Project may change or adversely affect the environment in such a way that Land Use in the vicinity of the Project may be affected. Land Use includes privately owned land along the RoW, other industrial users, and commercial (tourism) and recreational land use, as well as protected areas. Potential effects on visual quality may be of public concern with respect to commercial tourism and recreation activities.	✓	✓		• existing land uses in the area of the proposed routes, including residential, commercial, and industrial properties, as well as protected areas
Commercial, Recreational and Aboriginal Fisheries	Disruptions to fisheries activities during construction may cause public concern due to their economic and socio-cultural importance to communities.			✓	• existing commercial fisheries and aquaculture that could be affected by the Project
Socioeconomic Environment	Project construction has the potential to interact with labour and economy through employment and expenditures. However, due to the specialized nature of subsea cable installation and use of existing transmission line installation workforce, economic and employment effects are not likely to be substantial.	✓	✓		• economic and employment benefits of the Project to PEI and NB

Table 3.10 Selected Valued Components

Valued Component (VC)	Rationale for Inclusion as a VC	EIA Volume			Factors to be Considered
		Volume 2	Volume 3	Volume 4	
		PEI	NB	Northumberland Strait	
Heritage Resources	The Project may be carried out within areas with potential for archaeological or heritage resources. Physical disturbance of land may affect such resources. There is also potential for marine heritage resources to overlap with the subsea cable.	✓	✓	✓	• archaeological and heritage resources potentially located on land or in the water that may be subject to disturbance
Other Marine Users	There is potential for the marine component of the Project to interact with current marine transportation.			✓	• shipping of Construction materials and equipment to Project location • existing marine traffic and commercial activity that could be affected by the Project
Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons	First Nations consultations are required for any Projects crossing public lands.	✓	✓	✓	• Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons that may be affected by the Project

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