NALCOR ENERGY

LABRADOR-ISLAND TRANSMISSION LINK

ENVIRONMENTAL IMPACT STATEMENT

Chapter 16

Socioeconomic Environment: Environmental Effects Assessment

April 2012

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LIST OF ACRONYMS

Acronym	Description
%	Percent
AAC	Annual Allowable Cut
ATV	All terrain vehicle
BLM	Bureau of Land Management
capex	capital expenditures
CAR	Canadian Aviation Regulations
CCG	Canadian Coast Guard
CEAA	*Canadian Environmental Assessment Agency*
CSA	Canadian Standards Association
CSC	Construction Sector Council
dBA	A-weighted decibels
DFO	Fisheries and Oceans Canada
DND	Department of National Defense
e.g.,	for example
EA	Environmental Assessment
EAP	Employee Assistance Program
EIS	Environmental Impact Statement
ELF	extremely low frequency
EMF	Electromagnetic Field
EMI	electromagnetic interference
EPP	Environmental Protection Plan
EPRI	Electric Power Research Institute
FFAW	Fish, Food and Allied Workers
FLC	Fisheries Liaison Commitee
GDP	Gross Domestic Product
GIS	geographic information system
GNL	Government of Newfoundland and Labrador
HDD	Horizontal directional drilling
HNL	Hospitality Newfoundland and Labrador
HRSDC	Human Resources and Skills Development Canada
HST	Harmonized Sales Tax
HVdc	High Voltage direct current
i.e.,	that is

Acronym	Description
IATNL	International Appalachian Trail – Newfoundland and Labrador
IBA	Impacts and Benefits Agreement
ICD	implantable cardioverter defibrillator
IMD	Implantable Medical Device
kg	kilogram
KI	Key Indicator
km	kilometre
km^2	square kilometres
KOP	Key Observation Point
kV	kilovolt
kV/m	kilovolts per metre
LATP	Labrador Aboriginal Training Partnership
LSA	Local Study Area
m	metre
m^2	square metre
MP	Measurable Parameter
nA/m^2	100 amperes x 10^{-9} per square metre
NASP	Natural Areas Systems Plan
NCC	NunatuKavut Community Council
NLDEC	Newfoundland and Labrador Department of Environmental and Conservation
NLDNR	Newfoundland and Labrador Department of Natural Resources
NLDTCR	Newfoundland and Labrador Department of Tourism, Culture and Recreation
NLDTW	Newfoundland and Labrador Department of Transportation and Works
NLEPA	*Newfoundland and Labrador Environmental Protection Plan*
NLH	Newfoundland and Labrador Hydro
NLOA	Newfoundland and Labrador Outfitters Association
NOC	National Occupation Classification
NSA	noise sensitive area
OHSP	Occupational Health and Safety Plan
OHV	off highway vehicle
OPGW	Optical overhead groundwire
PAO	Provincial Archaeology Office
QNS-L	Québec North Shore and Labrador
ROV	remotely operated vehicle

Acronym	Description
ROW	right-of-way
RSA	Regional Study Area
SHERP	Safety, Health and Environmental Emergency Response Plan
TCH	Trans-Canada Highway
TLH	Trans-Labrador Highway; # indicates phase when applicable
TLH2	Trans-Labrador Highway (Phase 2)
TLH3	Trans-Labrador Highway (Phase 3)
UNESCO	United Nations Educational, Scientific and Cultural Organziation
USDI	United States Department of Interior
VEC	Valued Environmental Component
VTMP	Vessel Traffic Management Plan
WEP	Women's Employment Plan

16 SOCIOECONOMIC ENVIRONMENT: ENVIRONMENTAL EFFECTS ASSESSMENT

This Chapter of the Environmental Impact Statement (EIS) presents the environmental assessment (EA) for the Socioeconomic Environment, which includes Historic and Heritage Resources, Communities, Economy, Employment and Business, Land and Resource Use, Marine Fisheries, Tourism, and Visual Aesthetics.

To assess the effects of the Labrador-Island Transmission Link (the Project) on the Socioeconomic Environment, a number of Valued Environmental Components (VECs) were identified and have been assessed in the following sections.

16.1 Valued Environmental Component Selection

VECs are aspects of the biophysical and socioeconomic environments which are of particular ecological and / or social importance, and which have the potential to be affected (adversely or positively) by the proposed Project. VECs reflect identified scientific and community concerns regarding the Project and its potential effects, and reflect the questions and issues raised through consultation with governments, Aboriginal and stakeholder groups, and the general public.

Initial direction and input into VEC selection for this EIS was obtained through the EIS Guidelines and Scoping Document (Government of Newfoundland and Labrador (GNL) and the Government of Canada 2011) that were issued to Nalcor Energy (Nalcor) following Aboriginal and public review. Following additional analysis by the EIS study team and Nalcor's own consultation activities, the initial list of VECs has been expanded and refined to include and reflect the key environmental components and issues that require detailed consideration in the EIS.

The VECs that have been selected as the focus for the EA for the Socioeconomic Environment, as well as the rationale for their selection, are described below.

Historic and Heritage Resources has been identified as a VEC because of their historic, cultural, spiritual, natural, scientific and aesthetic importance. In Newfoundland and Labrador, such resources are protected under the *Historic Resources Act* (1985) and are administered through the Provincial Archaeology Office (PAO) of the Newfoundland and Labrador Department of Tourism, Culture and Recreation (NLDTCR). Historic and Heritage Resources are also often inherently valued by Aboriginal people and the general public as they may contain the only physical information on Aboriginal peoples and their activities prior to the arrival of Europeans in North America. These resources may also provide information about the early history of a region and the relationships between cultures.

Communities has been identified as a VEC because of the importance of strong and healthy communities in contributing to quality of life in the province. There is concern that the Project may put undue pressures on the existing infrastructure and services of communities located near the Project, as well as beneficially or adversely affecting the general health and well-being of individuals and the overall quality of life in those communities.

Economy, Employment and Business has been identified as a VEC because of its importance to the lives and livelihoods of the people of Newfoundland and Labrador. The Project will have direct and indirect effects on these economic parameters by creating opportunities for new employment and training, increasing the province's roster of skilled and experienced workers, creating new business opportunities, increasing government revenue, and influencing economic growth throughout the province.

Land and Resource Use has been identified as a VEC because it is an important and integral component of Newfoundland and Labrador's human environment and overall cultural landscape, and reflects the characteristics, traditions and values of its people; the communities they live in; how they travel from place to place; the manner in which they make a living or supplement their incomes; the outdoor activities that they partake in and enjoy for recreational purposes; and, their resolve to protect the natural and cultural heritage of the areas in which they live.

Marine Fisheries has been identified as a VEC because of the importance of marine fish harvesting activities in Newfoundland and Labrador for economic, social and cultural reasons. Both the Strait of Belle Isle and Conception Bay, locations of Project components, provide accessible fisheries primaily for commercial enterprises and, to a lesser extent, for the enjoyment of recreational fishers.

Tourism has been identified and considered as a separate VEC because it plays a key role in the provincial economy, and because it may be affected both directly and indirectly by the proposed Project. Attractions (e.g., parks, historic sites), events or activities (e.g., plays, festivals, boat tours) and related services (e.g., accommodations and restaurants) are important economic generators in Newfoundland and Labrador, particularly in rural areas.

Visual Aesthetics has been selected as a VEC because much of Newfoundland and Labrador is forested and remote from urban centres, with areas of pristine landscapes and many noteworthy viewscapes. Project activities (e.g., clearing) and components (e.g., right-of-way (ROW), towers) will provide visual contrast to the natural surroundings, and this VEC assesses the potential changes to the visual landscape and scenic quality as a result of the Project.

The effects of the Project on these VECs are assessed in the following sections of this chapter.

16.2 Historic and Heritage Resources

16.2.1 Introduction

Historic and Heritage Resources include sites, objects or other materials of historic and archaeological, palaeontological, architectural, cultural and / or spiritual importance. Such resources include sites and materials dating to the Pre-contact Period (defined as the time prior to the arrival of Europeans in North America and their first "contact" with Aboriginal peoples) as well as from the Historic Period (the time following Aboriginal peoples' first contact with Europeans and the beginning of written histories).

Typically, Historic and Heritage Resources include four broad categories, including:

- Archaeological Resources (such as stone tools, remains of camp sites and shipwrecks);
- Other Sites of Cultural / Historical Importance (such as burials and / or spiritual sites);
- Palaeontological Resources (fossils); and
- Architectural Resources (historic buildings and properties).

Archaeological Resources occur throughout Newfoundland and Labrador. The majority of sites and materials have been recorded in coastal locations, but they have also been identified in near-coastal and interior portions of the province. Eighteen archaeological sites are registered within the Project area, with the majority situated in Central Newfoundland (Section 15.2.3). Other known sites are present on the Labrador side of the Strait of Belle Isle, at a number of interior waterway crossings, including the Torrent River and Portland Creek Pond on the Northern Peninsula, and at Birchy Lake north-east of Corner Brook. No marine archaeological sites are registered within the cable crossing corridor in the Strait of Belle Isle or at either of the proposed electrode sites. As well, no marine archaeological sites or remains were identified during the marine survey work that was conducted by Nalcor between 2006 and 2011.

As specified in the Environmental Impact Statement Guidelines and Scoping Document (the Guidelines) (Government of Newfoundland and Labrador and the Government of Canada 2011), the EA for Historic and Heritage Resources also considers other sites of cultural / historical importance, including any known burial, cultural, spiritual and / or heritage sites. No known locations of cultural or spiritual importance to the Labrador Innu described in Armitage (2010) are located within the proposed Project area. Available information and the results of consultation with other Aboriginal groups in Labrador and Québec have also not identified any cultural or spiritual sites within the Project area (Nalcor Energy (Nalcor) et al. 2011). Any additional relevant information that is obtained through further consultation with Aboriginal groups will be considered and used to inform Project planning.

One location within the proposed Project area, namely Chapel Arm in Newfoundland, is known to contain Palaeontological Resources. All other areas where Project activities are proposed to occur are considered to have low potential to contain fossils.

There are no registered heritage buildings, structures or sites within the Project area that meet the necessary criteria for protection under the *Historic Resources Act*. The 19th century lighthouse at Point Amour in the Labrador Straits is a registered historic structure, but is on a parcel of land currently owned by the federal government and not the site of planned Project activity. Therefore, Architectural Resources are not assessed further in this EIS.

The existing environment for Historic and Heritage Resources is described in detail in Chapter 15 of this EIS.

16.2.2 Environmental Assessment Study Areas

16.2.2.1 Spatial Boundaries

Local Study Area

Historic and Heritage Resources are stationary and, therefore, any potential Project-VEC interactions are restricted to zones of physical ground disturbance. The Local Study Area (LSA) is the area where Project-related components and activities that may affect Historic and Heritage Resources will occur (Figure 16.2.2-1). The LSA therefore includes the 2 km wide transmission corridor while also considering the general nature and location of other Project activities and elements (e.g., access, electrode sites, electrode lines, camps, storage areas). Also included is the proposed 500 m wide submarine cable crossing corridor across the Strait of Belle Isle, from Labrador to the Island of Newfoundland.

Regional Study Area

Since Historic and Heritage Resources are stationary and any effects of the Project on these resources will not extend beyond the LSA, the concept of a Regional Study Area (RSA) is less relevant for the EA of this VEC. Nevertheless, the assessment of Historic and Heritage Resources does take on a larger "regional" perspective, by considering the overall cultural history of the regions in the Project area and in the province as a whole (as described in Section 15.2), as well as how any Historic and Heritage Resources that may be affected by the Project relate to this larger regional context.

16.2.2.2 Temporal Boundaries

The temporal boundaries for this VEC encompass the Construction, and Operations and Maintenance phases of the Project, with a primary focus on construction activities, which will involve the majority of ground disturbance associated with the Project.

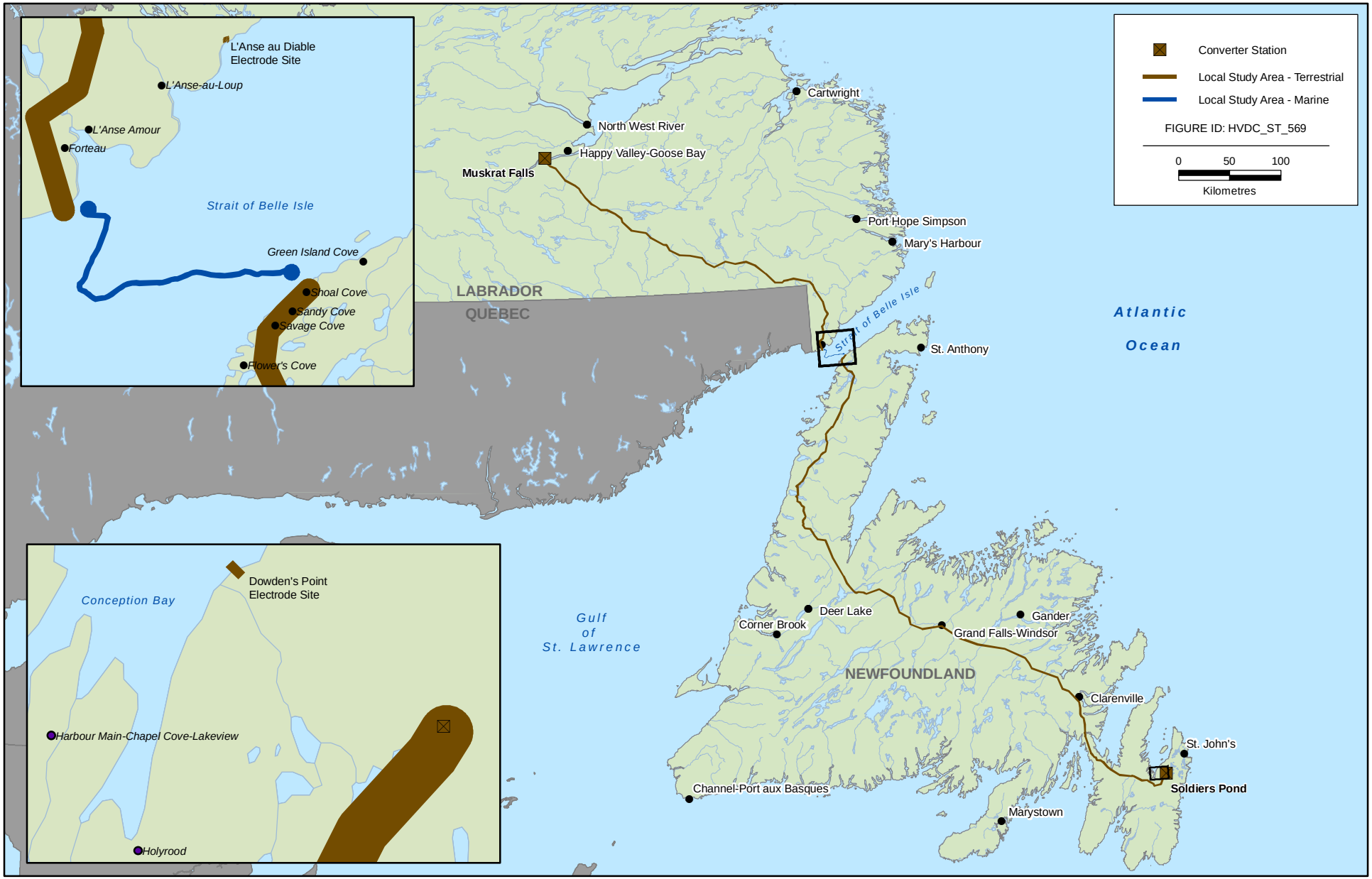


FIGURE 16.2.2-1

Historic and Heritage Resources: Local Study Area

16.2.3 Potential Environmental Issues, Indicators and Interactions

16.2.3.1 Potential Environmental Issues

Any activities involving ground disturbance can result in disturbance to or damage of Historic and Heritage Resources and the loss of any information they contain. In the case of cultural / historical resources, disturbance can occur to a site and / or the adjacent landscape of which it is considered a part, potentially diminishing its integrity and cultural value. Conversely, palaeontologists often welcome the opportunity to examine and gain additional scientific information on fossils in areas where construction activities expose underlying geological deposits (Savannah Environmental 2010).

A summary of the key identified issues and considerations related to Historic and Heritage Resources are summarized in Table 16.2.3-1 below.

Table 16.2.3-1 Identified Issues and Questions: Historic and Heritage Resources

Issue / Question	Nature and Rationale	Specific Considerations
Damage to or loss of Archaeological Resources during Project Construction and / or Operations and Maintenance.	Archaeological Resources are protected by legislation, valued by society and non-renewable.	Archaeological Resources are found in higher densities on the Labrador side of the Strait of Belle Isle and at major interior waterway crossings, including Torrent River, Portland Creek Pond, Birchy Lake and the Exploits River in insular Newfoundland. Known sites and areas of high archaeological potential have been identified at various locations along the LSA.
Damage to or loss of Palaeontological Resources during Project Construction and / or Operations and Maintenance.	Palaeontological Resources provide important information and are non-renewable.	Palaeontological Resources are known to occur within the LSA near Chapel Arm, Newfoundland.
Damage to or loss of sites of cultural-historical importance (including known burial, cultural, spiritual and heritage sites) during Project Construction and / or Operations and Maintenance.	Such features often form a key part of the history and culture of a people, particularly Aboriginal groups.	Muskrat Falls is a known site of cultural importance for the Labrador Innu.

16.2.3.2 Key Indicators and Measurable Parameters

Key Indicators (KIs) and Measurable Parameters (MPs) were identified for the Historic and Heritage Resources VEC to frame and focus the associated environmental effects analysis. Their selection was based on the four categories of Historic and Heritage Resources listed in Section 16.2.1, as well as those resources known to occur within the LSA based on available information. The likely effects of the Project on the KIs may be measured through associated changes in the identified MPs. The general rationale for the selection of these KIs and MPs is summarized in Table 16.2.3-2.

Table 16.2.3-2 Key Indicators and Associated Measurable Parameters: Historic and Heritage Resources

Key Indicator	Rationale for Key Indicator[(a)]	Measurable Parameter[(b)]	Rationale for Measurable Parameter
Archaeological Resources	– There are known archaeological sites and areas with high archaeological potential present in the LSA – Protected by legislation – Cultural and scientific importance – Potential for interactions / effects as a result of Project-related ground disturbance	– Number of archaeological sites present	– Losses of known sites would be an adverse effect on archaeological resources
Palaeontological Resources	– There is potential for fossils to be present in the LSA – Scientific importance (information) – Potential for interactions / effects as a result of Project-related ground disturbance	– Number of palaeontological specimens present	– Losses of palaeontological specimens would be an adverse effect on palaeontological resources
Sites of Cultural-Historical Importance	– Key aspect of the history and culture of a people, particularly Aboriginal groups	– Number of sites present – Integrity of a site and its value to people	– Disturbance to the site and / or its adjacent landscape will likely diminish the integrity and cultural value of a site

(a) Key Indicator: An aspect or characteristic of the VEC and / or its environment which, if changed as a result of the Project, may result in an effect on the VEC.

(b) Measurable Parameter: A characteristic that is related to the status of the KI. Project effects to an MP can be detected and measured.

16.2.3.3 Potential Project-Historic and Heritage Resources Interactions

The main potential for interaction between the Project and Historic and Heritage Resources will occur during those activities which result in ground disturbance. Interactions with Historic and Heritage Resources may therefore occur during the following activities:

- clearing of vegetation during the construction of Project components (e.g., access trails, temporary and permanent bridges, construction camps, ROW, electrode sites, converter stations, drill pad for the directional drill rig) and associated use and movements of equipment through these areas; and
- grubbing, excavation of soil and rock and quarrying during construction of certain Project components (e.g., transmission towers, permanent or temporary access infrastructure, camp sites, electrode sites, converter stations, drill rig placement).

As there are no registered or known archaeological resources within the marine LSA (Strait of Belle Isle cable corridor and both electrode sites), there will be no likely effects of the Project on marine archaeological resources.

Increased human presence throughout the Project area during Construction and Operations and Maintenance, as a result of improved road or trail access or along the ROW, can also lead to interactions with Historic and Heritage Resources (e.g., such travel can contribute to surface rutting and erosion and potential pilfering of exposed materials). Accidental events, such as fires or spills, can also affect sites or materials by disturbing or destroying organic materials or structural remains associated with a site (see Section 16.9.2).

A summary of Project activities that may interact with Historic and Heritage Resources is provided in Table 16.2.3-3.

Table 16.2.3-3 Potential Project Interactions: Historic and Heritage Resources

Project Phase / Activity	Key Indicators		
	Archaeological Resources	**Palaeontological Resources**	**Sites of Cultural-Historical Importance**
Construction			
Construction of access trails and roads	Loss of or disturbance to a site through ground disturbance	Loss of or disturbance to specimens through ground disturbance	Potential disturbance of sites and / or their adjacent landscape
Movement and presence of personnel, equipment and materials			
Construction camps			
Marshalling yards and staging areas			
Right-of-way clearing and preparation			
Quarrying and borrowing			
Transmission tower assembly and installation			
Conductor installation	—	—	—
Converter station site preparation and construction	Loss of or disturbance to a site through ground disturbance	Loss of or disturbance to specimens through ground disturbance	Potential disturbance of sites and / or their adjacent landscape
Preparation and construction of submarine cable landing sites (on-land works)	—	—	—
Construction and installation of submarine cables (marine works)			
Electrode site preparation and installation			
Island system upgrades	Loss of or disturbance to a site through ground disturbance	Loss of or disturbance to specimens through ground disturbance	Potential disturbance of sites and / or their adjacent landscape
Employment / presence of workers	—	—	—
Contracting / expenditures			
System commissioning			
Operations and Maintenance			
Access trails and roads	Loss of or disturbance to a site through ground disturbance	Loss of or disturbance to specimens through ground disturbance	Potential disturbance of sites and / or their adjacent landscape
Operation of the High Voltage direct current (HVdc) system	—	—	—
Routine line inspections and repairs	Loss of or disturbance to a site through ground disturbance	Loss of or disturbance to specimens through ground disturbance	Potential disturbance of sites and / or their adjacent landscape
Vegetation management			
Potential major system repairs			
Operation of the electrodes	—	—	—
Employment / presence of workers			
Contracting / expenditures			

— No likely or detectable interaction identified.

16.2.4 Approach to the Environmental Effects Analysis

16.2.4.1 Analytical Methods

The information sources and methods used to understand and describe the existing environment for Historic and Heritage Resources are outlined in Section 15.2.2. To assess the potential effects of the Project on this VEC, geo-referenced Project information was examined to determine where proposed Project components and activities could overlap with known archaeological sites, areas of identified high archaeological potential, fossil-bearing geological deposits and sites of known cultural-historical importance.

The EA, and ongoing Project planning, adopts a "preventative and mitigation-centered" approach, where the intent is first to attempt to avoid all known Historic and Heritage resources sites. This will include further (post-EA) information-gathering in select sites as Project design continues, as well as the implementation of contingency measures in the event of an accidental discovery of such resources in the field. The results of the environmental effects assessment for Historic and Heritage Resources is outlined further in the sections that follow.

16.2.4.2 Environmental Effects Descriptors

The likely effects of the Project on Historic and Heritage Resources, including each of its associated KIs, are described using the following attributes, which are based on standard EA practice as well as the provisions of the Newfoundland and Labrador *Historic Resources Act (1985)* and associated guidance material. These descriptors, and definitions for each of their associated ratings, are included in Table 16.2.4-1 below.

Table 16.2.4-1 Environmental Effects Descriptors: Historic and Heritage Resources

Effects Descriptor	Definition
Direction	
Adverse	The loss or disturbance of archaeological or palaeontological resources or of a known site of cultural-historical importance.
Neutral	No effect on archaeological or palaeontological resources or on a known site of cultural-historical importance.
Beneficial	Discovery of a previously unrecorded archaeological site and / or exposure of unknown / unrecorded fossils for research and information collection.
Magnitude	
No effect	No likely effect on archaeological or palaeontological resources or on known sites of cultural-historical importance.
Low	Disturbance of an archaeological or palaeontological resource but with prior retrieval of the resource and associated information, and with all necessary regulatory approvals. A change to the landscape immediately adjacent to a known site of cultural-historical importance, but with no direct effect on the site itself.
Moderate	The disturbance or loss of all or a portion of an archaeological or palaeontological resource, with retrieval of a portion of the resource and its associated information. A direct effect on a known site of cultural-historical importance which is of interest and concern to the associated community, but which does not reduce the overall integrity and cultural value of the site.
High	The disturbance or loss of an archaeological or palaeontological resource, with no retrieval of the resource and its associated information. A direct effect on a known site of cultural-historical importance which reduces the overall integrity and cultural value of the site.

Table 16.2.4-1 Environmental Effects Descriptors: Historic and Heritage Resources (continued)

Effects Descriptor	Definition
Geographic Extent	
Local	Any effect will be limited to the LSA.
Regional	Effects may extend beyond the LSA.
Duration	
Temporary	Effect will occur but measures are taken to salvage and retrieve information from the resources, and / or move / rehabilitate the site.
Permanent	Effect will be permanent and irreversible.
Frequency	
Intermittent	Effect will occur at various, intermittent times.
Continuous	Effect will occur continuously.

16.2.5 Construction

16.2.5.1 Overview of Project Construction and Associated Effects Management

Any Project activity involving disturbance of the ground surface or subsurface can result in disturbance or loss of archaeological or palaeontological resources. For archaeological resources, a loss occurs when structural remains, artifacts or any other materials associated with a site, cultural feature or landscape are dispersed, displaced, altered or destroyed and meaningful information regarding the object, the site's purpose and age, or its occupants or builders, is not retrieved. Similarly, the loss of palaeontological resources occurs when fossils and / or the geological deposit in which they are contained are altered or destroyed without study (and possibly retrieval) of the materials and information they provide.

Interactions with archaeological resources may occur during clearing of the ROW and construction of permanent or temporary access roads, temporary camps, and temporary or permanent bridges and watercourse crossings. Other Project activities, including excavation, grubbing and potential blasting for installation of electrical towers, converter stations and electrode sites may also result in effects on such resources. As well, more intensive human use of the area resulting from increased access on roads, trails and / or along the ROW, could lead to interactions with archaeological sites or materials. Accidental events, such as fuel spills, could also affect these resources. For palaeontological resources, quarrying, blasting, borrowing and drilling associated with the Project may result in adverse effects. Sites of cultural-historical importance can be affected by any Project activities that may occur at these sites and / or their adjacent landscapes.

Mitigation will be applied to avoid or reduce the potential effects of the Project on Historic and Heritage Resources. As indicated, the key and initial objective will be to avoid potential interactions and effects through Project planning and design. Known Historic and Heritage Resources within the LSA have been identified and mapped, and detailed Historic Resources Potential Mapping has been completed for the Project (Stantec 2011a, 2010) to identify areas of high, moderate and low potential for Historic and Heritage Resources that have not yet been discovered. Such a planning and avoidance approach is consistent with provincial guidelines (GNL 1992).

The key mitigation measures being proposed by Nalcor to avoid or reduce potential Project effects on Historic and Heritage Resources are summarized below:

- Information on known Historic and Heritage Resources will be mapped and included in the planning and design phase of the Project, including in eventual transmission line ROW selection. Nalcor will consult with the PAO on this issue during such detailed design.
- Once the transmission line ROW is defined, Nalcor will conduct an historic resources field survey of those sections of the ROW that cross through areas identified as high potential for undiscovered Historic and Heritage Resources. The specific nature and locations of such surveys will be planned in consultation with the PAO.
- Nalcor and its contractors will apply for and adhere to all provincial and federal permits required for Project Construction, and Operations and Maintenance, including for the transmission system and for all associated and ancillary infrastructure and activities (e.g., access trails, camps, quarries, marshalling yards). The permit application and review process will provide regulatory agencies, including the PAO, with the opportunity to review detailed information on the specific location and design of Project component, and to request additional information collection and / or analysis as required and appropriate.
- Nalcor or its contractors will identify any known Historic and Heritage Resources within 100 m of planned Project activities, and these sites will be made known to supervisory personnel. A 50 m “no work” buffer will be maintained around all known Historic and Heritage Resources sites to avoid interactions between Project activities and these resources.
- The orientation and training programs provided to construction personnel will include briefings related to Historic and Heritage Resources, including the avoidance of known sites, site and artefact recognition, the importance and value of such resources and their preservation, and the protection and contingency measures to be implemented in the event of an accidental discovery of Historic and Heritage Resources (as outlined below).
- Standard precautionary and reporting procedures will apply throughout Project Construction, and Operations and Maintenance. In the event that unregistered Historic and Heritage Resources are discovered, work will be halted immediately at that location, the PAO will be notified, and a Stage 1 Historic Resources Overview Assessment will be initiated by Nalcor in accordance with provincial guidelines. This assessment would include completion of a field survey (with necessary authorization from the PAO) of the find location and surrounding area to identify the nature and extent of the remains, the cultural group or groups represented and the time period involved. As well, recommendations regarding avoidance of the site or systematic retrieval of the materials and information it contains would be conducted in accordance with PAO guidelines. A report on the find would then be completed and submitted to the PAO. Project activity at that site would recommence only if and when approved by the PAO.
- If Historic and Heritage Resources are encountered and cannot be avoided through Project design, mitigation in the form of Systematic Data Recovery (i.e., appropriate excavation, documentation, salvage and retrieval and conservation of materials, followed by analysis and report preparation) would be undertaken in accordance with provincial guidelines (GNL 1992) and in full consultation with the PAO.
- Where Project components are constructed in any area known to have high potential to contain palaeontological resources, periodic inspections of disturbed areas will be undertaken by qualified palaeontologists to limit the potential for disturbance of fossils and the loss of any information they may provide.
- Nalcor will continue to consult with relevant Aboriginal communities and organizations, to further understand any sites of cultural-historical importance or other Historic and Heritage Resources that may be located within or near planned Project activities. Any such information that is made available to the proponent will be considered throughout ongoing Project design and eventual implementation, and Aboriginal groups will be kept informed as Project work progresses.

These mitigation measures will be clearly laid out in the Environmental Protection Plan(s) (EPP) prepared and used for all Project activities, so that all Project personnel are aware of the above-noted procedures related to the discovery of Historic and Heritage Resources.

16.2.5.2 Existing Knowledge

There is little available published "existing knowledge" which has evaluated and measured the actual and known effects of similar projects and activities on Historic and Heritage Resources. Several key sources which reference the effectiveness of avoidance, other mitigation measures and the systematic data recovery of archaeological sites and materials are outlined below (Table 16.2.5-1). Also included are sources referencing the use of archaeological potential mapping, as well as a number of key issues to consider in assessing likely effects of the Project on archaeological and palaeontological resources.

Table 16.2.5-1 Existing Knowledge (Construction): Effects of Similar Projects on Historic and Heritage Resources

Reference	Study / Project Context	Summary of Findings
PSC Wisconsin (2010, internet site)	This overview reviews the environmental issues and concerns raised by the construction of electric transmission facilities. The first part of the overview provides a general summary of the methods to measure and identify environmental impacts. The second part of the overview is an A to Z directory of specific environmental issues and techniques to minimize or mitigate the impacts.	– Discussion of potential impacts and methods to minimize or mitigate the impacts on archaeological and historical resources.
California Energy Commission (2008, internet site)	Canyon Power Plan Licensing Case AFC Files – Palaeontology	– Distinguishes differences between archaeological resources and palaeontological resources - the quality or quantity of fossils within the rock unit cannot be known until it is exposed as a result of natural erosion processes or earth-moving activities. – Fossils are rarely distributed evenly within a rock unit, making it difficult to predict where they may occur. – Mitigation measures such as pre-construction surveys may not be effective in reducing impacts on fossils as sites may not be present at the surface. – Monitoring of excavations by an experienced palaeontologist during construction increases the probability that fossils will be discovered and preserved.
Tetra Tech (2006)	North Baja Pipeline Expansion Project, Appendix K Palaeontological Resource Mitigation and Monitoring Plan	– Palaeontological Resources Mitigation and Monitoring Plan was developed for a pipeline project that passed through low to moderate potential areas. – Mitigation program had an emphasis on construction-worker education to increase

Table 16.2.5-1 Existing Knowledge (Construction): Effects of Similar Projects on Historic and Heritage Resources (continued)

Reference	Study / Project Context	Summary of Findings
		– potential of identifying fossils and following proper procedures if fossils were encountered, and spot monitoring by palaeontologists of selected sections of the pipeline ROW during excavation to salvage any significant fossil remains encountered during construction involving ground-disturbing and earth-moving activities.
Minaskuat Limited Partnership (2004)	A proposed electrical power line in southern Labrador by Newfoundland and Labrador Hydro (NLH)	– Historic and Heritage Resources research was completed in 2004 at Red Bay, Labrador, for NLH who were proposing to install 20 new transmission poles within an approximately 7 m wide ROW. – Background and field research determined that the proposed ROW was situated in close proximity to three historic archaeological sites and that installation of the transmission poles and maintenance of the line could result in adverse effects to cultural remains. – Consequently, a mitigation plan of site avoidance by re-routing the line was recommended, and accepted and implemented by NLH. – No adverse environmental effects were identified for known Historic and Heritage Resources as a result of the development.
Voisey's Bay Nickel Company Limited (1997, internet site)	Proposed Mining and Mill Project in Northern Labrador	– Historic and Heritage Resources research completed in the mid-1990s in relation to the proposed development of the Voisey's Bay mine and mill site in northern Labrador resulted in the identification of 134 archaeological and contemporary sites within the assessment area. – To reduce the likelihood of effects on the known sites, site fencing and avoidance was implemented in consultation with the proponent and Aboriginal groups. – In areas where sites could not be avoided due to project requirements, systematic data recovery and recording of remains was implemented. – Construction was completed without any unplanned disturbance to archaeological resources and mitigation for any planned disturbance (i.e., systematic data recovery) was completed to the satisfaction of the provincial government.

Table 16.2.5-1 Existing Knowledge (Construction): Effects of Similar Projects on Historic and Heritage Resources (continued)

Reference	Study / Project Context	Summary of Findings
Society of Vertebrate Palaeontology (1995, internet site)	Assessment and Mitigation of Adverse Impacts to Non-renewable Palaeontological Resources: Standard Guidelines	– First step is to map palaeontological potential based on pertinent geological and palaeontological literature, specimen records and field surveys if required. – Rock units are divided into three categories: high potential, undetermined potential, and low potential. – In areas of high potential, recommended mitigation includes: a preliminary survey and surface salvage prior to construction; monitoring and salvage during excavation; preparation, including screen washing to recover small specimens (if applicable), and specimen preparation to a point of stabilization and identification; identification, cataloguing, curation and storage; and, a final report of the finds and their significance after all operations are completed. – Mitigation measures generally need not be developed for areas of low palaeontological potential, unless fossils are unearthed in the course of excavation.
GNL (1992)	Historic Resources Impact Assessment Guidelines	– Outlines that mitigation can refer to a range of strategies including: project redesign, various types of active site protection or preservation, as well as different intensities of and approaches to systematic data recovery. – Avoidance ensures the complete, in situ protection of the resource from development and thus is considered the preferred mitigative option. – Avoidance may require erecting a fence or other suitable barrier around the site to ensure its protection if construction activities are to occur in close proximity. – Where it is not possible to avoid a site, active site protection can be used, including site stabilization and capping to minimize project effects. – Systematic data recovery is the least desirable mitigation strategy. It requires scientific and systematic investigation of unavoidable historic resource losses using accepted data recovery techniques.

16.2.5.3 Construction Effects: Archaeological Resources

Historic and Heritage Resources research completed to date indicates that 18 archaeological sites registered with the PAO are located within the LSA (Table 16.2.5-2). These sites include those identified during past research not associated with the Project, as well as during Nalcor studies completed between 1998 and 2011. There are nine identified archaeological sites within the LSA in Labrador and nine on the Island of Newfoundland. The locations of these sites are illustrated in Section 15.2.3 (Figures 15.2.3-1 and 15.2.3-3) and described in further detail in the *Historic and Heritage Resources Component Study* (Stantec 2010) and *Historic and Heritage Resources Component Study Supplementary Report* (Stantec 2011a).

Table 16.2.5-2 Known Archaeological Sites Present within the LSA

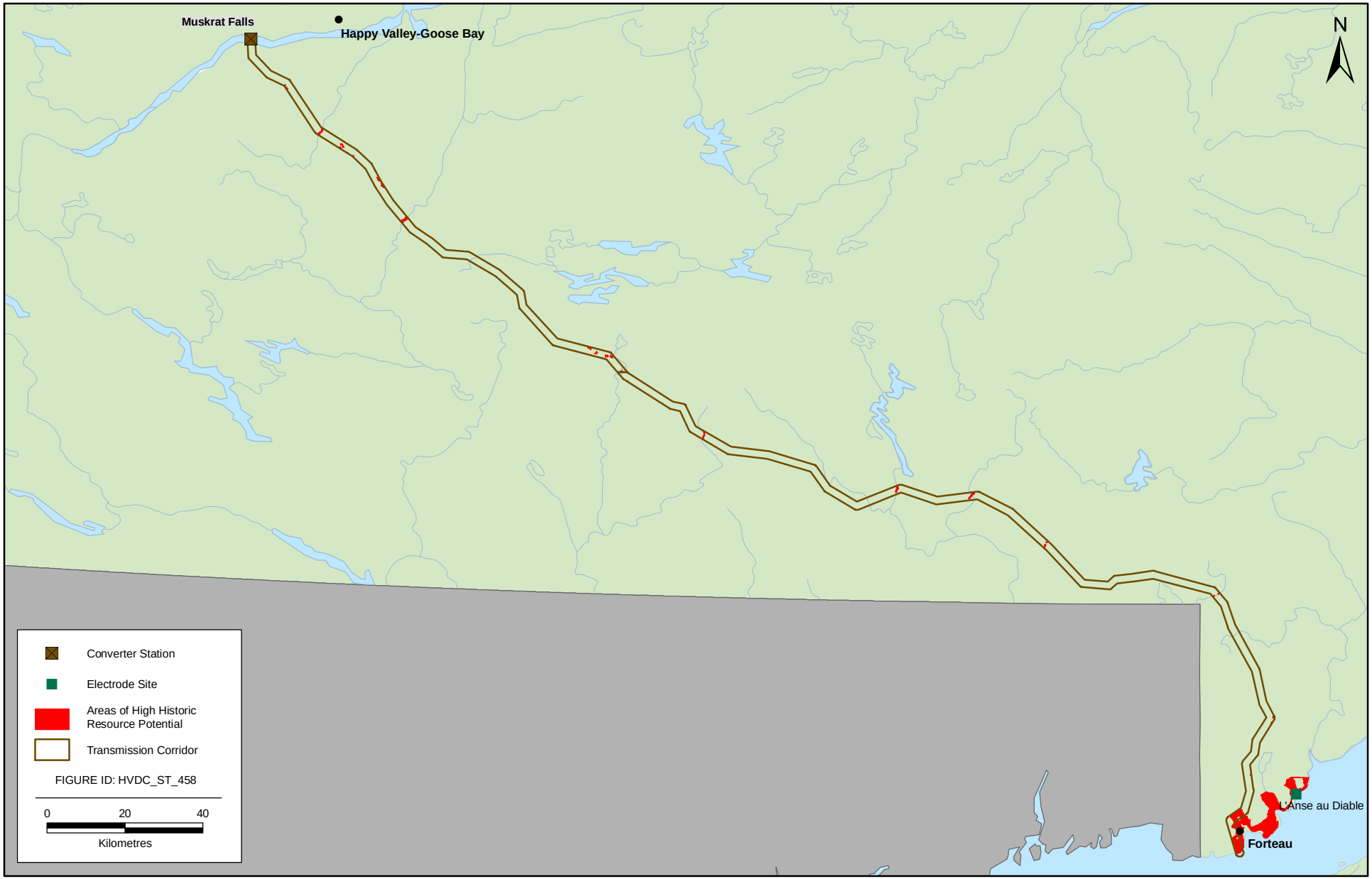
Number of Sites[(a)]	Central and Southeastern Labrador	Newfoundland
Discovered by Nalcor Surveys (1998-2011)	5	5
Discovered by Others	4	4
Total	**9**	**9**

[(a)] The number of sites represent those within the corridor (marine and on-land) and the electrode sites.

Of the 18 known archaeological sites registered with the PAO within the LSA in Labrador, five are situated at the L'Anse au Diable electrode location, one is within the 2 km wide corridor at Forteau Point, and three are within the 2 km wide corridor further north toward Churchill River. On the Island of Newfoundland, one archaeological site is situated at the Shoal Cove landing site, while the remaining eight sites are located along the 2 km wide transmission corridor further south and east. No archaeological sites were identified at Dowden's Point in Conception Bay.

As detailed engineering work continues, other Project components and activities – and their locations and footprints – will become further defined. Consideration of known and potential Historic and Heritage Resources will continue to be an aspect of Project planning and design work for Historic and Heritage Reosources, including avoidance of known sites and further work in areas of identified high potential to further inform Project design and / or implementation.

The Historic and Heritage Resources baseline study completed for the Project as part of the EA process (Stantec 2011a, 2010) has included archaeological potential mapping of the transmission corridor to identify areas of low, moderate or high potential to contain such resources. The results of the archaeological potential-mapping indicate that the proposed LSA in Labrador has a total of 66 high potential areas, covering a total area of approximately 23.57 square kilometres (km^2) (Figure 16.2.5-1). The section of the proposed LSA on the Island of Newfoundland has a total of 123 areas of high potential covering an area of approximately 25.56 km^2 (Figures 16.2.5-2 and 16.2.5-3). The information contained in the Historic and Heritage Resources Component Study (Stantec 2011a, 2010) and the archaeological potential mapping of the LSA will be used to select a transmission ROW and other Project sites to avoid known archaeological sites and areas of high archaeological potential where possible, and / or to plan further field investigations and mitigation procedures as Project planning progresses. In addition, as outlined earlier, many aspects of the Project will be the subject of detailed post-EA permitting, which will allow for detailed review of these activities and any potential effect on this VEC.



nalcor energy

FIGURE 16.2.5-1

Areas of High Potential for Archaeological Resources, Labrador

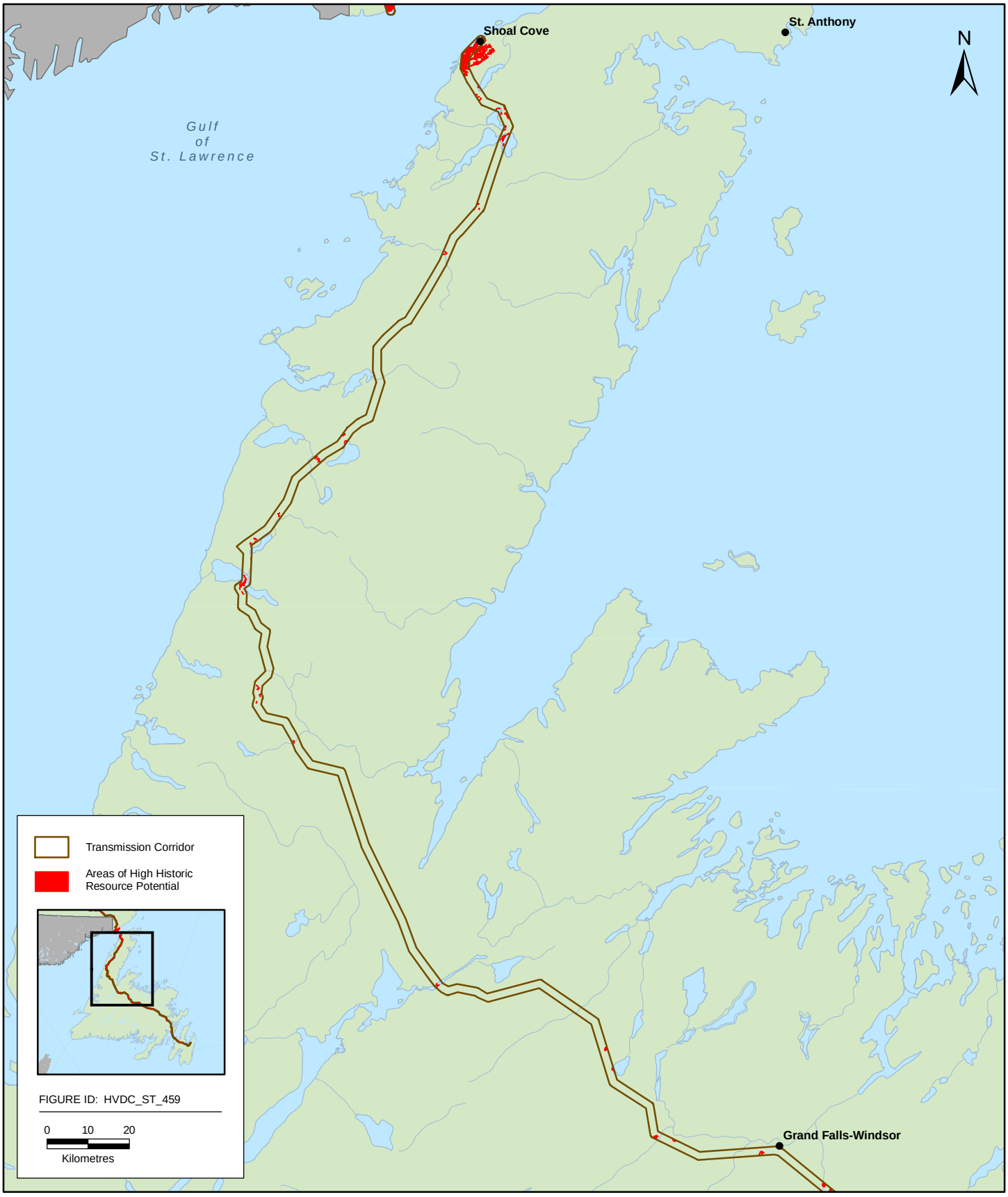


FIGURE 16.2.5-2

Areas of High Potential for Archaeological Resources, Newfoundland

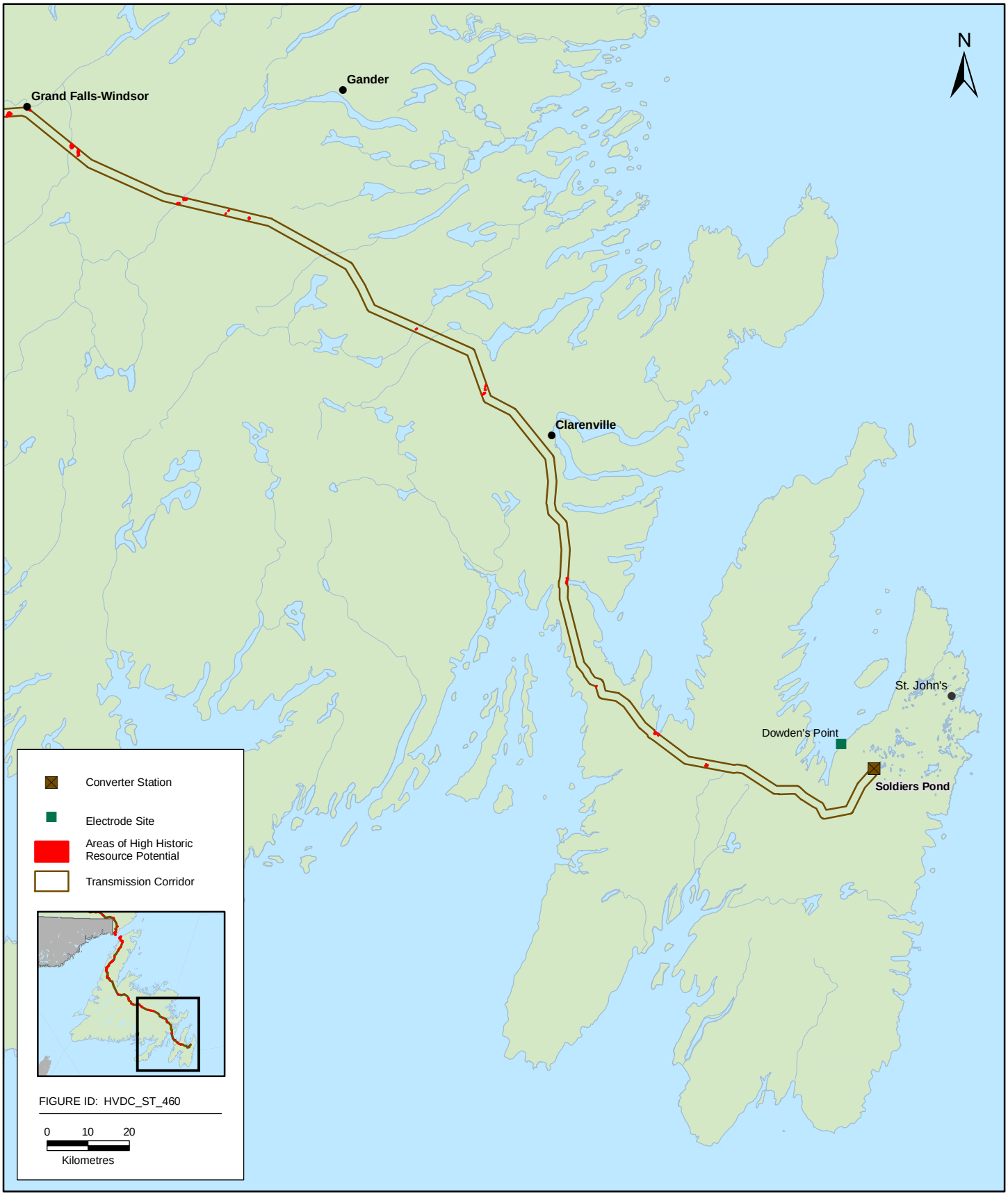


FIGURE 16.2.5-3

Areas of High Potential for Archaeological Resources, Newfoundland (continued)

Considering the studies completed to date related to Historic and Heritage Resources and the mitigation measures proposed by Nalcor for this Project, it is expected that all known Historic and Heritage Resources sites can and will be avoided, and any new sites discovered can be either avoided or mitigated through Systematic Data Recovery.

Summary of Likely Residual Environmental Effects

The likely residual effects of Project Construction on the Archaeological Resources KI are as follows:

- Adverse but of very low probability, as known sites will be avoided and future work and mitigation procedures will minimize the potential for presently unknown sites to be inadvertently disturbed or lost.
- No effect or of low magnitude, because sites will be avoided where possible, and information will be retrieved and / or the site salvaged where Project-VEC interactions are unavoidable.
- Limited to the LSA, and particularly, to any areas of Project-related ground disturbance.
- Temporary, because all sites that cannot be avoided will be salvaged (effects will occur intermittently during Construction, if at all).
- Intermittent frequency, because an effect, if one occurs, would occur at various intermittent times.

There is a high degree of confidence that the actual effects of the Project on the Archaeological Resources KI will not be greater than predicted because of the extensive Historic and Heritage Resources baseline studies conducted in relation to the Project, the low potential for interaction with unidentified sites, and the nature and effectiveness of the planned effects management measures.

16.2.5.4 Construction Effects: Palaeontological Resources

A review of the geological mapping and literature relevant to the LSA indicates that, due to the age and type of geological formations, the potential for encountering Palaeontological Resources during the Project is very low. One area of potential importance with respect to Palaeontological Resources – located at Chapel Arm on the Avalon Peninsula (in Figure 15.2.4-2) – has been identified within the LSA. Other than this, the LSA avoids all important fossiliferous outcrops located in the province.

Summary of Likely Residual Environmental Effects

The likely residual effects of Project Construction on the Palaeontological Resources KI are as follows:

- Adverse but of very low probability, as known fossiliferous sites will be avoided and future work and mitigation procedures will minimize the potential for presently unknown sites to be inadvertently disturbed or lost.
- No effect or of low magnitude, because fossiliferous sites will be avoided where possible, and information will be retrieved and / or the site salvaged where Project-VEC interactions are unavoidable.
- Limited to the LSA, and particularly, to any areas of Project-related ground (rock) disturbance.
- Temporary, because all sites that cannot be avoided will be salvaged (effects will occur intermittently during Construction, if at all).
- Intermittent frequency, because an effect, if one occurs, would occur at various intermittent times.

There is a high degree of confidence that the actual effect of the Project on the Palaeontological Resources KI will not be greater than predicted because of the low potential for interaction with unidentified sites and the nature and effectiveness of the planned effects management measures.

16.2.5.5 Construction Effects: Sites of Cultural-Historical Importance

One site of cultural and spiritual importance to the Labrador Innu identified in Armitage (2010) is located within or near the LSA. The *Manitu-utshu*, or rock knoll, is located on the north side of the Churchill River, on the edge of the LSA, and will not be physically disturbed or affected by the Project.

No other sites of cultural-historical importance in or near the LSA have been identified through review of available information and the results of Nalcor's consultation and information gathering activities to date with other Aboriginal groups in Labrador and Québec (Nalcor et al. 2011; Figure 15.5.7-3a). Any additional and relevant information that is obtained through such consultation activities will be considered, as it becomes available, in ongoing Project planning.

Considering the above information, Project Construction will not likely have an effect on or physically disturb sites of Cultural-Historical Importance.

16.2.6 Operations and Maintenance

16.2.6.1 Overview of Project Operations and Maintenance and Associated Effects Management

During Project Operations and Maintenance, there will be little or no additional ground disturbance beyond those areas affected during Project Construction. Activities such as maintenance, inspections and vegetation management will occur primarily within the existing ROW, access roads and locations of Project infrastructure / facilities developed during the Construction phase. Some potential exists for disturbance to archaeological resources during Operations and Maintenance due to increased access to formerly inaccessible and remote locations.

In the event that Historic and Heritage Resources are identified / reported by Nalcor staff or contractors or by a member of the public during Operations and Maintenance, the specific precautionary and reporting measures identified in Section 16.2.5.1 (and included in the EPP) will be followed, including:

- implementation of a Stage 1 Historic Resources Assessment in accordance with provincial guidelines; and
- cessation of any Project activities at this location until an appropriate approach is developed and approved by the PAO.

16.2.6.2 Existing Knowledge

The existing knowledge base pertaining to the potential effects of the Project during Operations and Maintenance is the same as that presented for Construction in Table 16.2.5-1.

16.2.6.3 Operations and Maintenance Effects (All Historic and Heritage Resources KIs)

During Project Operations and Maintenance, there will be little or no additional ground disturbance beyond those areas already affected during Project Construction. More intensive human use of previously remote locations (for recreational, subsistence or commercial purposes) as a result of improved access by road or along the ROW could lead to inadvertent (e.g., ground disturbance by all terrain vehicles (ATVs)) or purposeful (i.e., unauthorized artefact collection) interactions with archaeological resources.

Given the types of Project activities likely to occur during this phase of the Project (with no significant new disturbance of rock materials), effects on palaeontological resources and sites of cultural-historical importance during Project Operations and Maintenance are not likely (as shown in Table 16.2.3-3).

Summary of Likely Residual Environmental Effects

The likely residual effects of Project Operations and Maintenance on the Archaeological Resources and Palaeontological Resources KIs are as follows:

- Adverse but of very low probability, as there will be little if any new ground disturbance associated with this phase of the Project, and known sites will continue to be avoided and standard precautionary and reporting procedures will be implemented through the EPP(s).
- No effect or of low magnitude, because sites will be avoided where possible, and information will be retrieved and / or the site salvaged where Project-VEC interactions are unavoidable.
- Limited to the LSA and, particularly, to any areas of Project-related ground disturbance.
- Temporary, because all sites that cannot be avoided will be salvaged (effects will occur intermittently during Operations and Maintenance, if at all).
- Intermittent frequency, because an effect, if one occurs, would occur at various intermittent times.

As the rock knoll has been avoided by Project components during planning and planned Construction, and will not be disturbed during Operations and Maintenance, no likely effects on sites of Cultural-Historical significance are predicted.

There is a high degree of confidence that the actual effects of the Project Operations and Maintenance on Historical and Heritage Resources will not be greater than predicted because of the low potential for interaction with unidentified sites and the nature and effectiveness of the planned effects management measures.

16.2.7 Environmental Effects Summary and Evaluation of Significance

16.2.7.1 Summary of Environmental Effects

As a result of the baseline work completed to date, the planned avoidance of known Historic and Heritage Resources in Project design and planning, further study in areas of high potential of unidentified Historic and Heritage Resources prior to Construction, and the implementation of standard and proven mitigation and reporting procedures the likely effects on Historic and Heritage Resources are predicted to be of very low probability, and limited to any currently unknown sites that may be inadvertently discovered during Project activities. If any such resources are discovered during the pre-construction assessment of high potential areas, or during Construction or Operations and Maintenance activities, measures will be implemented to avoid or minimize the effects of the Project on these resources, the finding will be reported to the PAO and Nalcor, and the issue will be addressed in accordance with provincial regulations. The effects of the Project, for each phase, are summarized in Table 16.2.7-1.

16.2.7.2 Definition and Determination of Significance

A significant residual adverse effect on Historic and Heritage Resources would include the loss or permanent disturbance of identified archaeological resources and / or palaeontological resources without the appropriate documentation or salvage and retrieval of the material-culture and / or the scientific information it contains, and without prior approval from the PAO.

Recognizing that there is also at least some potential that Project activities could unknowingly affect such resources, significant adverse effects would also include the loss of unidentified archaeological and /or palaeontological resources to a degree that would negatively affect the overall understanding of the history of the region.

For sites of cultural-historical importance, a significant residual adverse effect is the disturbance of a known site such that its integrity and cultural value is fundamentally and irrevocably diminished.

An effect that does not meet the above definitions is not significant.

With the implementation of the mitigation measures listed in Section 16.2.5.1, the Project is not likely to result in significant adverse effects on Historic and Heritage Resources.

Table 16.2.7-1 Environmental Effects Analysis Summary: Historic and Heritage Resources

Project Phase / Key Indicator	Likely Residual Environmental Effects Summary Descriptors				
	Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**
Construction					
Archaeological Resources	**Adverse (but very low probability)** – Potential for unknown sites to be lost or disturbed	**Low** – Known sites will not be affected. High potential areas crossed by the ROW will be assessed. Information will be retrieved or sites will be salvaged for any newly discovered, inadvertently disturbed sites	**Local** – Effects limited to the Project footprint within the LSA	**Temporary** – While considered unlikely to occur, sites that will be disturbed will be salvaged and the information retrieved	– Intermittent disturbances, if at all
Palaeontological Resources	**Adverse (but very low probability)** – Potential for unknown sites to be lost or disturbed	**Low** – Known sites will not be affected. Information will be retrieved for newly discovered, inadvertently disturbed sites	**Local** – Effects limited to the Project footprint within the LSA	**Temporary** – While considered unlikely to occur, sites that will be disturbed will be salvaged and the information retrieved	– Intermittent disturbances, if at all
Sites of Cultural-Historical Importance	– No likely effect	– n/a	– n/a	– n/a	– n/a
Summary of Likely Residual Construction Effects on Historic and Heritage Resources: Likely effects on Historic and Heritage Resources are expected to be avoided or mitigated during Construction. As such, likely residual effects of the Project on the VEC during Construction are not predicted.					

Table 16.2.7-1 Environmental Effects Analysis Summary: Historic and Heritage Resources (continued)

Project Phase / Key Indicator	Likely Residual Environmental Effects Summary Descriptors				
	Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**
Operations and Maintenance					
Archaeological Resources	**Adverse (but very low probability)**	**Low** – Known sites will not be affected. Information will be retrieved or sites will be salvaged for undiscovered, inadvertently disturbed sites	**Local** – Effects limited to the LSA	**Temporary** – While considered unlikely to occur, sites that will be disturbed will be salvaged and the information retrieved	– Intermittent disturbances, if at all
Palaeontological Resources	**Adverse (but very low probability)**	**Low** – Known sites will not be affected. Information will be retrieved or sites will be salvaged for undiscovered, inadvertently disturbed sites	**Local** – Effects limited to the LSA	**Temporary** – While considered unlikely to occur, sites that will be disturbed will be salvaged and the information retrieved	– Intermittent disturbances, if at all
Sites of Cultural-Historical Importance	– No likely effect	– n/a	– n/a	– n/a	– n/a
Summary of Likely Residual Operations and Maintenance Effects on Historic and Heritage Resources: Very limited potential for further disturbance during Project Operations and Maintenance that would cause effects on Historic and Heritage Resources.					

n/a Not applicable.

16.2.8 Evaluation of Project Alternatives

A number of alternative transmission corridor segments (Section 2.12.6) have been identified by Nalcor for consideration for the Project. Several of these alternative corridor segments have been the subject of Historic and Heritage Resources research (Stantec 2010) and others are located in general proximity to the proposed transmission corridor, or pass through environmental settings that were determined through past research to have varying degrees of Historic and Heritage Resources potential (Stantec 2010, 2011a). Regarding Palaeontological Resources, the methods used to determine areas of potential involved a review of provincial geological mapping to highlight locations where fossils could potentially occur.

An overview of the results of the alternatives evaluation for transmission corridor segments is presented in Table 16.2.8-1 below. As indicated in the table, there are no significant differences between the proposed corridor and each alternative segment in terms of their potential effects on Historic and Heritage Resources. Again, avoidance of known sites and further pre-construction work would be required to mitigate these effects. As appropriate, a Historic and Heritage Resources assessment of any selected alternative corridor segment would be conducted, as required under the *Historic Resources Act* (1985). If any sites or materials of archaeological or palaeontological importance were identified, these areas would be subject to the same mitigation measures currently proposed for the Project. A comparative summary of the effects on Historic and Heritage Resources for each alternative segment is provided in Table 16.2.8-1.

Table 16.2.8-1 Summary Evaluation of Project Alternative Means: Historic and Heritage Resources

Project Alternative Means[(a)]	Environmental Implications Compared to the Proposed Transmission Corridor		
	Archaeological Resources	**Palaeontological Resources**	**Sites of Cultural-Historical Importance**
A2: North-west of Strait of Belle Isle Alternative Segment	No known difference. Any known or newly discovered sites can be avoided.	No known difference. Any known or newly discovered sites can be avoided.	No known difference. Any known or newly discovered sites can be avoided.
A3: Point Amour Alternative Segment	Assessment not completed. Several known sites in the area. Area of high archaeological potential. Known or newly discovered sites can be avoided.	Area of high potential for fossils. Known or newly discovered sites can be avoided.	No known difference. Any known or newly discovered sites can be avoided.
A4: Strait of Belle Isle Newfoundland Side Alternative Segment	No known difference. Any known or newly discovered sites can be avoided.	No known difference. Any known or newly discovered sites can be avoided.	No known difference. Any known or newly discovered sites can be avoided.
A5: GNP NE Segment	No known difference. Any known or newly discovered sites can be avoided.	No known difference. Any known or newly discovered sites can be avoided.	No known difference. Any known or newly discovered sites can be avoided.
A6: GNP West Central Segment	No known difference. Any known or newly discovered sites can be avoided.	No known difference. Any known or newly discovered sites can be avoided.	No known difference. Any known or newly discovered sites can be avoided.
A7: GNP Eastern LRM Crossing	No known difference. Any known or newly discovered sites can be avoided.	No known difference. Any known or newly discovered sites can be avoided.	No known difference. Any known or newly discovered sites can be avoided.

Table 16.2.8-1 Summary Evaluation of Project Alternative Segments: Historic and Heritage Resources (continued)

Project Alternative Means[(a)]	Environmental Implications Compared to the Proposed Transmission Corridor		
	Archaeological Resources	**Palaeontological Resources**	**Sites of Cultural-Historical Importance**
A8: GNP IATNL Segment	No known difference. Any known or newly discovered sites can be avoided.	No known difference. Any known or newly discovered sites can be avoided.	No known difference. Any known or newly discovered sites can be avoided.
A9: Birchy Lake Segment	No known difference. Any known or newly discovered sites can be avoided.	No known difference. Any known or newly discovered sites can be avoided.	No known difference. Any known or newly discovered sites can be avoided.
A10: NLOA Segment	No known difference. Any known or newly discovered sites can be avoided.	No known difference. Any known or newly discovered sites can be avoided.	No known difference. Any known or newly discovered sites can be avoided.
A11: Avalon Alternative	No known difference. Any known or newly discovered sites can be avoided.	No known difference. Any known or newly discovered sites can be avoided.	No known difference. Any known or newly discovered sites can be avoided.

(a) As identified and described in Chapter 2, Project Rationale and Planning.

No technically and economically feasible alternatives for the submarine cable crossing or the shoreline electrode sites were identified (see Chapter 2, Sections 2.12.3 and 2.12.5), and therefore marine Project alternatives are not evaluated for Historic and Heritage Resources.

16.2.9 Cumulative Environmental Effects

Newfoundland and Labrador has a rich and complex cultural history, which extends over a time period of up to 9,000 years. There are many known and yet to be discovered Historic and Heritage Resources throughout the province, with different regions being characterized by different histories and cultural landscapes, as well as having varying degrees of potential to contain such resources.

Several parts of the province that will be crossed by the proposed Project, such as the interior of Central and Southeastern Labrador, remain remote and undeveloped, and so the Historic and Heritage Resources these areas contain likely remain undisturbed. Other areas, however, have experienced considerable past and ongoing human activities and associated ground disturbance that have had effects on Historic and Heritage Resources.

As described above, any potential adverse effects of the Project on archaeological and palaeontological resources would occur primarily, if not exclusively, as a result of ground disturbance during Project Construction. Any such effects, if they did occur, would therefore be restricted to the immediate Project footprint within the LSA. Other sites of cultural-historical importance may be indirectly affected by disturbance due to activities in immediately adjacent landscapes. As explained in Section 16.2.7, the Project is not likely to result in any significant adverse effects on Historic and Heritage Resources.

Any potential for cumulative effects of the Project would be limited to instances where the physical zones of disturbance of the Project would overlap directly with those of other projects and activities that affect Historic and Heritage Resources. The greatest likelihood for geographic overlap will be close to communities and existing infrastructure. As the potential for the Project to affect such resources is low, given the very small size and localized nature of any such sites / effects, and because it is unlikely that a single site would be affected more than once and by multiple disturbances, the potential for cumulative environmental effects on this VEC is low.

On a more regional scale, other reasonably foreseeable projects and activities also have the potential to affect this VEC, to varying degrees, in the various regions through which the Project will extend. The future construction of the Lower Churchill Hydroelectric Generation Project, for example, will involve surface disturbance and flooding and consequential disturbance of archaeological sites within that project's footprint. However, appropriate mitigation is planned for that project prior to construction, including Systematic Data Recovery (i.e., excavation, documentation, salvage and retrieval and conservation of materials, followed by analysis and report preparation) in accordance with provincial guidelines (GNL 1992). Future forestry activities and practices throughout Newfoundland and Labrador may also result in the disturbance of archaeological sites. Also, infrastructure projects, such as road maintenance / construction, municipal works, and industrial construction, often have very localized, short-term construction periods, but could disturb undiscovered Historic and Heritage Resources if these activities require ground disturbance in previously undisturbed areas.

All development activities in the province are subject to the Newfoundland and Labrador *Historic Resources Act* (1985), as well as other applicable regulations and guidelines designed to help protect the biophysical and socioeconomic environments. Any new projects and activities will therefore be governed by routine application of the assessment and mitigation policies in accordance with the Newfoundland and Labrador *Historic Resources Act* (1985), which would serve to minimize any potential adverse effects on Historic and Heritage Resources. The potential for any effects on this VEC from other projects and activities that will overlap spatially with the Project is very low. Also, any effects on Historic and Heritage Resources resulting from the Project and other projects and activities are not likely to negatively affect the overall understanding of the history of a region or the province as a whole.

As a result of the above factors, the likely cumulative effects of the Project in combination with effects from other reasonably foreseeable projects and activities on Historic and Heritage Resources are not significant (Table 16.2.9-1).

16.2.10 Monitoring and Follow-up

As indicated in Section 16.2.5.1, a number of post-EA studies and / or planning initiatives related to Historic and Heritage Resources are proposed, including archaeological field surveys along those sections of the eventual ROW that cross identified high potential areas. Nalcor will consult with the PAO regarding post-EA initiatives during detailed Project design, as well as on the specific nature and locations of field surveys.

As a result of these initiatives, and the other mitigation measures identified in Section 16.2.5.1, as well as the consequently very low potential for Project effects on Historic and Heritage Resources, no specific monitoring and follow-up activities are recommended or proposed for this VEC.

However, to ensure that appropriate and effective environmental mitigation measures are employed during Construction, Nalcor will have full-time On-Site Environmental Monitors at various construction sites. These individuals will continually be inspecting worksites and activities for conformance with the EPP and mitigation measures required by design, and compliance with government regulations and permits.

Table 16.2.9-1 Cumulative Environmental Effects Summary: Historic and Heritage Resources

Cumulative Effects Analysis	Central and Southeastern Labrador	Strait of Belle Isle	Northern Peninsula	Central and Eastern Newfoundland	Avalon Peninsula
Current (Baseline) VEC Condition	Four registered Archaeological Resources are within the LSA in this region. No Palaeontological Resources are situated within the LSA in this region. One site of cultural-historical importance (rock knoll) is physical known within the LSA, however no disturbance will occur to the site. The inland area crossed by the transmission corridor is remote, with limited past development to affect Historic and Heritage Resources.	No marine Archaeological sites are known within the cable corridor (LSA) in the Strait of Belle Isle. No sites of cultural-historical importance are known within the LSA in this region.	Four archaeological sites are known within the LSA in this region. No Palaeontological Resources are known within the LSA in this region.	Four archaeological sites are known within the LSA in this region. No Palaeontological Resources are known within the LSA in this region. No sites of cultural-historical importance are known within the LSA in this region.	Two archaeological sites are known within the LSA in this region. One location with Palaeontological Resources (i.e., Chapel Arm) is known within the LSA in this region. No sites of cultural-historical importance are known within the LSA in this region.
Likely Residual Environmental Effects of Labrador - Island Transmission Link	No disturbance or loss to Historic and Heritage Resources are predicted for this region.	No disturbance or loss to Historic and Heritage Resources are predicted for this region.	No disturbance or loss to Historic and Heritage Resources are predicted for this region.	No disturbance or loss to Historic and Heritage Resources are predicted for this region.	No disturbance or loss to Historic and Heritage Resources are predicted for this region.
Likely Cumulative Environmental Effects of Other Future Projects and Activities	Limited potential for overlapping (cumulative effects) within the LSA. Loss or disturbance to Archaeological sites will occur in association with the Lower Churchill Hydroelectric Generation Project although mitigation will be in place to recover data from the sites. Increased off highway vehicle (OHV) access associated with the Trans-Labrador Highway (TLH) and forestry roads, and ground disturbance from general infrastructure work could contribute to cumulative effects near the Strait of Belle Isle.	Limited potential for overlapping (cumulative effects) within the LSA. Seabed disturbance from fishing activities could contribute to cumulative effects on any Archaeological Resources in the region (such as shipwrecks).	Limited potential for overlapping (cumulative effects) within the LSA. Ground disturbance from general infrastructure work and increased OHV access associated with forestry roads could contribute to cumulative effects near communities.	Limited potential for overlapping (cumulative effects) within the LSA. Ground disturbance from general infrastructure work and increased OHV access associated with forestry roads could contribute to cumulative effects near communities.	Limited potential for overlapping (cumulative effects) within the LSA. Ground disturbance from general infrastructure work and increased OHV access associated with forestry roads could contribute to cumulative effects near communities.
Cumulative Environmental Effects Summary[(a)]	**Not Significant** Very low potential for Project effects on the Historic and Heritage Resources VEC. This Project and all other development activities are subject to the Newfoundland and Labrador *Historic Resources Act* (1985) and will be governed by application of the assessment and mitigation policies. In addition, the Project and all other existing and known future projects that will overlap with the proposed Project will not likely affect the overall understanding of the history of the region or the province as a whole.				

(a) Total (cumulative) change from the existing environment. Significance of cumulative environmental effects is evaluated using the same definitions as for the Project environmental effects analysis.

16.3 Communities

16.3.1 Introduction

The key questions addressed in the Communities VEC are whether and how the proposed Project will affect the communities in which people live, and the lives of people in those communities.

Strong and healthy communities are reflected in the physical, emotional and mental health of their residents, the availability and quality of physical and social infrastructure and services, and the characteristics of their local economies. The Communities VEC focuses on infrastructure and services, health and well-being, and overall quality of life. Potential economic benefits and effects that may occur as a result of the Project are discussed in the Economy, Employment and Business VEC (Section 16.4).

The Project may directly affect communities where it leads to changes in the nature and quality of local infrastructure and services, and / or where it causes changes in health and well-being of community members. These effects may be beneficial or adverse in different areas and / or for different segments of the population.

16.3.2 Environmental Assessment Study Areas

16.3.2.1 Spatial Boundaries

The components and activities associated with the Project will be located within and adjacent to a number of regions and communities throughout Newfoundland and Labrador.

The LSA for the Communities VEC is defined as the area within which Project-related elements and activities that affect communities and their residents are likely to occur. This includes the Project area itself (e.g., transmission corridor, access, camps, electrode sites), as well as other locations where people and communities may be directly affected by the Project (such as through direct interaction with Project personnel and works, and related demands for infrastructure and services).

The RSA for this VEC encompasses the regions that overlap with and extend beyond the LSA (see Figure 15.3.1-1). Where relevant and as required, the environmental effects assessment for Communities also takes a larger, provincial perspective.

16.3.2.2 Temporal Boundaries

The temporal boundaries of the assessment for the Communities VEC encompass the Project's Construction phase, as well as the Operations and Maintenance phase that will extend through the life of the Project.

16.3.3 Potential Environmental Issues, Indicators and Interactions

16.3.3.1 Potential Environmental Issues

Potential issues and questions associated with the Communities VEC were identified in the *Environmental Impact Statement Guidelines and Scoping Document* for the Project (Government of Newfoundland and Labrador and Government of Canada 2011), as well as through regulatory, Aboriginal and stakeholder consultation by Nalcor, and by the EIS study team for the Communities VEC.

The considerations that form the main focus of the assessment are summarized in Table 16.3.3-1. As indicated, the issues and questions raised to date have focused on various aspects and elements from within the overall theme of "communities". This has served to scope and focus the Communities VEC on a number of specific and relevant components.

Table 16.3.3-1 Identified Issues and Questions: Communities

Issue / Question	Nature and Rationale	Specific Considerations
Possible use of transportation infrastructure and services during Project Construction (especially roads and ports), and potential disruption of existing users, safety implications and effects on the overall quality of such infrastructure	– Project could place demands on community infrastructure and services that exceed the capacity of those systems – Could adversely affect the quality of life of community residents if that infrastructure and those services become less available, more costly, and / or of poorer quality as a result of Project-related uses and demands	– Large ports in strategic areas throughout the province may be used. Some port facilities, such as that located at Goose Bay, Labrador, may require upgrading to handle additional traffic by this and other projects – There is public concern about the current condition of roads in some areas, particularly the Labrador Straits. Increased use associated with the Project could result in further adverse effects on these roads – Concerns about types and volume of traffic from safety, service and potential interference (nuisance) considerations
Possible use of and demands for municipal infrastructure and services (e.g., waste disposal, safety and security, health, housing) as Project activities and crews move through an area during Construction		– Waste disposal facilities in some areas, e.g., Labrador Straits, have little or no capacity to accommodate additional waste material – Any potential Project-related accidents and malfunctions (e.g., fires, hazardous spills) will require adequate response mechanisms to be in place, which must not reduce the ability of existing response mechanisms to respond to other needs
Possible social issues in communities due to Project activity	– The Project could affect the health and / or quality of life of community members if it adversely affects their physical and mental health and safety, general sense of well-being and / or economic security	– May occur due to worker participation in the wage economy, and / or possible interaction of theconstruction workforce with local communities
Possible effects on human health from noise, electromagnetic fields (EMF) and / or other “emissions” during the Operation of the transmission system		– Noise associated with Construction and with the Operation of the transmission system could have adverse effects on general well-being – EMF is perceived by some to have implications for various human health issues
Perceived reduction in property values adjacent to the transmission line and / or other components		– Property values could be adversely affected by the presence of the transmission line or other Project components
Possible effects of transmission system operation on television and radio signals		– High voltage transmission systems may have localized effects on television and radio signals in their immediate vicinity

16.3.3.2 Key Indicators and Measurable Parameters

The KIs listed in Table 16.3.3-2 have been selected to reflect concerns expressed about potential Project effects on communities and their residents. Each KI has associated MPs, which represent aspects of the KI for which changes could be detected / measured.

Again, the issues and questions raised to date have focused on various, specific aspects and elements of communities, which has served to scope and focus the Communities VEC environmental effects assessment,

and "screen out" aspects of the large theme of communities, for which little or no potential for Project interaction or concern has been identified.

Table 16.3.3-2 Key Indicators and Associated Measurable Parameters: Communities

Key Indicator	Rationale for Key Indicator[(a)]	Measurable Parameter[(b)]	Rationale for Measurable Parameter
Transportation Infrastructure and Services	Concern has been expressed about the use of transportation infrastructure for the movement of materials, goods and equipment to and within the Project area, and potential effects on their use and quality (particularly roads and ports during Construction)	– Traffic volumes / types – Design capacity – Travel times – Quality of physical infrastructure and services	Comparison of normal traffic plus Project traffic with the designed capacity of highway / port infrastructure components allows for the determination of any capacity issues and constraints, and allows relevant authorities and Nalcor to determine appropriate follow-up actions
Waste Disposal Infrastructure and Services	Concern has been expressed that community or regional landfill facilities will not be able to accommodate Project-related waste (particularly during Construction)	– Volume of waste requiring disposal and capacity of existing facilities	Comparison of waste volumes potentially generated and the capacity of landfill sites highlights requirements and allows relevant authorities and Nalcor to determine appropriate follow-up actions
Safety and Security Services	Concern has been expressed about potential demands on safety and security services arising from potential Project accidents and malfunctions	– Use levels and capacity of existing safety and security services	Comparison of likely demands on services and current capacities allows relevant authorities and Nalcor to determine appropriate follow-up actions
Health Conditions	Concern has been expressed about Project-related issues that could affect the health of individuals (physical, emotional, mental) and communities	– Numbers of transportation-related accidents – Disease rates – Incidences of social issues (crime, domestic incidents) – Use levels of health and social services	Comparison of projected levels with existing / natural levels allows Project effects to be determined and relevant authorities and Nalcor to determine appropriate follow-up actions
Community Well-being	Concern has been expressed that the Project will affect quality of life of community residents	– Interference / annoyance / nuisance levels and tolerance – Property values	Comparison of projected levels with existing / natural levels allows Project effects to be determined and relevant authorities and Nalcor to determine appropriate follow-up actions

(a) Key Indicator: An aspect or characteristic of the VEC and / or its environment which, if changed as a result of the Project, may result in an effect on the VEC.

(b) Measurable Parameter: An environmental characteristic that is related to the status of a KI. Project effects to an MP can be detected and measured.

16.3.3.3 Potential Project-Communities Interactions

Many of the types of interactions that may occur between large development projects and communities are avoided due to the nature and characteristics of the Project, and can be avoided or reduced through appropriate Project planning and design considerations. As such, Project design can be used for effects management purposes where interactions leading to potential adverse effects are recognized at the outset,

thereby eliminating many possible causes for concern. These and other effects management approaches for the proposed Project are discussed in further detail in Section 16.3.5. The proactive identification and management of social issues through Project design has been an important aspect of Nalcor's planning to date.

The key potential interactions between Project components / activities and the KIs for the Communities VEC are identified in Table 16.3.3-3. Each Project Construction, and Operations and Maintenance element that could affect infrastructure and services and / or health and well-being aspects of the general public to some detectable degree, and which cannot be avoided through Project planning and design measures, is considered.

Project Construction will require a large workforce, and will involve the movement of a large amount of material and equipment to a number of marshalling yards near or along the transmission corridor (Chapter 3, Project Description). As such, there will be interactions between Project components / activities, and port and road / highway infrastructure and services that cannot be avoided.

Interaction is not expected to occur between the Project and certain municipal and regional infrastructure and services such as local water and sewer, housing, education and other components, because the Construction workforce for the Project will be accommodated in a series of largely self-contained construction camps located along the transmission corridor. The mobile nature of the work and the accommodation arrangements will mean that workers are unlikely to be accompanied by their families and so interaction between the Project and local school systems, for example, is not anticipated.

Table 16.3.3-3 Potential Project Interactions: Communities

Project Phase / Activity	Key Indicator				
	Transportation Infrastructure and Services	**Waste Disposal Infrastructure and Services**	**Safety and Security Services**	**Health Conditions**	**Community Well-being**
Construction					
Construction access trails and roads	Upgrading of some roads and a general increase in traffic on roads and highways	Generation of Construction waste	Risk of accidental events involving persons and / or property	—	Potential nuisance effects (e.g., noise, visual, interference)
Movement and presence of personnel, equipment and materials	Additional traffic, especially at ports and on roads			Potential accidents (e.g., transportation)	
Construction camps	—			—	
Marshalling yards and staging areas	Movement of materials to and from marshalling yards and staging areas				
ROW clearing and preparation	—				
Quarrying and borrowing	Movement of quarry materials to / from ports				
Transmission tower assembly and installation	—				
Conductor installation					
Converter station site preparation and construction					
Preparation and construction of submarine cable landing sites (on-land works)					
Construction and installation of submarine cables (marine works)					
Electrode site preparation and installation					

Table 16.3.3-3 Potential Project Interactions: Communities (continued)

Project Phase / Activity	Key Indicator				
	Transportation Infrastructure and Services	**Waste Disposal Infrastructure and Services**	**Safety and Security Services**	**Health Conditions**	**Community Well-being**
Island system upgrades	—	Generation of Construction waste	Risk of accidental events involving persons and / or property	—	Potential nuisance effects (e.g., noise, visual, interference)
Employment / presence of workers				Interactions between Construction workforce and local communities; effects of wage employment	
Contracting / expenditures		—	—	Effects of wage employment	—
System commissioning			Risk of accidental events involving persons and / or property	—	—
Operations and Maintenance					
Access trails and roads	A small increase in traffic on roads and highways	—	—	—	—
Presence and operations of the transmission system			Risk of accidental events involving persons and / or property	Transmission system "emissions" (e.g., MF, noise); risk of accidental events or malfunctions	Potential nuisance effects (e.g., noise, visual, interference, property value)
Routine line inspections and repairs			—	—	—
Vegetation management				Potential effects of herbicide use	
Potential major system repairs	Additional traffic, especially at ports and on roads	Generation of waste	Risk of accidental events involving persons and / or property	—	Potential nuisance effects (e.g., noise, visual, interference)

Table 16.3.3-3 Potential Project Interactions: Communities (continued)

Project Phase / Activity	Key Indicator				
	Transportation Infrastructure and Services	**Waste Disposal Infrastructure and Services**	**Safety and Security Services**	**Health Conditions**	**Community Well-being**
Operation of the electrodes	—	—	—	Transmission system "emissions"; risk of accidental events or malfunctions	—
Employment / presence of workers				Effects of wage employment	
Contracting / expenditures					

— Indicates no likely or detectable interaction identified.

16.3.4 Approach to the Environmental Effects Analysis

16.3.4.1 Analytical Methods

The environmental effects analysis uses the approach commonly adopted for the socioeconomic assessments of other projects. Relatively precise predictions of certain interactions arising from the Project, such as noise and EMF, can be made through specific modelling techniques (Chapter 3, Project Description; Chapter 11, Atmospheric Environment). For other potential social effects, such as effects on health or other social issues, quantitative predictions are often neither possible nor particularly meaningful. In such cases, an objectives-based approach is adopted in which Project design and other effects management techniques are used with the objective of avoiding, reducing or, at a minimum, not increasing the level of a particular issue and parameter.

16.3.4.2 Environmental Effects Descriptors

The potential effects of Project activities on the various aspects of the Communities VEC are generally described in terms of a set of descriptors summarized in Table 16.3.4-1.

Table 16.3.4-1 Effects Descriptors: Communities

Effects Descriptor	Definition
Direction	
Adverse	Effect is negative and undesirable
Neutral	Effect does not change existing (baseline) socioeconomic conditions or trends
Beneficial	Effect is positive and desirable
Magnitude	
No effect	Project results in no change in the existing condition / baseline value
Low	Project results in a small change in the existing condition / baseline value, which is well within the capacity of the infrastructure or service element in question, or is in keeping with the natural condition / variability or accepted threshold of the parameter in question
Moderate	Project results in a clear change in the existing condition / baseline value, which is within the capacity of the infrastructure or service element in question, or is in keeping with the natural condition / variability or accepted threshold of the parameter in question
High	Project results in a major change in the existing condition / baseline value, that exceeds the capacity of the infrastructure or service element in question or is outside the natural condition / variability or accepted threshold for the parameter in question
Geographic Extent	
Local	Effect will be evident within the LSA
Regional	Effect will be evident within the RSA
Beyond regional	Effect will be evident throughout the province and potentially beyond
Duration	
Short-term	Effect will be evident for less than one year
Medium-term	Effect will be evident for between one and four years
Long-term	Effect will be evident for from four to ten years
Far future	Effect will be evident throughout the life of the Project
Frequency	
Continuous	Effect continues uninterrupted throughout Construction and / or Operations and Maintenance
Intermittent	Effect occurs sporadically during Construction and / or Operations and Maintenance

16.3.5 Construction

16.3.5.1 Overview of Project Construction and Associated Effects Management

The Project, for the purposes of this EA, consists of the Construction, and Operations and Maintenance phases, as described in Chapter 3, Project Description. Of particular relevance to the Communities VEC and its associated KIs are the proposed construction methods and arrangements for the Project.

The transmission system will be similar to other existing transmission infrastructure in the province, and Nalcor will use standard practices and procedures and will comply with applicable regulatory requirements during Project Construction. The Project will be constructed under the guidance of internal policies, regulatory authorities and government departments and agencies. Nalcor will work with government departments and agencies before and during Project Construction to facilitate planning and preparation for Project activities.

Access to and within the Project area for the transportation and distribution of personnel, equipment and materials to the work areas is a key requirement. Ports and other transportation infrastructure will be used throughout the province as required. In Labrador, the TLH and other existing roads in the area will provide access to the western half of the transmission corridor. The Labrador Straits Highway (Route 510) will provide access to the eastern end. On the Island of Newfoundland, considerable access is available through the existing provincial highway system, resource road networks and trails. Access to the Project area will be via access trails and roads established from existing roadways to select points along the ROW and other sites. At strategic points along the ROW and at other key sites, marshalling yards will be established to receive and temporarily store materials and equipment for use in Project Construction.

Lodging for the construction workforce will be provided through the use of small, temporary, self-contained construction camps established at strategic points along or near the ROW (Chapter 3, Project Description), which will typically be occupied by a sequence of sets of workers. For example, once those responsible for clearing the ROW in a particular area have completed their tasks, they will move on and be replaced by those involved in the next stages of the Project, such as tower foundation installation. When this group of workers completes its work, those assembling and erecting the towers will replace them. While the size of the workforce at any one camp may be relatively constant, the membership of the work crews at each location will change with each phase / activity. Crews will follow a roster system (yet to be finalized), with a given number of days on the job followed by a number of days of rest.

Construction workers will primarily be housed in camps and there will be limited demand placed on local housing or other accommodations. In-migration of workers and their families to communities near the transmission corridor during the Construction phase is unlikely, due to the relatively short construction period (four years), the highly mobile nature of much of the work (with periodic changes of camp locations by various task groups as work in a particular area is completed), and the roster work arrangements that allow workers to return to their homes between work cycles.

In contrast to transmission line construction, the work on other Project components (i.e., converter stations at Muskrat Falls and Soldiers Pond, the cable crossings of the Strait of Belle Isle, and the electrode sites) will be of comparatively longer duration. For these other Project components, individual workers will not typically be involved for the duration of the Construction phase. Considering this, as well as the use of camps and the work roster system, it is unlikely that workers will choose to relocate themselves or their families to local communities. This situation is supported by experience with even longer-term projects in the province and elsewhere. For example, the original intention of the operators of the Duck Pond copper-zinc mine at Millertown, Newfoundland and Labrador was to have workers reside in nearby local communities. Workers objected to these proposed arrangements and, instead, a commute operation with a roster work system was established and a camp constructed near to the mine site (Aur Resources 2006, internet site).

In the absence of Project-related in-migration, limited demand will be placed on local infrastructure and services such as education, recreation and social services. The presence of paramedic, firefighting and security personnel on-site at the camps will also serve to minimize any effects of the Project on health, fire and security services, except in the case of serious incidents and emergencies.

Extended work-days, the rotational work system and the secured nature of the camps will also help to minimize worker-community interactions. The use of construction camps will thus help to isolate Project workers from the community and to insulate the community from Project workforce demands for many local facilities and services and, thereby, minimize any potential adverse effects of the Project on local communities.

16.3.5.2 Existing Knowledge

The construction of electrical transmission systems is common throughout North America and worldwide. The potential effects of transmission line construction on Communities are similar to those that may be experienced with any large construction project, and particularly comparable with those of other linear projects such as pipeline, road and railway construction. Long, linear developments will typically interact with a range of types of communities, such as large and small municipalities, and those with and without prior experience of transmission line or other major infrastructure construction projects.

There is little available published "existing knowledge" which has evaluated and measured the actual and known effects of similar projects and activities on Communities. Some key findings from a selection of recently published literature that is specific to transmission line construction, and which relates primarily to known and perceived social issues that are often associated with such projects, and / or to the management of their associated effects, are summarized in Table 16.3.5-1.

More generally, the province has experienced a large number of major construction projects over the last 25 years. While there were concerns about community effects of the megaproject Hibernia, studies of its actual effects showed that they were small and in some cases positive effects, due largely to successful management initiatives. This also appears to have been the case with subsequent projects such as the Newfoundland Transhipment Terminal, the Terra Nova and White Rose floating oil production facilities, and the Voisey's Bay mine / mill.

Table 16.3.5-1 Existing Knowledge (Construction): Effects of Similar Projects on Communities

Reference	Study / Project Context	Summary of Findings
Bembani Sustainability Training (Pty) Ltd. (2011, internet site)	Assessment of construction of a 400 kilovolt (kV) transmission line in KwaZulu Natal province, South Africa	– Study considered demographic, land use, socio-cultural and economic changes for the construction and operational phases of the project. – Main effects expected during the construction phase included in-migration of construction workers, resettlement of landowners, disruption of agriculture, and effects on roads and airstrips. – No issues of major significance were identified that could not be mitigated such that the proposed project was not acceptable from a social perspective. – In addition, the proposed project is expected to result in positive impacts, which might benefit the local people.

Table 16.3.5-1 Existing Knowledge (Construction): Effects of Similar Projects on Communities (continued)

Reference	Study / Project Context	Summary of Findings
British Columbia Transmission Corporation (BCTC) (2010, internet site)	North-west Transmission Line Project BC. Environmental Assessment Application	– Workers to be accommodated at existing and new construction camps along the proposed project route. This is not expected to result in increased pressure on locally available housing or emergency services in Terrace and the surrounding region. – Private properties along the proposed route are likely to experience a low-level decrease in property market values. BCTC to seek agreements with private property owners directly in the path of the ROW. – Residents of private properties in proximity to the project could experience a temporary decrease in quality of life during construction, as a result of increased industrial activity. These effects would be short-term and are predicted to be not significant. – Project approved in February 2011.
PSC Wisconsin (2010, internet site)	Overview of environmental issues and concerns raised by the construction / operation of electric transmission facilities	– Findings on changes in property values are highly variable, tend to be context-specific, and not readily project-to-project transferrable. – The policy of corridor sharing favours the placement of new transmission lines within or next to existing infrastructure, which may cause some landowners to be burdened by multiple easements. These hardships must be balanced against the potential to reduce environmental effects caused by the development of new transmission corridors. – Appraisers, utility consultants and academic researchers have studied the potential change in property values due to the proximity to a new transmission line since the 1950s. Data from these studies are often inconclusive and have not been able to provide a basis for specific predictions in other locations for other projects (see, for example, PSC Wisconsin 2010, internet site; Elliott and Wadley 2002, internet site). – Transmission lines may have general effects on property values; estimated reduction in sale price for single-family homes has ranged from 0 percent (%) to 15%. – Adverse effects on the sale price of smaller properties can be greater than effects on larger properties. – Other factors, such as schools, jobs, lot size, house size, neighbourhood characteristics and recreational facilities tend to have a greater effect on sale price than the presence of a transmission line. – Sale prices can increase where the transmission corridor is landscaped or developed for recreation (e.g., hiking, hunting and snowmobiling). – The effects on price and value appear to be greatest immediately after a new transmission line is built or an existing ROW is expanded, these effects appear to diminish over time and over generations of property owners. – The effects on sale price have most often been observed on property crossed by or adjacent to a transmission line, but effects have been observed for properties farther away from a line.

Table 16.3.5-1 Existing Knowledge (Construction): Effects of Similar Projects on Communities (continued)

Reference	Study / Project Context	Summary of Findings
Sims and Dent (2005)	UK based study of the effect of high-voltage overhead transmission lines, on the value of residential property	– Studies based on perceptions of buyers are questioned due to differences between buyer attitudes and buyer behaviour. Accuracy is improved when survey data are compared with transaction data from the same location. – Where transaction data are available, results suggest that presence of distribution equipment may have a negative effect on property values. Results are mixed, with some studies suggesting no real value effects and others finding significant value diminution. – Studies of negative effects tend to suggest that it was not the health and safety issues that influenced the market, but other factors such as unsightliness, visual and aural pollution.
Elliott and Wadley (2002, internet site)	Literature review of effects on property values and a model of the stigma apparently attached to power lines	– Authors argue that the effects on property values are insufficiently explored and inconclusively theorized. – Analysis of 30 years of case studies shows negative effects on property values of 1% to 9%, but results are open to interpretation based on distances from the ROW at which effects are observed.

16.3.5.3 Construction Effects: Transportation Infrastructure and Services

The following provides a high level and initial estimate of some of the heavy equipment, materials and supplies that may be required to be shipped to and within the province during Project Construction:

- excavators, cranes and bulldozers;
- large electrical components, such as sync condensers;
- 2,200,000 m of conductor (2,700 reels);
- 450,000 insulators (6,250 pallets);
- 3,150 steel towers and 12,000 steel lattice foundations (76,000 metric tonnes of steel);
- 1,100,000 m each of optical overhead groundwire (OPGW) and counterpoise wire (2,750 reels);
- 800,000 m of guy wire (1,000 reels);
- 830,000 m of electrode conductor (1,000 reels);
- 120,000 m of submarine cable; and
- 60 million litres of diesel fuel.

Bulk materials, heavy equipment and other Project requirements from outside the province will be shipped to the Québec North Shore and Labrador (QNS-L) main ports (e.g., Happy Valley-Goose Bay, Corner Brook and St. John's) and then moved by truck to marshalling yards that will located at strategic points on or near the Project sites. In Labrador, some of the required materials could also be shipped to Blanc Sablon and then via Route 510, or to Sept-Îles in Québec and then via the QNS-L railway and the TLH. On the Island of Newfoundland, some use may be made of the Gulf ferry to Port-aux-Basques or Argentia. However, while the provincial ferry system has been identified as a potential means of transport for construction materials, the Project will not make substantial use of the Gulf or Strait of Belle Isle ferry services, both of which have identified capacity issues.

The ports in Corner Brook and St. John's operate year-round and are well-equipped to handle the volumes of material that will be required for the Project. The shipping season for the Port of Goose Bay is typically five months, from June to November, which has implications for the temporal flow of materials into the area. Also, the Goose Bay dock requires upgrading to handle the larger and heavier loads associated with the Lower Churchill Hydroelectric Generation Project (Nalcor 2009, internet site). Nalcor has and will continue to liaise with the relevant planning authorities and be involved to the extent appropriate and necessary to upgrade the dock.

There will be a substantial requirement for aggregate for the Strait of Belle Isle crossing. Rock will be loaded on to a specialized vessel at a port and the vessel will then travel to the submarine cable corridor to deposit the rock. The vessel will return to port, re-load, and repeat the process. There are a number of operational quarries and associated port sites in Newfoundland. Those selected for the Project will be determined by the rock supply and installation contractor and will be reviewed and approved by Nalcor, but in all cases the facilities are expected to have the capacity to meet Project requirements.

Smaller local ports will be used as necessary and appropriate for the Project. Activities in the Strait of Belle Isle will likely make use of one or more port facilities. Ports will be evaluated on an as needed basis and will only be used following consultation with owners and stakeholders, and if it is determined that the adjacent infrastructure (e.g., area roads) have the capacity to support Project requirements.

From the ports, equipment, goods and materials will be moved to the Project marshalling yards along the main highways. In Labrador, yards will likely be established at Muskrat Falls, at a midway point along the route, and in the Labrador Straits area. On the Island of Newfoundland, marshalling yards will be established at Deer Lake and Witless Bay Line, with an auxiliary yard at Plum Point. Approximate locations of the Project marshalling yards are described in Table 16.3.5-2.

Table 16.3.5-2 Approximate Marshalling Yard Locations and Proposed Route of Material and Equipment Delivery

Marshalling Yard	Location	Material and Equipment Delivery
A	Located approximately 150 km south-east of Happy Valley-Goose Bay near the southern most point of the TLH3	Material can be transported by road, either from Goose Bay or Québec, to the marshalling yard.
B	Located on the Labrador side of the Strait of Belle Isle, near the intersection of Route 510 (Labrador Straits Highway) and the secondary road that leads to Point Amour.	Transmission line materials can be transported by ship or barge, or via the TLH3.
C	Located near the community of Plum Point on the Northern Peninsula. This is considered an auxiliary yard as it will be used for relatively short-term storage only.	Materials can be transported to the marshalling yard via Route 432. Materials and equipment that are brought in from off-Island will either be sent via boat to Corner Brook or on the Trans-Canada Highway (TCH) via the Marine Atlantic Ferry at Port aux Basques.
D	Located near Deer Lake. This will be the main marshalling yard for the Island portion of the Project and will include an administration building and a security office.	Materials can be transported to the marshalling yard via the TCH. Materials and equipment that are brought in from off-Island will either be sent via boat to Corner Brook or on the TCH via the Marine Atlantic Ferry at Port aux Basques.
E	Located at the eastern end of the transmission corridor, on the Witless Bay Line (Route 13), near the existing transmission line.	Materials can be transported to the marshalling yard by road. Materials and equipment that are brought in from off-Island will be either sent via boat to Corner Brook and St. John's or by road (TCH or Route 13) via the Marine Atlantic Ferry at Port aux Basques. Alternate docking locations may be available.

In addition to these locations, the contractor will select a number of staging or temporary laydown areas along the ROW. Wherever possible, existing clearings, such as pits, will be used as staging areas.

All goods and materials will be delivered as standard truckload units (approximately 12 tonnes). Infrequent movements of equipment involving extra heavy or wide loads are also anticipated. In St. John's and Corner Brook, roads from the respective ports to the main highways are designed to accommodate the type and volume of traffic that will be generated by the Project. However, in Happy Valley-Goose Bay there is already some congestion on Hamilton River Road and construction activity associated with this and other projects will add to this (see the cumulative effects discussion, below). Widening this road would reduce congestion or, alternatively, access from the port of Happy Valley-Goose Bay to the TLH could be achieved by upgrading South Branch Road or by extending an existing road around the west side of the airport to the TLH (Nalcor 2009, internet site). To reduce any adverse socioeconomic effects of additional road traffic within the community, Nalcor has met with various authorities, such as the Newfoundland and Labrador Department of Transportation and Works (NLDTW) and the Town of Happy Valley-Goose Bay, to discuss possible mitigation strategies, and Nalcor will continue to consult regularly with these authorities.

During the public consultation process for the Project, residents of the Labrador Straits expressed concern about the current condition of the road surface of Route 510 and the potential for Project-related traffic to result in further road surface deterioration. Nalcor recognizes the concern and will liaise with the responsible authority (NLDTW), local stakeholders and surrounding communities to explore ways to minimize and address Project issues relating to Route 510.

Particular concern was expressed about any substantial increase in the use of the Trans-Labrador Highway Phase 2 (TLH2) between Red Bay and Cartwright in southern Labrador to move equipment and materials during Project Construction. The Project plans do not, however, indicate that Project activities will take place in or near the communities in this part of southern Labrador (north of Red Bay). No lay down areas, camps or other construction infrastructure are planned in or near these communities, and it is unlikely that there will be large and / or repeated movements of personnel, equipment or materials to or through these communities. While the port at Cartwright could potentially be used to bring in some large Project components, this is not currently planned, and if this were to occur, it would be limited in terms of the scale and frequency of activity. No effects on the quality of the TLH in this region are likely as a result of the Project.

Throughout Project Construction, equipment, goods and materials will be distributed from the marshalling yards directly to the staging areas along the ROW and then to the worksites, with the bulk of the heavy equipment being moved in Year 1. To access the ROW from the main highways, existing access roads will be used wherever possible, with upgrades as required. However, some new access roads and trails will be required (Chapter 3, Project Description). Once the equipment is on the ROW, most of it will remain there and be transported along the ROW, rather than being brought to another location via the highway system. Supplies will be trucked to the temporary camps on a regular basis.

Traffic generated on the Island of Newfoundland may originate at St. John's, Corner Brook, or possibly other ports from where the materials, goods and equipment will be distributed across the Island. Project-related traffic effects will be mainly experienced at the port arrival points, but roads in these areas are designed to accommodate higher truck traffic volumes with good access to main highways. Elsewhere, incremental traffic volumes on particular highway legs will decrease the further from the arrival points that vehicles must travel (i.e., items arriving in Corner Brook and destined for various areas in western and central Newfoundland must all use the Corner Brook-Deer Lake section of the TCH, but at that point some traffic will terminate, some will be diverted towards St. Anthony, while other vehicles will continue to marshalling yards further east along the TCH).

It is anticipated that the highest proportion of the traffic movements generated will be in the first two years of the Construction period. These volumes are associated with the movement of steel, of which some 76,000 metric tonnes is required for the Project. Detailed information on materials delivery by time, location and quantity cannot be determined at this stage of Project planning and design. However, in Labrador, for example, if it were assumed that half of the peak-year trips are made from Happy Valley-Goose Bay and half from the Labrador Straits area, and that all trips for the year are concentrated in a one month (30 day) period, the daily incremental truck traffic in each of these areas for that month would be approximately 13 trips. The concentration of traffic activity for the year into a single month is highly unlikely, but even under this condition, in the context of normal daily traffic on these transportation route segments, Project-generated traffic increases will be relatively minor.

As a percentage of current traffic volumes, Project-generated incremental traffic volumes will be highest on low volume highway legs, such as Route 430 on the Northern Peninsula, but the absolute volume of traffic generated will still be relatively small. Table 16.3.5-3 provides annual average daily traffic counts at select locations along the main highways likely to be used to move equipment, materials and goods for the Project in Labrador and on the Island of Newfoundland. Data are provided for the TLH (Route 500 and Route 510), Route 430 on the Northern Peninsula, and the TCH between Corner Brook and St. John's.

There are no published capacities data for these highway segments. For the most part, average travel speeds on highways in provincial jurisdictions are described as being in the higher category, given that there are opportunities for passing that lowers the percentage of time vehicles must follow other, slower vehicles and thus giving a high level of service on these highways (A to B range). When highway volume exceeds 12,000 vehicles per day, it usually warrants upgrading to a divided highway standard, thereby giving a higher level of service (Morrissey 2011, pers. comm.). As indicated in Table 16.3.5-3, annual average daily traffic counts for all highway sections other than the TCH near St. John's (Whitbourne to St. John's is a divided highway), and the TCH at Gander are well below the 12,000 vehicles per day level.

Table 16.3.5-3 Highway Traffic Counts Selected Locations, Major Highways, Study Area Regions

Survey Location	Survey Year	Direction	Leg Destination[(a)]	Leg AADT[(b)]
TLH Route 500 Lab West km 30	2010	East West	Wabush Goose Bay	545 545
TLH Route 500 Route 510 Intersection Goose Bay km 539	2010	East West	Cartwright Wabush	153 341
TLH at Chateau Pond Depot between Red Bay and Lodge Bay	2010	North South	Lodge Bay Red Bay	238 238
Route 430 Intersection Route 435 Cook's Harbour	2007	East West	St. Anthony Deer Lake	5,741 5,741
Route 430 at St Barbe	2007	North South	St. Anthony Deer Lake	1,232 1,172
Route 430 at Port au Choix	2007	North South	St. Anthony Deer Lake	1,271 1,660
TCH at Route 430 Deer Lake	2007	East West North	Grand Falls Corner Brook St. Anthony	5,143 8,451 7,937
TCH at Massey Dr. Corner Brook	2007	East	Deer Lake	5,224

Table 16.3.5-3 Highway Traffic Counts Selected Locations, Major Highways, Study Area Regions (continued)

Survey Location	Survey Year	Direction	Leg Destination[(a)]	Leg AADT[(b)]
TCH at Route 410 to Baie Verte	2007	East West	Grand Falls Deer Lake	3,221 3,153
TCH at Route 350 to Botwood and Bishop's Falls	2007	East West	Gander Grand Falls	6,190 8,996
TCH at Caldwell St. Gander	2007	East West	Clarenville Grand Falls	10,587 13,661
TCH at Clarenville Inn	2007	East West	St. John's Gander	8,157 5,796
TCH at Route 61 Foxtrap	2007	East West	St. John's Clarenville	16,033 15,776

Source: Morrissey 2011, pers. comm.

(a) "Destination" refers here to the next major centre along the highway in the direction specified, and cited in the highway leg description.

(b) AADT = Annual Average Daily (24 hours) Traffic Count.

While the Project will generate additional traffic, it is expected to be only a small percentage of the total annual traffic for any one highway segment, and is not expected to result in a substantially lower level of service on the highways used.

To reduce any adverse socioeconomic effects of additional road traffic resulting from the Project, Nalcor will liaise with provincial and local authorities to provide them with the necessary information to plan and manage the expected traffic volumes. Nalcor has met with various authorities, such as the NLDTW, and will continue to meet regularly with these authorities. Where there is potential for traffic slowdowns as a result of a temporary increase in Project activity, Nalcor will advertise these details to advise motorists of potential slowdowns and, where possible, these activities will be conducted to avoid periods of peak traffic. All traffic operations will be conducted in accordance with provincial legislation, including the *Uniform Highway Transport Vehicle Regulations*, which regulate the weight and dimensions of highway vehicles operating in Atlantic Canada.

Summary of Likely Residual Environmental Effects

The likely residual effects of Project Construction on the Transportation Infrastructure and Services KI are as follows:

- Direction:
  - Project effects on highways will be adverse because increased demands on highway infrastructure may contribute to additional maintenance requirements and costs, possible safety concerns for highway users, and nuisance effects (e.g., noise, dust, user inconvenience). Beneficial effects will result from the upgrading of roads in areas where capacity issues have been identified.
  - Use of ports will be beneficial from a revenue-generating perspective for those ports with the capacity to handle Project-related traffic. For Goose Bay, the cost of upgrading facilities could be considered an adverse effect in the short-term, but Project-related activity and the overall improved dock infrastructure will provide long-term benefits.

- Magnitude:
  - Project effects on highways will be moderate and within the capacities of the highway segments affected.
  - Decisions have not been made on which ports will be used for the receipt and distribution of materials, equipment and goods for the Project. The effects of the Project on Corner Brook and St. John's will be moderate, and within the current capacities of those ports. If upgrades to the port at Goose Bay are undertaken, the effect of the Project there will also be moderate.
- Geographic Extent:
  - Project effects on highways will be regional and experienced on major highways within all regions, and on some community roads between ports and the major highways. In addition, effects will be local where they are experienced on existing or purpose-built tote roads, or resource roads between the main highways and the transmission corridor ROW.
  - Project effects on ports will be regional, experienced in specific communities in those regions with the required port facilities, including Central and Southeastern Labrador (Happy Valley-Goose Bay), the Northern Peninsula (Corner Brook) and the Avalon Peninsula (St. John's).
- Duration:
  - Project effects will be of medium-term duration throughout Construction.
  - Beneficial effects from road improvements will be far future in duration.
- Frequency:
  - Project effects will be intermittent throughout Construction.
  - Beneficial effects of road improvements will be continuous throughout Construction.

There is a high degree of confidence that the level of effects of the Project on the Transportation Infrastructure and Services KI will be as predicted because the types and volumes of equipment, goods and materials required have been estimated based on past experience with similar transmission line and other project construction requirements.

16.3.5.4 Construction Effects: Waste Disposal Infrastructure and Services

Waste from the Project will include waste from packaging of materials and equipment, and domestic waste from the Construction camps. Most of the Construction waste will be generated in Year 1 to Year 3 of the Project. All solid waste disposal will be in compliance with the Project EPP(s).

Large volumes of packaging materials will be associated with transmission tower components, conductors and insulators, and other Project requirements listed above (Section 16.3.5.3). The amount of domestic waste from the temporary Construction camps is estimated to be 2.2 kilograms (kg) per person per day (Murphy 2010, pers. comm.). At this rate, a 150-person camp would produce 9,900 kg or 9.9 metric tonnes per month. It is anticipated that 11 camps will be established along, but outside, the ROW. Four will be located between Muskrat Falls and Forteau Point, three will be located between Shoal Cove and Taylors Brook, and four will be located between Taylors Brook and Soldiers Pond. Whenever possible, waste materials will be reused and / or recycled. The domestic waste and other potential waste attractants will be temporarily stored in bear-proof containers before being transported to an approved disposal site.

Waste disposal for the Project will be permit-based, and with the approval of waste management authorities or municipalities across the province. Where local waste management facilities do not have the capacity or authority to accept Project waste, as may be the case in the Labrador Straits area, Nalcor and its contractors will be required to remove the waste from the area and make arrangements to dispose of it elsewhere. Early and ongoing communication and consultation regarding Project plans and likely requirements between Nalcor

and local communities and stakeholders will be key, as will appropriate infrastructure planning by the responsible authorities.

Summary of Likely Residual Environmental Effects

The likely residual effects of Project Construction on the Waste Disposal Infrastructure and Services KI are as follows:

- Direction:
  - Project effects may be considered adverse because waste will be generated, but as the Project can and will only use those sites that have the capacity and are authorized to accept such waste, there may be no adverse effects on waste infrastructure and services. Disposal of Project waste will be beneficial from a revenue generation perspective for some municipalities.
- Magnitude:
  - If they occur, adverse effects on the Project will be low to moderate, as waste can and will be disposed of only at those sites with the capacity to accept that waste.
- Geographic Extent:
  - Project effects will be regional and limited to a few landfill sites in some regions.
- Duration:
  - Project effects will be of medium-term duration throughout Construction.
- Frequency:
  - Project effects will be continuous throughout Construction.

There is a high degree of confidence that the actual effects of the Project on the Waste Disposal Infrastructure and Services KI will be as predicted based on previous transmission line construction experience, and existing knowledge of the characteristics of goods and materials required for the Project, together with their waste-generating potentials.

16.3.5.5 Construction Effects: Safety and Security Services

Accidents or other unplanned events are possible during the construction of any large project, which may affect human health and safety and thereby place additional demands on local safety and security services including fire, emergency response and policing. Potential accidents and malfunctions are described in detail in Chapter 5, Accidents and Malfunctions. Worker health and safety issues are not addressed specifically in this VEC, which focuses on potential issues and effects that relate to the general public. The types of community and regional services that could be called upon in the event of an accident or malfunction (e.g., forest fire services and policing) are described in Section 15.3.5.

A number of potential, though unlikely, types of accidents and malfunctions may occur, of which the following are the most likely to have community-related implications:

- fires occurring at marshalling yards, camps and converter station sites;
- forest fires; and
- spills and leaks of hazardous materials.

In Chapter 5, Accidents and Malfunctions, the nature of these potential incidents is discussed, together with incident prevention measures and responses. Risk evaluations are then carried out for 'Most Likely' and 'Worst Case' scenarios. The conclusions drawn with respect to the probability, consequences and level of risk associated with the potential incidents are based on 50 years of Nalcor experience with construction and

maintenance of transmission and distribution lines, industry knowledge, and government statistics. In both its Occupational Health and Safety Guidelines and Emergency Response Plans, Nalcor conforms to both provincial and federal legislation with the intent of meeting both its legal and corporate responsibilities.

To minimize the likelihood of accidents and malfunctions and to mitigate the effects of those incidents, Nalcor will develop Safety, Health and Environmental Emergency Response Plans (SHERP) to address potential unplanned incidents and emergency situations. All Project personnel will be made aware of the SHERP and designated staff will receive SHERP training. Among other elements, these plans will address handling and storage of materials, driving safety, animal encounters, emergency response communications, spill response, personnel injury response and vehicle accidents. The plans will describe response measures for major medical emergencies and include procedures for emergency response coordination with local emergency response personnel and local medical facilities.

Details on the Incident Risk Evaluation Matrix are provided in Table 16.3.5-4, and Table 16.3.5-5 summarizes the conclusions from this analysis. Further details on the nature of Worst Case Scenarios can be found in Chapter 5, Accidents and Malfunctions, Table 5.15-1. Further discussion of specific incidents can also be found in the biophysical effects assessments.

Table 16.3.5-4 Incident Risk Evaluation Matrix

Incident Risk Evaluation			**Consequence**		
			Low	**Moderate**	**High**
			Incident could result in a slight decline in the resource in the Study Area during the life of the Project. Research, monitoring, and / or recovery initiatives would not normally be required	Incident could result in a decline in the resource to lower-than-baseline but stable levels after Project closure and into the foreseeable future. Regional management actions such as research, monitoring and / or recovery initiatives may be required	Incident could threaten sustainability of the resource and should be considered a management concern. Research, monitoring and / or recovery initiatives should be considered
Probability	**Low**	This type of incident has rarely been reported for electricity transmission projects	Low	Low	Moderate
	Moderate	Evidence supports the occurrence of this type of incident in some, but less than half, of electricity projects	Low	Moderate	High
	High	This type of incident is considered common for electricity transmission projects	Low	High	High

Source: Table 5.1.3-1, Chapter 5, Accidents and Malfunctions.

Table 16.3.5-5 Summary of Selected Causes of Safety and Security Service Requirements: Communities

Potential Incident	Most Likely Scenario			Worst Case Scenario		
	Probability	Consequence	Risk Level	Probability	Consequence	Risk Level
Fire	Low	Low	Low	Addressed as separate incident – forest fire		
Forest Fire	Moderate	Low	Low	Low	Moderate-High	Moderate
Spills / Leaks of Hazardous Materials	High	Low		Low	Moderate-High	Moderate

Source: Based on Table 5.15-1 Chapter 5, Accidents and Malfunctions.

In the event of forest and other fires caused by the Project, provincial and local firefighting forces could be called upon. Similarly, fire, police and other emergency responders could be called upon in the event of a spill or leak of hazardous materials caused by the Project. With incident prevention and response mechanisms in place, the consequences and risk levels associated with the Most Likely Scenarios for each potential incident are low. In the unlikely event of a Worst Case Scenario situation, the community consequences of forest fires or spills of hazardous materials could be more serious, ranging from moderate to high, depending on the type of incident. However, the low probability of any of these incidents occurring suggests that the associated risk is, at worst, moderate. Nalcor will develop a SHERP to address potential unplanned incidents and emergency situations. This includes coordinating communications with local emergency management officials.

Summary of Likely Residual Environmental Effects

The likely residual effects of Project Construction on the Safety and Security Services KI are as follows:

- Direction:
  - Project Construction effects will be adverse, because of increased demand on local emergency services.
- Magnitude:
  - Under the most likely scenarios, the effects of the Project will be low or moderate**.** Only in the case of a highly unlikely worst case major incident would there be high magnitude effects.
- Geographic Extent:
  - Increased demand on local emergency services will likely be local or regional in extent.
- Duration:
  - Project effects on Safety and Security Services are likely to be of short-term duration.
- Frequency:
  - Incidents will likely be intermittent, as they may occur sporadically throughout Project Construction.

There is a moderate degree of confidence that the level of effects of the Project on the Safety and Security Services KI will be as predicted. While Nalcor has considerable experience with construction and maintenance of transmission and distribution lines and there is a substantial amount of industry knowledge to support these effects predictions, the nature and scale of most unanticipated events by their very nature cannot be predicted with a high level of certainty.

16.3.5.6 Construction Effects: Health Conditions

The main Project driver with the potential to affect health conditions is employment, including both direct employment and employment generated by Project expenditures. The potential socioeconomic effects will be

experienced by residents involved with the Project and worker-community interactions. These effects will occur primarily during Project Construction.

While in some cases, the socioeconomic effects of the Project on health are direct (e.g., the benefits of employment income), in most cases effects on health will be indirect. The socioeconomic effects of the Project on health determinants are dependent on social responses, health practices and coping skills, and the availability of social support networks, particularly that of the family. The prediction of Project effects on many of the underlying determinants of health is complex and is a factor of personal choice and underlying social conditions.

For those who obtain employment with the Project, there is the possibility of increased income, self-esteem and social status which, in turn, may positively affect other aspects of health and well-being such as improved personal health practices and coping skills. For some, increased income and any community-worker interactions may have adverse effects in terms of poor personal health practices (e.g., alcohol and substance abuse, gambling, prostitution) and coping skills.

Both positive and adverse residual effects of the Project are likely. Effects management measures focus on minimizing the potential for increased stress on communities and individuals, and on providing the supportive frameworks necessary to enhance the existing health and underlying determinant conditions. The likely socioeconomic effects of the Project on health services will be addressed through liaison with health authorities, as part of Nalcor's planning process.

Summary of Likely Residual Environmental Effects

The likely residual effects of Project Construction on the Health Conditions KI are as follows:

- Direction:
  - Project effects will be both adverse and positive. While increased income and any community interactions may have adverse effects in terms of poor personal health practices and coping skills, for others, changes in employment and income will result in increased self-esteem, improved social status, and development of coping skills.
- Magnitude:
  - Project effects will be of low magnitude.
- Geographic Extent:
  - Project effects will be regional and potentially beyond regional, depending on the home community of those employed during Project Construction.
- Duration:
  - Project effects will be of medium-term duration, throughout Construction.
- Frequency:
  - Effects will be continuous in certain areas throughout Project Construction.

There is a moderate degree of confidence that the actual effects of the Project on the Health Conditions KI will be as predicted. While Nalcor has considerable experience with construction and maintenance of transmission and distribution lines, and there are industry standards, the nature of the effects cannot be predicted with a high level of certainty.

16.3.5.7 Construction Effects: Community Well-being

Construction can affect Community Well-being through its noise and visual effects, its effects on property values, and nuisance effects such as traffic delays.

The noise effects associated with Project Operations and Maintenance are discussed in greater detail in Chapter 3 (Project Description) and Chapter 11 (Atmospheric Environment). A brief summary of the key findings as they relate to individuals and communities is also provided in this section.

Potential noise sensitive receptors include residences, daycares, schools, hospitals, places of worship, nursing homes and any sites where socially significant Aboriginal cultural or religious ceremonies take place (Health Canada 2009). The majority of the transmission corridor is distant from communities, towns and cities. However, residential areas, communities, towns or cities within the 2 km transmission corridor and within 1 km on either side of the corridor boundary were characterized as noise sensitive area (NSAs). These NSAs include the following: Forteau, Shoal Cove, Sandy Cove, Savage Cove, Mistaken Cove, Flower's Cove, Grand Falls-Windsor, Clarenville, Deep Bight, North West Brook-Ivany's Cove, Sunnyside, Chapel Arm, Whitbourne, Blaketown and Holyrood.

Concerns expressed during community consultations include the possibility of sleep disturbance and annoyance to community residents as a result of heavy equipment being operated nearby. However, sound modelling for transmission corridor ROW clearing indicates that the value for the predicted construction noise plus background noise will not exceed 62 A-weighted decibels (dBA) (Health Canada 2009) at any of the NSAs. The higher sound pressure levels generated during Project Construction will be transient as equipment is moved along the ROW; therefore, any nearby residents will not be affected for prolonged periods. Noise levels at NSAs during the night will also remain unchanged from the existing conditions, as Construction activities related to the assembly and installation of towers will only occur during the day. Construction activities will also be conducted in accordance with municipal by-laws regarding noise. If it is determined that there are locations of concern within the NSAs as designated by Health Canada, mitigation measures will be implemented.

Drilling for the installation of the submarine cables will result in localized noise generation at Forteau Point on the north side of the Strait of Belle Isle, and Shoal Cove on the south side. However, after the incorporation of the mitigation measures indicated in Chapter 11, Atmospheric Environment, the sound pressure levels during Project Construction at the NSAs are unlikely to cause more than brief annoyance during periods of particularly intensive activity. Further, in light of planned mitigation measures, frequent exceedances of Health Canada noise level criteria are not anticipated.

The effects of the Project on visual aesthetics will be limited to a small number of communities relatively close to the Project. This will include many of the communities identified as NSAs above with respect to noise except that effects of the Project on visual aesthetics will be dependent on topography and view-planes, and will therefore be experienced by some communities more than 1 km from Construction activities and will not be experienced by some communities close to the Project. The degree of visual effects will generally decline with increased distance from the Project.

Effects of the Project on land use are discussed in detail in Section 16.5, Land and Resource Use. Readers are encouraged to review Section 16.5.5.1 with reference to effects on property ownership.

Individuals or community authorities along the proposed transmission corridor may raise property ownership issues. Easement payments are issued when there are direct land issues with the ROW placement. Current market values are determined by independent qualified property appraisers, and are negotiated between the landowner and Nalcor.

People living near the ROW but not on the ROW, who feel that they might be affected, may be concerned if they do not receive an easement payment. Research on property values associated with other transmission line projects has shown that small effects on values sometimes occur immediately after construction but diminish over time, with no long-term effects. Effects of the Project on property values are dependent on factors such as the distance from the ROW and the availability of the ROW for recreational activities. Nalcor will consult with property owners on any issues related to use of their property. Any potential adverse effects of the Project will be managed through a combination of:

- avoiding physical infrastructure (e.g., parks, cottages and outfitting lodges) to the extent practical;

- using existing access wherever possible;
- compliance with laws and regulations; and
- negotiated damage claim settlements.

There are other potential effects of the Project on Community Well-being that relate to nuisance, including traffic delays resulting from the movement of vehicles carrying Project equipment, supplies and personnel. However, as discussed earlier (Section 16.3.5.3), such effects will be only moderate and intermittent.

It is anticipated that Construction effects of the Project on Community Well-being will affect different segments of local populations, such as youth, the elderly, women and Aboriginal peoples, in different ways. All community residents will be similarly exposed to any noise and visual effects, and while there may be some minor differences between the attitudes of different groups to such effects, these are expected to be minor. To the degree that there are variations in property and vehicle ownership between different population groups in different communities, the effects will also vary, but again the variations will be minor and inconsistent within any one group. In the case of Aboriginal peoples, it should also be noted that the nature and location of the Project and associated work are such that they will not interact strongly with Aboriginal communities.

Overall, the routing of the Project is such that there will be limited interaction between the Project and Communities.

Summary of Likely Residual Environmental Effects

Where there is an interaction, the likely residual effects of Project Construction on the Community Well-being KI are as follows:

- Direction:
  - Project noise and visual effects will be adverse because there will be increased disturbance of and annoyance to residents as a result of Construction activity. The effects on property owners could be adverse or beneficial: some properties near the ROW may decline in value, and some landowners may be willing to sell and benefit financially from the sale. The effects of Project traffic will be adverse.
- Magnitude:
  - Project noise effects will range from no effect to low magnitude, and then only during working hours; any increase in sound levels will not likely be detectable beyond the 2 km transmission corridor and will be within the normal range of variability. Visual effects will range from no effect to low magnitude. Effects on property values will be low to moderate, and effects on traffic will be low.
- Geographic Extent:
  - Project effects will be local, limited to communities along or in close proximity to the ROW.
- Duration:
  - Project noise and visual effects will be of medium-term duration, throughout Construction. Project effects on property values will be short to long-term (up to ten years) for any market adjustments to be made. Effects on traffic will be of medium-term duration throughout Project Construction.
- Frequency:
  - Noise and visual effects will be continuous in certain areas throughout Project Construction during working hours. Effects on property market values may be continuous throughout Construction. Traffic effects will be intermittent throughout Construction.

There is a high degree of confidence that the actual effects of the Project on noise and visual aesthetics will be as predicted given the location of the Project relative to the location of residences and other community facilities and since Construction activities will be conducted in accordance with municipal by-laws regarding noise. There is a moderate level of confidence that the actual effects of the Project on property values will be as predicted. Past experience with other projects does not always provide a good basis for predicting property value effects; however, general findings from previous experience do suggest that any adverse effects on property values are more likely to be influenced by other factors unrelated to the Project than the presence of the transmission line itself. There is a high degree of confidence that the traffic effects of the Project will be as predicted.

16.3.5.8 Construction Effects: Summary

The majority of the likely effects of Project Construction on Communities are expected to be on ports and highways, waste disposal sites, property values, and noise receptors. These effects will be caused by both anticipated Construction activities and accidents and malfunctions. In all cases, appropriate Project design and effects managementmeasures will be adopted to prevent and minimize potential adverse effects.

With few exceptions (e.g., the Port of Goose Bay), the capacities of existing transportation infrastructure required are likely adequate to meet Project needs. Where existing transportation infrastructure is insufficient or where the Project is likely to negatively affect the quality of existing infrastructure, Nalcor will continue to liaise with the appropriate authorities and key stakeholders to mitigate these matters. Where additional demands will be placed on local infrastructure, e.g., local port facilities used for transport of quarry materials, these sites and adjacent infrastructure will be evaluated prior to use.

Increased demands of the Project on highway infrastructure may contribute to additional maintenance requirements and costs, traffic delays, and an increase in safety concerns for other highway users. The magnitude of these effects will vary depending on the capacities of the highway segments affected. Project effects will likely be experienced on major highways within all regions of the Project area. Where the Project will result in upgrades to local transportation infrastructure, this will be a positive, far-future effect.

Although the Project will generate waste, the Project will only use those disposal sites that have the capacity and are authorized to accept such waste. As a result, there may be no adverse effects on Waste Disposal Infrastructure and Services. However, some municipalities may experience a positive effect of additional revenue generation.

Project Construction will result in an increase in the probability, consequences, and risk to communities from fires and spills of hazardous materials, with resultant demands on Safety and Security Services. The effects on Safety and Security Services are expected to be low magnitude, local or regional in extent and of short-term duration.

The Project will likely have both positive and negative effects on Health Conditions as a result of increased employment and income; however, the magnitude of these effects is expected to be low and of medium-term duration.

In terms of effects on Community Well-being, Project effects will likely be limited to communities along or in close proximity to the ROW. Project noise and visual effects will be of medium-term duration, throughout Construction, and will be continuous during working hours in certain areas. Project effects on property values will be short to long-term (up to ten years) for any market adjustments to be made.

Nalcor and its subsidiaries have a long history of constructing transmission lines within the province and there is a high degree of confidence, based on this experience, that the likely residual effects of the Project will be as predicted.

16.3.6 Operations and Maintenance

16.3.6.1 Overview of Project Operations and Maintenance and Associated Effects Management

Once Construction of the Project is completed, and following Project commissioning, the Project will be operated on a continuous basis. Maintenance activities will include regular inspection of all Project components, repairs to the system as required, and periodic vegetation management along the cleared ROW (Chapter 3, Project Description). This will involve much reduced activity levels as compared with the Construction phase of the Project.

The entire transmission line will be inspected by helicopter each year, and a portion each year will be inspected by foot. The submarine cables and electrodes will be inspected through remotely operated vehicle (ROV) surveys and / or other relevant means. Activities associated with the operation of the High Voltage direct current (HVdc) system will be integrated into Nalcor's existing system-wide inspection and maintenance program.

Vegetation management will commence eight years after Construction is completed and will be conducted every seven years thereafter during Project Operations and Maintenance. Nalcor will incorporate the Project into its established vegetation management program for its transmission and distribution system. The management schedule for the Project will vary with the habitat type crossed and the resulting re-vegetation, the extent of ground disturbance during Construction, and the terrain.

The Project will be operated indefinitely, and decommissioning is not contemplated at this time. Should decommissioning activities eventually be considered for all or part of the HVdc system, these will be planned and conducted in accordance with the relevant standards and regulatory requirements in place at that time.

Project Operations and Maintenance activities will be carried out in accordance with standard procedures and in accordance with required and relevant environmental protection measures. These are discussed integrally in the following sections of the environmental effects assessment.

16.3.6.2 Existing Knowledge

Much of the public concern regarding the operation of electrical transmission systems surrounds their perceived health effects. There is a substantial body of information on this subject, recent examples of which are summarized in Table 16.3.6-1.

While specific study conclusions vary, surveys of the literature typically conclude that a causal link between power-line EMF exposure and demonstrated health effects has not been established, even after considerable research in the U.S. and abroad (e.g., PSC Wisconsin 2010, internet site; Connecticut Siting Council 2007, intenet site). While the data on health effects may be inconclusive, and even though there are often no regulations pertaining to EMF emissions, many regulatory authorities with responsibility for electricity transmission have adopted 'good management practice' approaches to try to minimize any potential health risk from electricity transmission systems.

As discussed in detail in Chapter 3, Project Description, the proposed HVdc system is being designed and will be constructed and operated in accordance with relevant standards. That chapter has also provided detailed modelling for EMF and other emissions that may be associated with the Project, the results of which have been brought forward into the analysis that follows.

Table 16.3.6-1 Existing Knowledge (Operations and Maintenance): Effects of Similar Projects on Communities

Reference	Study / Project Context	Summary of Findings
PSC Wisconsin (2010, internet site)	Overview of environmental issues and concerns raised by the construction / operation of electric transmission facilities	– EMF: Weak and inconsistent associations between exposures and human health. Design of line configuration can reduce EMF. – Implantable Medical Devices (IMD): EMF can cause electromagnetic interference (EMI) with pacemakers and implantable cardioverter defibrillators (ICDs). Transmission lines are only one source of EMI. ICD patients must adjust behaviour. Moving away from an EMI source is a standard response. – Noise: Sizzles, crackles and hissing, can occur during periods of high humidity. Noise quickly dissipates with distance from the lines, usually overshadowed by other background noises. – Property owner impacts: Findings on changes in property values are inconclusive and not project-transferrable. – Radio and television reception: Transmission lines do not usually interfere with normal radio and television reception. – Safety: State Electric Code sets minimum safety standards; utility construction standards are generally more stringent.
World Health Organization (2007, internet site)	Review of health effects of extremely low frequency (ELF) electromagnetic field (EMF)	– Concludes that evidence for a link between ELF EMF fields and childhood leukemia "is not strong enough to be considered causal but sufficiently strong to remain a concern." "Virtually all of the laboratory evidence and the mechanistic evidence fail to support" this reported association. For all other diseases, there is inadequate or no evidence of health effects at low exposure levels. – The report emphasizes that, given the weakness of the evidence for health effects, the health benefits of exposure reduction are unclear and policies based on the adoption of arbitrary low exposure limits are not warranted.
World Bank Group (2007, internet site)	Environmental, Health and Safety Guidelines and examples of Good International Industry Practice re: Electric Power Transmission and Distribution	Recommends: – Evaluation of EMF exposure against reference levels developed by the International Commission on Non-Ionizing Radiation Protection. – Facility siting to avoid / minimize exposure to the public. – If EMF levels are anticipated to be higher than recommended, example engineering techniques are suggested to reduce EMF. – Most occupational health and safety guidelines are common to most large industrial facilities. Provides recommendations specific to power transmission including: live power lines; working at height; electric and magnetic fields; exposure to chemicals. – Community health and safety issue recommendations include those relating to electrocution, electromagnetic interference (EMI), visual amenity, noise and ozone, and aircraft navigation safety.
Connecticut Siting Council (2007, internet site)	Best management practices for construction of electric transmission lines	– Recognizes that a causal link between power-line magnetic field exposure and demonstrated health effects has not been established, even after much scientific investigation in the U.S. and abroad. – Develops a “best management practices” approach including requiring utility companies to develop no cost / low cost EMF mitigation plans to reduce EMF by 15% at the edge of the ROW as part of their development application.

16.3.6.3 Operations and Maintenance Effects: Transportation and Waste Disposal Infrastructure and Services

Transmission line inspections will be conducted annually using a combination of ATVs, snowmobiles and helicopters. Additionally, vegetation management will be required within the ROW. These activities will require relatively few materials and small numbers of workers, which will therefore result in minimal traffic and waste generation. These activities will be integrated into Nalcor's existing transmission system inspection and maintenance program. All Project Operations and Maintenance activities will be conducted in accordance with applicable permits and regulations (Chapter 3, Project Description). Activities associated with potential major system repair will affect transportation and waste disposal infrastructure and services. However, this activity is unlikely to occur and is discussed in Section 5.4.1, and therefore is not considered in the Operations and Maintenance phase assessment.

Summary of Likely Residual Environmental Effects

The likely residual effects of Project Operations and Maintenance on the Transportation and Waste Disposal Infrastructure and Services KIs are as follows:

- Direction:
  - Neutral as the effects do not change the existing baseline for Transportation and Waste Disposal Infrastructure and Services.
- Magnitude:
  - Not applicable.
- Geographic Extent:
  - Not applicable.
- Duration:
  - Not applicable.
- Frequency:
  - Not applicable.

There is a high degree of confidence that the likely / effects of Project Operations and Maintenance on the Transportation and Waste Disposal Infrastructure and Services KIs will be as expected given that the activities requiring these services will be integrated into Nalcor's existing transmission system inspection and maintenance programs, and thus the levels of incremental activity associated with Project Operations and Maintenance, and the associated effects are within Nalcor's control.

16.3.6.4 Operations and Maintenance Effects: Safety and Security Services

Forest fires and spills of hazardous materials could occur during Project Operations and Maintenance, thereby placing additional demands on Safety and Security Services including fire response, emergency measures and policing. However, the frequency and level of activity (number of personnel and amount and type of equipment) will be much less than that required during Project Construction. As such, the probability of such incidents and the associated risk levels will be lower during Operations and Maintenance.

As discussed, Nalcor will develop a SHERP to address potential unplanned incidents and emergency situations. The SHERP will include response measures for major medical emergencies, and procedures for emergency response coordination with local response personnel and local medical facilities. All Project personnel will be made aware of the SHERP and designated staff will receive SHERP training.

Summary of Likely Residual Environmental Effects

The likely residual effects of Project Operations and Maintenance on the Safety and Security Services KI are as follows:

- Direction:
  - The effect on Safety and Security Services will be adverse, because increased demands will be placed on local emergency services.
- Magnitude:
  - Activity levels will be much lower during Project Operations and Maintenance compared with Construction, and the probability of unanticipated incidents and associated effects on services will be much lower. The magnitude of likely effects is low.
- Geographic Extent:
  - Accidents and Malfunctions could be experienced at various locations within the Project area, affecting local and / or regional services according to the scale of the incident, but limited to the RSA.
- Duration:
  - Likely incidents would have only short-term effects on Safety and Security Services.
- Frequency:
  - Effects of Project Operations and Maintenance on Safety and Security Services would be intermittent as accidents and malfunctions may occur sporadically throughout this phase of the Project.

There is a moderate degree of confidence that the level of effects of Project Operations and Maintenance on the Safety and Security Services KI will be as predicted because, while Nalcor has considerable experience with construction and maintenance of transmission and distribution lines and there is a substantial amount of industry knowledge to support these effects predictions, the nature and scale of most unanticipated events and hence their effects on safety and security services by their very nature cannot be predicted with a high level of certainty.

16.3.6.5 Operations and Maintenance Effects: Health Conditions

During the operation of HVdc systems, there are low levels of emissions and discharges, including electromagnetic fields (EMF) and electric fields that can potentially have health effects. Vegetation control also has the potential to cause effects on health conditions.

Electromagnetic Fields

A number of Project components, including the transmission lines, converter stations, electrodes and wood pole electrode lines, will produce EMF. EMF are a combination of electric and magnetic fields produced by electrically charged objects. EMF are strongest near the source, and the strength of the field diminishes rapidly with distance (Health Canada 2010, internet site). When EMF interact with conductors, they can affect the distribution of charge and induce a current to flow within the conductor. The direct current in an HVdc system travels in one direction only and thus produces a static magnetic field. Because HVdc systems do not emit time-varying EMF, they cannot induce currents in nearby objects including people and wildlife (Canadian Electricity Association 2010, internet site).

Research findings to date on the health effects of EMF are often conflicting and have uncovered only weak and inconsistent associations between exposures to EMF and human health (see, for example, Connecticut Siting Council 2007, internet site; Feychting et al. 2005). The research has not established a causal relationship between exposure to magnetic fields and human disease, nor a plausible biological mechanism by which

exposure to EMF could cause disease. The magnetic fields produced by electricity do not have the energy necessary to break chemical bonds and cause DNA mutations (PSC Wisconsin 2010, internet site).

There are currently no Canadian regulations regarding EMF emissions, nor are there any Canadian guidelines for EMF exposure (Canadian Electricity Association 2010, internet site). The Electrical Power Research Institute (EPRI) in the United States, however, recommends a limit of 25 kilovolts per metre (kV/m) for electric fields from an HVdc transmission line and 100 amperes x 10^{-9} per square metre (nA/m^2) for the ion current density limit at ground level (EPRI 2008). EMF and ion current density for the Project will be within the limits recommended by the EPRI.

Use of Implanted Medical Devices (IMD) is becoming increasingly common in the general population. Two such devices, pacemakers and implantable cardioverter defibrillators (ICD), have been found to encounter problems when exposed to EMI from EMF such as the devices being inappropriately triggered or inhibited from responding appropriately.

Transmission lines are only one of a number of external EMI sources, but manufacturers' recommended threshold for modulated magnetic fields is 1 gauss, which is five to ten times greater than the magnetic field likely to be produced by a high voltage transmission line. All pacemaker and ICD patients are informed of potential problems associated with exposure to EMI and must adjust their behaviour accordingly. Moving away from a source is a standard response to the effects of exposure to EMI and patients can shield themselves from EMI with a car, a building, or the enclosed cab of a truck (PSC Wisconsin 2010, internet site).

Vegetation Management

Nalcor conducts an integrated vegetation management program along its transmission corridor ROWs and within its terminal station yards. Methods of vegetation management include the selective application of herbicides and manual clearing.

As discussed in Chapter 12, Terrestrial Environment (Table 12.6.1-2), Nalcor will not use sterilants as a means of vegetation control for the Project, but will rely on non-residual herbicides and mechanical methods, where practical. The requirements of all applicable regulations will be met or exceeded, and all herbicide application will be conducted in accordance with the *Pesticides Control Regulations 1996* under the *Environmental Protection Act* SNL 2002 and will be performed by applicators certified with an Industrial Vegetation license issued by the Newfoundland and Labrador Department of Environment. The vegetation maintenance will allow root systems to remain intact, permitting the soil to bind. This encourages rapid colonization of low-growing plant species which in turn reduces the requirement for future vegetation management.

Herbicide applications will not be undertaken in Protected Water Supply Areas, private or provincial parks, ecological reserves, or on private lands without permission of the owner. Vegetation buffer zones, established at environmentally sensitive areas during transmission line construction, will be maintained during vegetation management activities, with only danger trees being removed from these areas.

Summary of Likely Residual Environmental Effects

The likely residual effects of Project Operations and Maintenance on the Health Conditions KI are as follows:

- Direction:
  - Effects will be adverse because of an increase in EMF and effects on IMD, all of which have potential health implications.
- Magnitude:
  - EMF and IMD health effects will be low in magnitude and affect small numbers of people for short durations.

- Geographic Extent:
  - EMF and IMD health effects will be local, and limited to persons spending time in the transmission ROW.
- Duration:
  - EMF and IMD health effects will be experienced into the far future, throughout Operations and Maintenance.
- Frequency:
  - EMF and IMD health effects will be experience infrequently, whenever people spend time in the transmission ROW during Operations and Maintenance.

There is a high degree of confidence that the level of effects of Project Operations and Maintenance on the Health Conditions KI will be as predicted because Nalcor has considerable experience with Construction, and Operations and Maintenance of transmission and distribution lines and there is a substantial amount of industry knowledge and government statistics to support the effects predictions. More detailed discussion of the levels of confidence associated with particular effects (e.g., EMF and noise effects), can be found in Chapter 3 (Project Description) and Chapter 11 (Atmospheric Environment).

16.3.6.6 Operations and Maintenance Effects: Community Well-being

Project Operations and Maintenance has the potential to affect Community Well-being by generating noise, interfering with radio and television reception and interfering with visual aesthetics, as discussed below.

Noise

Noise outputs that may be associated with Project Operations and Maintenance activities are discussed in greater detail in Chapter 3 (Project Description) and Chapter 11 (Acoustic Environment). A brief summary of the findings presented in those sections is included here.

A transmission line emits audible noise when electrical energy within the conductor interacts with the air surrounding the conductor surface. These reactions, or corona, depend on ambient conditions such as temperature, humidity, and wind speed and direction. The noise emitted typically resembles a crackling or sizzling sound.

There are currently no Canadian noise control regulations applicable to HVdc transmission lines. Suggested thresholds for audible noise levels associated with HVdc lines, of 51 dBA (Maruvada et al. 1982) or an average level of 55 dBA outdoors and 45 dBA indoors (EPRI 2006) have been adopted in other jurisdictions (e.g., the United States Environmental Protection Agency follows the latter guidelines). Nalcor has adopted the threshold of 50 dBA at the edge of the ROW, as recommended by the EPRI in the United States for HVdc transmission lines (EPRI 2008). Noise effects associated with operation of the proposed HVdc transmission lines would not exceed this adopted threshold of 50 dBA at the edge of the ROW.

Radio and Television Reception

Transmission lines do not usually interfere with television and radio reception, but interference can be caused by arcing discharges that may occur on insulators and by corona discharges on conductors. Maximum radio interference levels are specified by Industry Canada (Industry Canada 2001, internet site). The proposed HVdc system will be designed and constructed to comply with Canadian Standards Association Standard CAN3-C108.3.1-M84, the same standard that is applied to HVac transmission lines. This standard limits worst-case radio interference levels to 69 dB at a distance of 15 m from the high voltage conductors. The maximum radio interference levels specified by Industry Canada as part of its spectrum management and telecommunications policy (Industry Canada 2001, internet site) will not be exceeded by the Project.

Visual Aesthetics and Land Use

Power transmission and distribution systems are necessary to transport energy from power facilities to users, but the associated physical infrastructure may be visually intrusive and undesirable to local residents. Community Sell-being issues relating to land users and visual aesthetics are addressed separately and specifically in Chapter 16.5 (Land and Resource Use) and Chapter 16.8 (Visual Aesthetics). Readers are also encouraged to read these sections in respect to likely Project effects on Community Well-being.

Summary of Likely Residual Environmental Effects

The likely residual effects of Project Operations and Maintenance on the Community Well-being KI are as follows:

- Direction:
  - Effects will be adverse as there will be an increase in noise disturbance, radio / television interference, and stray voltage.
- Magnitude:
  - Effects will be of low magnitude, because they will be below or within acceptable levels.
- Geographic Extent:
  - Effects will be local and limited to the LSA.
- Duration:
  - Effects will be experienced into the far future, throughout Operations and Maintenance.
- Frequency:
  - Effects will be continuous throughout Operations and Maintenance.

There is a high degree of confidence that the level of effects of Project Operations and Maintenance on the Community Well-being KI will be as predicted because Nalcor has considerable experience with construction and maintenance of transmission and distribution lines and there is substantial industry knowledge and government statistics to support the effects predictions.

16.3.7 Environmental Effects Summary and Evaluation of Significance

16.3.7.1 Summary of Environmental Effects

Environmental effects are assessed in terms of their direction (adverse or beneficial), magnitude, spatial and temporal extent, duration and frequency of occurrence. The assessment of significance of an effect considers all these factors. The likely environmental effects of the Project on the Communities VEC are summarized in Table 16.3.7-1.

Table 16.3.7-1 Environmental Effects Analysis Summary: Communities

Project Phase / Key Indicator	Likely Residual Environmental Effects Summary Descriptors				
	Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**
Construction					
Transportation Infrastructure and Services	**Beneficial / Adverse** – Increased highway demands will result in maintenance requirements and have safety and nuisance effects, and upgrading ports will be costly. However, any upgrading of transportation infrastructure will be beneficial.	**Moderate** – The magnitude of effects on highways will be moderate. – The magnitude of effects on ports will depend in part on the ports that are selected for the Project. – The magnitude of effects on the ports in Corner Brook and St. John's will likely be moderate and within the current capacity of these ports. If upgrades to the port at Goose Bay are required, the magnitude of effects on that port will likely be moderate.	**Local to Regional** – Effects on highways will be regional on major highways and roads connecting ports to highways. There will be local effects associated with tote and resource roads connecting the Project ROW to the highway system. – Effects on ports will be regional around the required facilities.	**Medium-term to Far future** – Adverse effects on transportation will be medium-term, while the beneficial effects will last into the far future.	**Intermittent to Continuous** – The adverse effects will be intermittent, while the beneficial effects will be continuous once infrastructure has been upgraded.
Waste Disposal Infrastructure and Services	**Adverse / Beneficial** – Increased generation of waste, but disposal revenue will benefit some communities.	**Moderate** – The magnitude of effects will be low to moderate, because waste will only be disposed of at sites with spare capacity.	**Regional** – Regional, limited to a few landfill sites.	**Medium-term** – Project effects will be medium-term.	**Continuous** – The effects will be continuous through Construction.
Safety and Security Services	**Adverse** – Likely increased demand for local emergency services resulting from Project-related incidents.	**Moderate** – Under likely risk scenarios, the magnitude of effects would be low or moderate.	**Local to Regional** – Unanticipated incidents could have local or regional effects on services.	**Short-term** – Project effects on Safety and Security Services will be short-term.	**Intermittent** – Incidents and their effects will be intermittent.

Table 16.3.7-1 Environmental Effects Analysis Summary: Communities (continued)

Project Phase / Key Indicator	Likely Residual Environmental Effects Summary Descriptors				
	Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**
Health Conditions	**Adverse / Beneficial** – Income and community interactions may result in adverse effects depending on skills and practices, but effects on income and employment will also be positive.	**Low** – The numbers of workers and worker / community interactions is limited, with the scale of the likely effects also being low.	**Regional to Beyond Regional** – The effects on health will mostly be regional, but could extend further depending on the home community of workers employed on the Project.	**Medium-term** – Project effects on health conditions will be of medium-term duration throughout Construction.	**Continuous** – Effects on health condition will be continuous throughout Construction.
Community Well-being	**Adverse / Beneficial** – Noise, visual and traffic effects will be negative, while property value effects will vary according to circumstances and owner responses.	**Low** – Project noise will have no to low effects. – Visual-related effects will range from none to low. – Effects on property values will be low to moderate. – The effects on traffic will be low.	**Local** – Project effects will be local, limited to communities along or close to the ROW.	**Short- to Long-term** – Project effects related to noise, visual and traffic will be of medium-term duration throughout Construction. – Effects on property values may be short- to long-term.	**Continuous** – Project effects related to noise, visual and property effects will be continuous throughout Construction, while effects on traffic will be intermittent.
Summary of Likely Residual Construction Effects on Communities: Given the scale and distribution of Project Construction activities, the adverse effects will mostly be local and of short duration. There will also be some localized beneficial effects, some of which (e.g., transportation infrastructure improvements) will be long lasting.					
Operations and Maintenance					
Transportation and Waste Disposal Infrastructure and Services	**Neutral** – Operations and Maintenance activities will be incorporated into existing activities.	– No effect.	– n/a.	– n/a.	– n/a.

Table 16.3.7-1 Environmental Effects Analysis Summary: Communities (continued)

Project Phase / Key Indicator	Likely Residual Environmental Effects Summary Descriptors				
	Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**
Safety and Security Services	**Adverse** – Likely increased demands on local emergency services.	**Low** – Activity levels will be much lower during Operations and Maintenance compared with Construction and the magnitude of effects will be low.	**Local to Regional** – Unanticipated incidents could have local or regional effects on services.	**Short-term** – Most potential incidents would have only short-term effects.	**Intermittent** – Effects on safety and security services will be intermittent given the sporadic nature of incidents.
Health Conditions	**Adverse** – An increase in EMF and effects on IMD have adverse health implications.	**Low** – Effects will be of low magnitude and will affect small numbers of people.	**Local** – EMF and IMD health effects will be local, limited to persons in the LSA.	**Far Future** – EMF and IMD health effects will be experienced into the far future, throughout Operations and Maintenance.	**Intermittent** – Intermittent, as people spend time in the transmission corridor.
Community Well-being	**Adverse** – Effects from increased noise disturbance, radio and television interference, and stray voltage.	**Low** – Effects will be of low magnitude, within acceptable limits.	**Local** – Effects will be local, limited to the LSA.	**Far Future** – Effects on community well-being will be experienced into the far future, throughout Operations and Maintenance.	**Continuous** – These effects will be continuous throughout Operations and Maintenance.
Summary of Likely Residual Operations and Maintenance Effects on Communities: The effects of Operations and Maintenance will be of a longer duration but much smaller scale than those from Construction. They will also generally be highly localized within and around the transmission corridor.					

n/a not applicable, as no effect is predicted.

16.3.7.2 Definition and Determination of Significance

Residual socioeconomic effects of the Project are those adverse effects remaining after effects management strategies have been implemented. Significant residual adverse effects of the Project on Communities are defined here as those with the following characteristics:

- A change in the overall availability and quality of infrastructure and services for current users and / or in the health and well-being of affected individuals or communities, resulting in, detectable and sustained decreases in the overall quality of life and / or health of a population.

As the summary provided in Table 16.3.7-1 suggests, and considering the significance definition above, no likely significant residual effects on any of the KIs for the Communities VEC are anticipated. While most effects are adverse, the magnitudes of those effects are low to moderate, meaning that the effect is within the capacity of the infrastructure component or the accepted threshold value of the parameter in question. The KI for which there is greatest concern is that related to Safety and Security Services where Worst Case unanticipated events could cause substantial harm to communities and their residents. The likelihood of such an event occurring, however, is low, and unlikely, therefore the effect is predicted to be not significant.

16.3.8 Evaluation of Project Alternatives

Project alternatives considered are associated with alternative segments for the transmission corridor in particular areas, as influenced by terrain, ecology, settlement, land use and other physical and human environment factors. The alternative segments, and the environmental implications compared to the proposed transmission corridor, are summarized in Table 16.3.8-1.

Table 16.3.8-1 Summary Evaluation of Project Alternative Means: Communities

Project Alternative Means[(a)]	Environmental Implications (Compared to the Proposed Alternative)[(b)]				
	Transportation Infrastructure and Services	**Waste Disposal Infrastructure and Services**	**Safety and Security Services**	**Health Conditions**	**Community Well-being**
A2 to A11	No difference in the ports and highways used to distribute equipment, goods and materials. No significant difference in the types or volumes of equipment, goods and materials to be moved. No difference in the effects management strategies required.	No difference in the type, amount or general location of waste generation. No difference in the effects management strategies required.	No difference in the nature or magnitude of potential incidents anticipated or services required. Only minor differences in potential locations where such incidents might occur. No difference in the effects management strategies required.	No additional communities or individuals affected by the alternatives. No substantial difference in effects between the prospect transmission corridor and the proposed alternatives or in the risks associated with accidents and malfunctions. No difference in the effects management strategies required.	No difference in property value issues, or radio-television interference. No difference in the effects management strategies required.

(a) As identified and described in Chapter 2, Project Rationale and Planning.

(b) Namely, the proposed Project described in Chapter 3, Project Description, and assessed in the preceding Environmental Effects Analysis.

None of the identified alternatives considered would have substantially different implications for the Communities VEC, including each of the associated KIs. The same types, and approximately the same volumes, of goods, equipment and materials will have to be transported, using the same ports and along the same highways, using the same general approaches. Similarly, Construction, and Operations and Maintenance activities and the characteristics of the Project once in place would be essentially the same, and none of the alternatives bring the Project closer to local communities, or increase the potential for interaction with residents and communities or otherwise occupied areas such that there would be an increase in any potential or perceived health risks or potential changes in property value issues. Similarly, the same planning and mitigation measures would be applied.

No technically and economically feasible alternatives for the submarine cable crossing or the shoreline electrode sites were identified (see Chapter 2, Section 2.12.3), and therefore marine Project alternatives are not evaluated for the Communities VEC.

16.3.9 Cumulative Environmental Effects

This section evaluates the effects of the Project on the Communities VEC in combination with the effects of other projects or activities whose socioeconomic effects will likely overlap spatially and temporally with those of the Project. Examples of such projects include the:

- Lower Churchill Hydroelectric Generation Project;
- Hebron offshore oilfield development;
- Long Harbour Processing Plant; and
- Iron Ore Company of Canada expansion.

Other projects, such as the Hibernia Southern Extension, are not expected to overlap with the Project, but ongoing investment in infrastructure, commercial forestry projects and other oil and gas developments, for example, could increase activity at particular locations throughout the Project Construction period, increasing demands on similar community infrastructure and service elements.

From the perspective of the Project, cumulative effects on Community infrastructure KIs will be greatest during Construction because this is when demand on those facilities will be greatest. While there may be some cumulative effects on health-related infrastructure and services during Construction associated with workers from a variety of projects requiring medical attention as a result of illness or injury, most health-related concerns are associated with Project Operations, are long-term (life of the Project) in nature, and unique to this type of project (associated with EMF).

The change in the overall availability and quality of infrastructure and services for current users and / or in the health and well-being of affected individuals or communities resulting from the effects of the Project in combination with other projects and activities will not result in detectable and sustained decreases in the overall quality of life and / or health of a population. Therefore, significant adverse cumulative effects on Communities are not likely to occur.

Cumulative effects associated with the Project are summarized in Table 16.3.9-1.

Table 16.3.9-1 Cumulative Effects Summary: Communities

Cumulative Effects Analysis	Central and Southeastern Labrador	Northern Peninsula	Central and Eastern Newfoundland	Avalon Peninsula
Current (Baseline) VEC Condition				
Transportation Infrastructure and Services	– Ports – Major ports (St. John's, Corner Brook) likely to be used have sufficient capacity to accommodate current and additional traffic. The Port of Goose Bay can accommodate current traffic levels, but only limited additional traffic. – Highways – Highway capacities are adequate to meet current demands. Some congestion is already evident on Hamilton River Road (local road) in Happy Valley-Goose Bay.			
Waste Disposal Infrastructure and Services	– The 2002 Newfoundland and Labrador Waste Management Strategy provides a basis for the modernization of the province's waste management program. Eighty percent of current disposal sites will be phased out and three full service disposal facilities will be established. Currently 8 of 15 Regional Waste Management Authorities and one central disposal facility (St. John's) are operating.			
Safety and Security Services	– Safety and security services are in place to deal with accidental events such as forest and other fires and spills of hazardous materials. These services are considered adequate to meet anticipated needs.			
Health Conditions	– Health infrastructure and services are considered adequate or better to meet most needs of the provincial population.			
Community Well-being	– Community well-being as reflected in self-assessed physical health, emotional health, health practices, preventative behaviours and health issues, varies widely across the province. In some cases this is a reflection of high sampling variability. In the case of Aboriginal groups the underlying reasons are a complex mix of economic, social, political and cultural factors.			
Likely Residual Environmental Effects of Labrador - Island Transmission Link				
Transportation Infrastructure and Services	– Ports – The Project will place demands on infrastructure in the Port of Goose Bay beyond its current capacity unless the port infrastructure is upgraded. – Highways – Highways in Labrador and on the Island have sufficient capacity to accommodate Project traffic. Widening of Hamilton River Road or upgrades of other local roads in Happy Valley-Goose Bay will mitigate adverse effects during Construction and provide improved access post-Construction.			
Waste Disposal Infrastructure and Services	– There will be no likely adverse residual effects of the Project as all landfill waste will be disposed of under permits and in facilities where it can be accommodated.			
Safety and Security Services	– Project may increase demands on community services to respond to certain incidents, but no significant adverse residual effects are likely or anticipated.			
Health Conditions	– During Project Construction, on-site medical personnel will be able to deal with minor health issues, and demands on regional medical facilities are not expected to be substantial. Any health effects that do occur will be spread across the regions. – Construction and operational health effects from noise, EMF and IMD interference are anticipated to be low and within accepted levels.			
Community Well-being	– Some individuals will benefit from Project employment and income (see Chapter 16.7, Economy, Employment and Business). Some others may choose to spend that income in ways not conducive to a healthy lifestyle, but overall employment effects are viewed as positive on Community Well-being. Other effects (e.g., property values, radio / television interference) are anticipated to be not significant.			

Table 16.3.9-1 Cumulative Effects Summary: Communities (continued)

Cumulative Effects Analysis	Central and Southeastern Labrador	Northern Peninsula	Central and Eastern Newfoundland	Avalon Peninsula
Potential Cumulative Environmental Effects (within RSA) of Other Future Projects and Activities				
Transportation Infrastructure and Services	– Ports – The Lower Churchill Generation Project will place greater demands on infrastructure in the Port of Goose Bay than the proposed Project. Discussions concerning port requirements are ongoing between the Port operator, Transport Canada, and Nalcor as the proponent of both the Lower Churchill Generation Project and the proposed Project. Current infrastructure, together with any necessary infrastructure upgrades, is expected to be adequate to meet any cumulative demands. – Highways – The Lower Churchill Generation Project will be the source of overlapping effects in the area between Happy Valley-Goose Bay and Muskrat Falls. In addition, the Long Harbour Nickel Processing Plant and Hebron Project will contribute to additional traffic on the TCH in the Isthmus of Avalon area. Other projects will have negligible effects on highway infrastructure. Current infrastructure, together with any necessary infrastructure upgrades, is expected to be adequate to meet any cumulative demands.			
Waste Disposal Infrastructure and Services	– During construction other projects may generate some waste, but not to the same degree as the Project and not at the same locations. The exception is the Lower Churchill Generation Project. As the proponent for both projects, Nalcor will plan joint waste disposal strategies for its Labrador-based activities. Current waste disposal infrastructure is anticipated to be adequate to meet cumulative demands.			
Safety and Security Services	– Accidental events could occur at locations where projects overlap, e.g., Happy Valley-Goose Bay. Others could occur associated with transportation through areas where other projects are occurring, e.g., accidental spills associated with the Project on the TCH near the Long Harbour processing plant. All such events could place additional demands on services.			
Health Conditions	– During Project Construction there may be some overlap in demand for health services in Happy Valley- Goose Bay with the Lower Churchill Hydroelectric Generation project. There is unlikely to be any overlap of effects with other projects. The dispersed nature of Construction of the Project will also reduce any substantial demands on health facilities in any one location. – The potential health issues associated with Project Operations and Maintenance (e.g., noise, EMF) are unique to the Project and will not overlap with other existing or known future activities.			
Community Well-being	– Cumulative employment effects are seen as generally beneficial to Community Well-being (see Chapter 16.4, Economy, Employment and Business). – Other effects such as radio reception and noise are unique to the Project and are not expected to generate any cumulative effects.			
Cumulative Environmental Effects Summary				
Transportation Infrastructure and Services	– Ports – Any cumulative adverse effects will be negligible and not significant if appropriate planning for and development of the Port of Goose Bay is undertaken. – Highways – Mitigative action will be undertaken to minimize cumulative adverse effects on highway traffic in Happy Valley-Goose Bay. Cumulative affects on highway traffic elsewhere will be within the capacities of the main highways to be used and any adverse effects will be **not significant**.			
Waste Disposal Infrastructure and Services	– Any cumulative adverse effects from the Project and the Lower Churchill Hydroelectic Generation Project will be avoided by adopting the same effects management strategy for each. Other cumulative effects are likely to be negligible in terms of quantities of waste generated and any temporal overlap with the Project, and **not significant**.			

Table 16.3.9-1 Cumulative Effects Summary: Communities (continued)

Cumulative Effects Analysis	Central and Southeastern Labrador	Northern Peninsula	Central and Eastern Newfoundland	Avalon Peninsula
Safety and Security Services	– Cumulative effects of accidents and malfunctions have a low probability of occurrence, but pose risks to communities and individuals and increase demands on services. In likely scenarios, the cumulative effects of the Project will be **not significant**.			
Health Conditions	– Any cumulative effects on health are expected to be negligible and therefore likely to be **not significant**.			
Community Well-being	– Cumulative effects on Community Well-being as a result of employment and income opportunities from multiple projects will be generally beneficial. Any potential adverse cumulative effects are anticipated to be **not significant**.			

16.3.10 Monitoring and Follow-up

With respect to community infrastructure and services and community health and well-being, these components, services and social characteristics are typically the responsibility of municipal, Aboriginal, provincial and / or federal authorities with the necessary mandate and expertise. Monitoring demand on infrastructure and services and increasing or decreasing capacity as required are activities that those authorities typically undertake as part of their normal business – for example, highway use statistics, waste volumes and remaining landfill capacities are regularly monitored by government and upgraded as necessary. Similarly, the monitoring of health and other social issues and phenomena is the responsibility of community and government organizations and agencies. Nalcor has neither the mandate nor the expertise to monitor activity in these areas. Nalcor has provided and will continue to provide Project information to relevant authorities as input to their monitoring and decision-making processes, and will continue to consult with relevant stakeholders throughout the life of the Project.

16.4 Economy, Employment and Business

16.4.1 Introduction

The term “environment” is interpreted and applied comprehensively in this EIS to include the economic and social environments within which the Project will take place and where its potential effects will occur. How people maintain their livelihoods, and how those livelihoods may be affected positively or negatively by the proposed Project, are the primary questions addressed in this Economy, Employment and Business VEC. Strong economies are typically associated with employment and income-earning opportunities, which in turn bring self-esteem and economic security to workers and business owners and, as such, are valued by those individuals and the general population as key components of their overall quality of life and general well-being.

The Project will directly affect the lives of people living throughout Newfoundland and Labrador and elsewhere through the creation of new employment and earned income, opportunities for training skills development and work experience, and enhanced business opportunities related to the supply of goods and services to the Project. Indirect effects of the Project include increased revenue to governments and the subsequent benefits associated with how that revenue is spent on public goods and services. Additional induced effects of the Project will be felt with successive rounds of spending of personal and business incomes, which in turn will generate additional jobs and government revenues through the overall economy.

The economy of Newfoundland and Labrador has seen substantial growth over the last decade, associated primarily with the development of offshore oil and mineral resources. Employment, business activity levels and government revenues have increased to make the province one of the most important growth regions in Canada. Although the recession of 2008 interrupted this to some degree, the economy has since rebounded and is expected to once again show strong performance throughout 2012. This growth will be substantially enhanced with the development of the Lower Churchill Hydroelectric Generation Project and the Labrador-Island Transmission Link, as well as other ongoing and imminent projects, and additional economic development activities throughout the province.

The Economy, Employment and Business VEC assesses these potential socioeconomic benefits, as well as any adverse effects that may occur as a result of the Project, during the Construction phase and during future Operations and Maintenance of the Project. This VEC does not discuss or assess the likely economic benefits of the general operation of the transmission system, particularly with regard to revenue generation or other economic issues and outcomes. These are discussed separately as part of the overall need, purpose and rationale for the Project (see Chapter 2 of this EIS).

It is worth noting that Nalcor has considered potential job loss resulting from the closure of the Holyrood Thermal Generating Station. Nalcor will work with its staff to minimize any effect and find solutions that work for the employees and Nalcor.

16.4.2 Environmental Assessment Study Areas

16.4.2.1 Spatial Boundaries

The Project's likely effects on Economy, Employment and Business are assessed primarily at the provincial level, given the provincial nature and scale of the Project, which will include components and activities (and associated expenditures) throughout Newfoundland and Labrador and elsewhere.

Workers for the Project will be drawn from various regions throughout the province and beyond. At the current stage of Project planning it is not possible, however, to know the particular areas from which these workers will come, and thus the specific geographic and temporal distribution of such employment benefits. Similarly, the awarding of contracts to provide goods and services to the Project will be based on commercial and technical requirements, while also taking into account factors such as experience, creditworthiness, price, quality, service, safety and delivery. Which companies will bid, meet these criteria, and be successful in winning contracts for the Project likewise cannot be known at this time.

The assessment of the Project's likely effects on Economy, Employment and Business that is presented in the following sections is focused primarily at the overall provincial level. While some regions of the province may experience greater involvement in Project activities by virtue of the size, skills and availability of their labour forces, number and types of businesses, and proximity to the Project components, the regional distribution of those economic benefits cannot be accurately or meaningfully evaluated at this stage. Therefore, revenues from employment and business incomes that accrue to government are assessed only at the provincial level.

A key focus of the following analysis is the identification and discussion of ongoing and planned Nalcor measures to help optimize the participation of, and benefits to, Newfoundland and Labrador workers and businesses throughout the life of the Project.

16.4.2.2 Temporal Boundaries

The temporal boundaries of the assessment for the Economy, Employment and Business VEC encompass the Project's Construction phase, which is the period of greatest employment and expenditures and the primary focus of the assessment, as well as the Operations and Maintenance phase, which will extend through the life of the Project.

16.4.3 Potential Environmental Issues, Indicators and Interactions

16.4.3.1 Potential Environmental Issues

Potential issues and questions associated with the Economy, Employment and Business VEC were identified in the *Environmental Impact Statement Guidelines and Scoping Document* (Government of Newfoundland and Labrador and Government of Canada 2011) for the Project, through a review of regulatory requirements, through Aboriginal and stakeholder consultation by Nalcor, and by the EIS study team.

The issues and questions raised are associated primarily with how the economy, employment and business levels will be affected by the Construction, and Operations and Maintenance of the Project. More specifically, given the substantial construction requirements of the Project, there has been considerable interest in the levels and potential share of expenditures, employment and business activities that will accrue to Newfoundland and Labrador. These considerations form the main focus of the assessment for this VEC, and are summarized in Table 16.4.3-1.

Table 16.4.3-1 Identified Issues and Questions: Economy, Employment and Business

Issue / Question	Nature and Rationale	Specific Considerations
How will the Construction, and Operations and Maintenance of the Project affect / benefit the Newfoundland and Labrador economy?	– Economic benefits of the Project to Newfoundland and Labrador are an important aspect of, and consideration for, the Project – Individuals, companies and governments are interested in having opportunities to receive income and revenue benefits from the Project, contributing to further economic growth and development in the province	– The proportion of Project activities / expenditures in Newfoundland and Labrador, including direct, indirect and induced benefits
How will Newfoundland and Labrador be affected by / benefit from employment generated by the Construction, and Operations and Maintenance of the Project?	– The Project will generate substantial employment, particularly during the Construction phase – The Newfoundland and Labrador labour force has a strong interest in Project-related employment opportunities as a source of income, training and work experience	– The presence of a skilled construction labour force in Newfoundland and Labrador, with extensive recent experience related to major development projects in the province and elsewhere – Labour force competition from other projects both within the province and elsewhere, potentially resulting in insufficient labour supply to meet Project needs – The potential for / value of training to meet employment needs
How will Newfoundland and Labrador businesses be affected by / benefit from the Construction, and Operations and Maintenance of the Project?	– The Project will generate substantial business opportunities related to the supply of goods and services, particularly during the Construction phase – Newfoundland and Labrador companies can benefit from Project-related business opportunities, with associated business growth and development	– The capability and capacity of Newfoundland and Labrador businesses to provide required goods and services, and bid competitively

16.4.3.2 Key Indicators and Measurable Parameters

Various KIs and MPs were identified for this VEC to frame and focus the associated environmental effects analysis. The selection of these KIs and MPs was based on consideration of the various key elements of the VEC as well as the questions and issues that have been identified about associated Project effects, including job creation / income earning and revenue generating opportunities generated by the Project for the province generally (Economy), the provincial labour force (Employment) and the provincial business community (Business). Each KI has associated MPs, which represent aspects of the KI to which Project-related changes could be detected / measured. These include consideration of direct, indirect and induced effects (Table 16.4.3-2).

Table 16.4.3-2 Key Indicators and Associated Measurable Parameters: Economy, Employment and Business

Key Indicator	Rationale for Key Indicator[(a)]	Measurable Parameter[(b)]	Rationale for Measurable Parameter
Economy	– The state of the economy is important to and valued by society, and a key contributor to the overall well-being of a population – Assessing changes to the economy as a consequence of the Project is indicative of potential changes in economic and social well-being	– Income levels in Newfoundland and Labrador – Annual tax revenues (These may be affected by the Project through direct[(c)], indirect[(d)] and / or induced[(e)] effects)	– Standard units, measurable from Project costs / expenditure data
Employment	– Employment is valued for, among other things, the income earning opportunities and associated economic and social benefits that it brings – Assessing changes in employment as a consequence of the Project is indicative of potential changes in economic and social well-being	– Employment levels in Newfoundland and Labrador (These may be affected by the Project through direct[(c)], indirect[(d)] and / or induced[(e)] effects)	– Standard unit, measurable from Project employment data
Business	– Business activity creates wealth and employment and is a major contributor to the economic health of a region – Assessing changes to the level of business activity as a consequence of the Project is an indicator of potential changes to the health and strength of the economy	– Business activity levels and revenues in Newfoundland and Labrador (These may be affected by the Project through direct[(c)], indirect[(d)] and / or induced[(e)] effects)	– Standard units, measurable from Project costs / expenditure data

(a) Key Indicator: An aspect or characteristic of the VEC and / or its environment, which, if changed as a result of the Project, may result in an effect on the VEC.

(b) Measurable Parameter: An environmental characteristic that is related to the status of a KI. Project effects on a MP can be detected and measured.

(c) Direct effects: Result from the direct hire of persons, and include employment and labour income effects.

(d) Indirect effects: Result from the supply of goods and services, and are measured in terms of employment, labour income and business income.

(e) Induced effects: Result from the expenditures of money in the economy by those employed directly or indirectly on the Project, and are measured in terms of employment, labour income and business income.

16.4.3.3 Potential Project-Economy, Employment and Business Interactions

Potential interactions between Project components / activities (phases) and the KIs for the Economy, Employment and Business VEC are identified in Table 16.4.3-3. Both the Construction and the Operations and Maintenance phases of the Project will involve activities and expenditures that will:

- have direct, indirect and induced income and tax revenue effects on the Economy;
- require workers that will generate direct, indirect and induced effects on Employment; and
- generate effects on Business as a result of Project expenditures.

Table 16.4.3-3 Potential Project Interactions: Economy, Employment and Business

Project Phase / Activity	Key Indicator		
	Economy	**Employment**	**Business**
Construction[(a)]	Project work and expenditures will result in the creation of employment and business income and government tax revenue (measured in Canadian dollars)	Project expenditures will result in direct, indirect and induced employment (measured in person years of employment)	Project expenditures will result in contracts with businesses to provide required goods and services (measured in Canadian dollars)
Operations and Maintenance[(b)]			

(a) Construction activities that could interact with the Economy, Employment and Business VEC include: construction of access trails and roads; movement and presence of personnel, equipment and materials; construction camps; marshalling yards and staging areas; ROW clearing and preparation; quarrying and borrowing; transmission tower assembly and installation; conductor installation; converter station site preparation and construction; preparation and construction of submarine cable landing sites (on-land works); construction and installation of submarine cables (marine works); electrode site preparation and installation; Island system upgrades; employment / presence of workers; contracting / expenditures; and system commissioning.

(b) Operations and Maintenance activities that could interact with the Economy, Employment and Business VEC include: maintenance of access trails and roads; presence and operation of the transmission system; routine line inspections and repairs; vegetation management; potential major system repairs; operation of the electrodes; employment / presence of workers; and contracting / expenditures.

16.4.4 Approach to the Environmental Effects Analysis

16.4.4.1 Analytical Methods

The environmental effects analysis for Economy, Employment and Business is based on similar approaches adopted for other project EAs and involves tracking expenditures through the economy and applying coefficients to estimate direct, indirect and induced effects on employment, incomes, gross domestic product (GDP) and taxation.

The primary source of information used in the analysis was Construction, and Operations and Maintenance labour force and cost estimates and cash flow forecasts (expenditures) developed by Nalcor for the Project (see Chapter 3, Project Description).

The results of this analysis should be considered illustrative rather than definitive. The labour and cost estimates used in the assessment, while appropriate and typical for the current stage of Project design and planning, will be subject to continued refinement and increasing precision as Project engineering and other work progress. This is typical of any major development project at the EA stage, and can be considered to

provide a reasonable and illustrative assessment of the likely socioeconomic outcomes of the Project, at an appropriate scale of analysis for EA purposes.

The underlying concept is that socioeconomic effects flow through the economy from Project expenditures during each phase of activity. These effects are magnified as incomes earned by labour and businesses are re-spent throughout the economy.

Information on the composition of capital expenditures (capex) for each component of the Project during Construction and expenditures during Operations and Maintenance provides information for the estimates of direct income and employment effects in the province.

Indirect income and employment are estimated based on estimated capture rates that reflect the types of goods and services required and the likely (predicted) ability of Newfoundland and Labrador businesses to supply them. The discussion of optimization strategies (i.e., approaches to maximizing business and employment benefits to the province) is based on Nalcor's benefits philosophy and approaches to benefits planning (see discussion below and GNL 2010, internet site).

Induced income and employment effects are estimated by applying an income multiplier appropriate to the province. This income multiplier reflects estimates of how much of the income that people receive is actually spent, how much of that income goes to government through taxation, and how much of the income spent in the community is on imported goods and services.

Project expenditures allow for an estimation of the effects of the Project on provincial incomes, employment and government revenues. However, there are no comparable data upon which to base detailed projections for Project-related business effects. Which companies will secure contracts to supply services, materials or equipment to the Project will be determined through a competitive bidding process (see Section 16.4.5.1), the outcome of which cannot be known or even meaningfully predicted at this time. The focus of this section is thus on the effects management process that will be in place to optimize the potential for business benefits to accrue to the province.

The actual effects on each of the Economy, Employment and Business KIs will be addressed by Nalcor through its adaptive management process, as outlined in Section 16.4.10.

16.4.4.2 Environmental Effects Descriptors

The potential effects of Project activities on the various aspects of the Economy, Employment and Business VEC are presented in terms of a set of descriptors and summarized in Table 16.4.4-1.

Project effects on the Economy, Employment and Business VEC and its associated KIs will likely occur continuously throughout the Construction, and Operations and Maintenance phases once they begin, therefore, "frequency" does not help to describe or characterize such effects. The amount / level of effect varies between and during Construction, and Operations and Maintenance, and is captured in Sections 16.4.5 and 16.4.6. The level of confidence for the effects predictions is indicated for each.

Table 16.4.4-1 Effects Descriptors: Economy, Employment and Business

Effects Descriptor	Definition
Direction	
Adverse	Effect is negative and undesirable
Neutral	Effect is neither adverse nor beneficial
Beneficial	Effect is positive and desirable
Magnitude	
No Detectable Effect	Project does not change existing socioeconomic (baseline) conditions for the parameter, or any effect is within the normal range of variability / trends for the parameter
Reduction	Effect results in a detectable overall reduction in the existing value of the parameter
Increase	Effect results in a detectable overall increase in the existing value of the parameter
Geographic Extent	
Local	Effect is evident within the region(s) where the associated Project activities occur
Regional	Effect is evident throughout Newfoundland and Labrador
Beyond regional	Effect is evident elsewhere in Canada and / or internationally
Duration	
Short-term	Effect will be evident for less than one year
Medium-term	Effect will be evident for between one and four years
Long-term	Effect will be evident for from four to ten years
Far future	Effect will be evident throughout the life of the Project

16.4.5 Construction

16.4.5.1 Overview of Project Construction and Associated Effects Management

The Economy, Employment and Business VEC and its KIs focus on Project expenditures on labour, goods and services and equipment associated with any of the Project components / activities and the degree to which they can and will likely be provided by Newfoundland and Labrador individuals and companies.

The Project's socioeconomic benefits can be optimized if the residents and firms of the province take advantage of the employment and business opportunities that arise. The more people and businesses that are involved in these opportunities, the greater the revenues to government from personal, corporate and other types of tax, which, when reinvested in the province, benefits the overall population.

In July 2010 the GNL announced a Benefits Strategy that will apply to both the Labrador-Island Transmission Link and the Lower Churchill Hydroelectric Generation Project to help enhance the potential for, and degree of, such socioeconomic benefits (Nalcor 2010, internet site; NLDNR 2010, internet site). The Benefits Strategy outlines the work to be performed in the province for the benefit of provincial businesses and workers, as well as the principles and procedures to be followed by Nalcor and its contractors and sub-contractors regarding employment, business activities and benefits. It is also intended to assist with the development and implementation of Gender Equity and Diversity programs during all phases of the projects. Additional information on the Benefits Strategy was provided in Chapter 2, Project Rationale and Planning, with specific and relevant details also described in the sections that follow.

Economic benefits specific to the Project include requirements for at least one million person-hours of engineering and Project management employment, and 2.5 million person-hours of construction employment in the province. Project management activities will be executed within the province, with the appropriate site management offices set up in Labrador and other areas of the province as required. Local contractors, service

providers, consultants and suppliers will be made aware of business opportunities associated with the Project and these groups will have full and fair access to participate on a competitive basis for such opportunities as outlined by the Benefits Strategy.

Although Nalcor will make efforts to optimize economic, employment and business opportunities to Newfoundland and Labrador workers and companies, there will inevitably be some economic leakages to other areas of Canada and beyond. Some of the required materials, equipment and specialized labour will have to come from manufacturers, suppliers and sources outside the province and country.

As an example, there are no steel producers in Newfoundland and Labrador, and the quantity of steel required for the transmission towers is expected to be well beyond the capacity of Canadian steel producers; some or all of the supply of tower material is likely to be contracted to an international supplier(s). With respect to employment, there are some specialized trades, such as line installers, of which there are insufficient skilled workers in Newfoundland and Labrador, and possibly Canada, to meet Project needs. The manufacture and installation of the Strait of Belle Isle submarine cables are highly specialized activities and the contract to perform this work likely will be awarded to an international company with the appropriate equipment and experience, as there are no subsea cable suppliers in Canada. Notwithstanding these types of economic leakages, the potential income, employment and business benefits to Newfoundland and Labrador are expected to be substantial, as illustrated below.

Project-related employment within the province will be influenced by ongoing changes in the construction labour supply environment, which is characterized by an aging workforce, an increase in the number of those retiring, and a shrinking pool of potential new entrants in Newfoundland and Labrador and in Canada. This issue is further discussed as part of the effects management strategies for employment (below). In addition, labour issues may be compounded by concurrent and competing projects both within the province and elsewhere in Canada. These and other aspects of the cumulative effects of multiple projects on this VEC are further discussed in Section 16.4.9.

Effects Management Measures: Employment

Under the Benefits Strategy (Nalcor 2010, internet site), a construction hiring protocol will be established for Project Construction. This protocol will be consistent with the Canadian Charter of Human Rights and Freedoms, as well as any associated terms and conditions of governmental approvals for the Project. Nalcor will implement commitments made in any executed Impacts and Benefits Agreement (IBA) (GNL 2010, internet site), followed by first consideration for employment of qualified Newfoundland and Labrador residents, considering the gender equity and diversity provisions discussed below. Any collective agreements entered into by Nalcor or its primary contractors will contain provisions consistent with this protocol.

Prior to Project sanction, Nalcor will consult with relevant stakeholder organizations and provincial departments and agencies to develop and implement a Gender Equity Program and a Diversity Program for the Project. The objectives of these programs will be to optimize employment equity for the Project, including access to employment opportunities for and employment of qualified women and qualified members of disadvantaged groups, with an emphasis on continuous improvement. These programs will implement proactive programs and practices that contribute to the creation of an inclusive work environment and corporate culture, and will promote accountability and responsibility for equity.

The Gender Equity Program will include a Women's Employment Plan (WEP) and Business Access Strategy, which will have goals for the employment of women in Project Construction, and Operations and Maintenance. Nalcor will initially establish these targets by considering the availability of women in particular occupational categories as identified by Statistics Canada in its Employment Equity Data Report (HRSDC 2006, internet site). The WEP will include programs and processes to facilitate employment and participation for women in both phases of the Project, and at all facilities, sites and offices in the province where Project work is performed by Nalcor and its primary contractors. Specific provisions for the WEP are outlined in the Benefits Strategy prepared for the Lower Churchill Hydroelectric Generation Project (Nalcor 2010, internet site).

The Diversity Program will include a business access strategy for disadvantaged groups (Diversity Plan) in which Nalcor will establish specific goals. The Diversity Plan will institute ongoing programs and processes to facilitate employment and participation for disadvantaged groups in both phases of the Project, and at all facilities, sites and offices in the province where Project work performed by Nalcor and primary contractors is taking place. Specific aspects of the Diversity Plan are also outlined in the Benefits Strategy prepared for the Lower Churchill Hydroelectric Generation Project (GNL 2010, internet site).

Nalcor understands that training is an important component of the commitments identified above. Project training requirements will cover a broad spectrum, including health and safety requirements, work place protocols and skills development programs. Nalcor has worked and will continue to work with governments, Aboriginal groups, women's organizations, training institutions and labour organizations to discuss Project labour requirements, identify existing or anticipated gaps in the labour supply pool, and will explore and discuss potential approaches to address gaps.

As part of its strategy to address labour supply concerns, NLH (now Nalcor) was a participant in the Newfoundland and Labrador Skills Task Force, which was established by the provincial government in March 2006. The Skills Task Force is mandated to advise government about future skills requirements (labour supply and demand by occupation), particularly those associated with large-scale development projects, and to assess the within-province ability to respond to these needs. The Skills Task Force was also asked to identify and develop strategies for an appropriate and responsive training, education and support system to meet these demands. The report and associated recommendations were submitted to government in March 2007 (Skills Task Force 2007, internet site).

Nalcor participates in an informal working group with a number of relevant government departments on an ongoing basis. The group facilitates dialogue, and cooperates in identifying issues and planning to meet the Project's labour force requirements. The working group facilitates ongoing discussions and information sharing regarding the anticipated occupational requirements of the Project, as well as measures to train, recruit and retain workers.

As part of the hiring and training process, Nalcor has developed resource demand profiles at the National Occupation Classification (NOC) level. These data will be made available to appropriate stakeholders to help identify labour supply gaps so that government agencies and organizations can also take the appropriate action.

Nalcor is committed to:

- Encouraging pre-construction training initiatives to enable people in the province to participate fully in the Project.
- Working with successful contractors to provide adequate workplace training for employees. This training will include health and safety, cultural awareness, gender sensitivity, environmental awareness and respectful workplace programs, as well as specialized skills training.
- Working with contractors who have the responsibility to develop and implement apprenticeship programs for the Project.
- Working with training institutions and government agencies throughout the province to offer technical advice and expertise where appropriate and to assist in coordinating training for Project-related work with relevant stakeholders.

Nalcor will also engage employees and potential employees through a variety of programs and practices including:

- Maintaining a work environment that facilitates the achievement of their career goals and provides the training and support they need to meet Nalcor's business objectives.
- Encouraging employed journeypersons to participate in post-journeyperson training.

- Supporting initiatives to increase the number of women who have the skills required to support the Project, including supporting post-secondary education institution efforts that encourage the participation of women in trades and other occupations required by the Project.
- Providing or encouraging contractors and sub-contractors to provide on-the-job-training opportunities for qualified participants during the Construction phase of the Project.
- Communicating with school staff and students about career options, participating in career fairs and supporting training efforts.
- Contributing to and participating in activities and initiatives designed to help students become aware of and interested in the skilled trades in general, as well as upcoming Project employment opportunities, and associated training opportunities and requirements. This will include participating in career fairs and career counselling activities in schools, publicizing successful trades role models from the local area and encouraging and facilitating a mentorship program.
- Contributing to student achievement awards and providing summer student employment opportunities and work-term placement opportunities on the Project.
- Nalcor and Innu Nation have agreed to co-operate in the development of a specific Innu Training Plan to encourage and assist Innu to participate in and become qualified for employment on the Project. This will include training programs to assist Innu to become qualified for applicable employment opportunities prior to the commencement of the Construction phase, and will be undertaken in consultation with appropriate government departments and educational institutions.

The provincial and federal governments, along with Labrador's three Aboriginal groups and Nalcor, are contributing $30 million towards increasing employment opportunities for Labrador's Aboriginal people who wish to get involved in the region's major development projects.

The successful partnership has led to the formation of the Labrador Aboriginal Training Partnership (LATP), an incorporated, not-for-profit organization. The LATP is overseeing a comprehensive training-to-employment plan that will help prepare members of Labrador's Innu Nation, the Nunatsiavut Government and NunatuKavut for employment opportunities in resource development throughout Labrador, including the Project.

Nalcor will support employees through:

- Access to an Employee Assistance Program (EAP), which will provide counselling for employees and their families who are experiencing problems in their work or personal lives. EAP services will be available for such issues as depression, loneliness, interpersonal relationships, stress, anxiety, financial problems and money management. Employees will also be informed about and referred to other relevant social and community services as required.
- Establishment of a workplace committee that serves as a discussion forum to identify and discuss perceived or potential workplace issues and make recommendations to Nalcor and its contractors on any requirements and measures for improvement.

Effects Management Measures: Business

Nalcor is committed to optimizing Project benefits and communicating with the business community regarding procurement opportunities. This includes commitments made in the Project's Benefits Strategy with the Government of Newfoundland and Labrador, and in the Lower Churchill Innu Impacts and Benefits Agreement with Innu Nation.

On a competitive basis, Nalcor will give full and fair opportunity to provincial suppliers and contractors who wish to participate in the supply of goods and services to the Project. These opportunities will include direct supply relationships with Nalcor, and relationships with the Project's main contractors and suppliers.

To communicate these opportunities, Nalcor has conducted supplier information sessions, one-on-one meetings with suppliers, participated at trade shows, and presented at numerous chamber of commerce, board of trade, regional economic development board, rotary club, municipal and professional association functions. A complete list of these engagements is provided in Chapter 8. The Nalcor Energy-Lower Churchill Project website also provides information on the procurement process, including vender registration questionnaire, information sheets, Powerpoint presentations, and contact information for members of the procurement team. The same information applies to this Project.

Contracts for the provision of goods and services for the Project will be awarded through a competitive bidding process. The procurement and contracting philosophy for the Project will provide for full and fair opportunity for all suppliers. Goods and services will be acquired on a Best Value basis, which is defined as a blend of total cost, quality, technical suitability, creditworthiness, delivery and continuity of supply and services

Newfoundland and Labrador content and benefits, as well as technical and commercial considerations, will be selection factors in evaluating bids and awarding Project contracts. Bid evaluations will be structured on a case-by-case basis to meet specific contract requirements, and the weighing of criteria may therefore vary accordingly.

Nalcor is committed to investigating the capabilities of businesses in communities near the Project, and information on the scope of the Project will be disseminated as details are developed (Nalcor / Labrador North Chamber of Commerce 2010, internet site). There will be open communication with all persons and companies requesting non-proprietary information. Supplier information sessions will take place throughout the province.

Nalcor is committed to sustained communication with the business community in Newfoundland and Labrador. Nalcor has a proactive approach to supplier engagement focused on ensuring businesses have up-to-date information and are Project-ready. Nalcor has been meeting with members of the local business community since 2009 to discuss their companies and capabilities to meet the needs of the Project.

Supplier information meetings in September and October 2009 provided the first opportunity for suppliers in the Happy Valley-Goose Bay region to talk one-on-one with a member of the Project procurement team. Nalcor's Supply Chain Lead met with 42 local suppliers to understand their capabilities and interests and to identify and discuss any joint ventures and partnerships they had formed. Further one-on-one supplier meetings were held during Expo Labrador in June 2010. In October 2011, more than 250 businesses attended Nalcor supplier information sessions in Happy Valley-Goose Bay, St. John's, Grand Falls-Windsor, Corner Brook, Flower's Cove and L'Anse au Loup. In addition to supplier information sessions, the Lower Churchill Project hosted 17 open houses across Newfoundland and Labrador from April to June 2011 (see Chapter 8). Project staff and information were available for people interested in learning more about the procurement process for the Project.

Where goods and services are not available locally on a competitive basis, successful companies will be encouraged to involve Newfoundland and Labrador-based firms. This collaboration would assist in the development of local companies, capacity and expertise and would transfer technology toward long-term opportunities.

Nalcor's Contracting and Purchasing policy for the Project requires that the Lower Churchill Project and its primary contractors:

- become familiar with Newfoundland and Labrador supplier capabilities;
- size and design bid packages, where appropriate, to fit the capabilities of Newfoundland and Labrador companies;
- communicate with Newfoundland and Labrador suppliers and manufacturers and, when requested, make reasonable efforts to guide them in qualifying for future bids and contracts;

- make the names and locations of key personnel available to potential suppliers and manufacturers involved in the bidding process, where appropriate; and
- request benefits information as part of the bid solicitation process in sufficient detail to assess the benefits to be derived from individual bids (a Bidders Benefit Questionnaire will be completed).

To further encourage dialogue on its Industrial Benefits Planning activities, a Business Opportunities Committee will be established during Project Construction. This committee will involve Nalcor, key Project contractors and representatives of the provincial business community. This forum for ongoing information sharing and discussion about upcoming Project requirements and contracting opportunities will enable Nalcor to explore means to help provincial businesses to plan effectively and pursue these opportunities.

Effects Management Measures: Labrador Innu Impacts and Benefits Agreement

In addition to the above-described measures and processes, Nalcor and Innu Nation have negotiated and concluded the Lower Churchill Innu IBA which pertains to both the Lower Churchill Hydroelectric Generation Project and the Labrador portion of the Labrador-Island Transmission Link (see Chapter 7).

The IBA is the outcome of several periods and processes of discussion and negotiation over 10 years between Innu Nation and Nalcor and its predecessors. On September 26, 2008, Innu Nation and the GNL announced the signing of the *Tshash Petapen Agreement* (which translates as the "New Dawn Agreement"), which resolved key issues relating to matters between the province and Innu Nation surrounding the Innu Rights Agreement, the Lower Churchill IBA and Innu redress for the Upper Churchill Hydroelectric development. On February 16, 2010, Innu Nation leaders and the GNL initialled an agreement that completed the outstanding issues associated with the New Dawn Agreement. The agreements, including the IBA, were subsequently ratified by a vote of the Innu Nation membership on June 30, 2011 and signed on November 18, 2011.

The IBA defines how the Labrador Innu will participate in and benefit from the Project. The specific nature and provisions of the IBA are, and will remain, confidential. The agreement does, however, include processes for continued consultation and cooperation throughout the planning, Construction, and Operations and Maintenance phases of the Project. The IBA also includes mechanisms intended to avoid or reduce potential adverse effects on Innu and Innu communities, and particularly relevant to this VEC, to create and enhance potential benefits of the Project. This includes processes and provisions related to Innu employment, training and business opportunities for the Labrador-components of the Project, workplace policies and conditions, and Innu commercial participation in the Project.

16.4.5.2 Existing Knowledge

The construction of electrical transmission systems is a common activity throughout North America and worldwide. The potential effects of transmission line construction on Economy, Employment and Business are, in many respects, similar to those which may be experienced with any large construction project, and particularly comparable with those of other large linear projects such as pipeline, road and railway construction.

There is, however, little available published "existing knowledge" which has evaluated and measured the known economic effects of similar projects and activities. Some key findings from a selection of recent literature that is available are summarized in Table 16.4.5-1.

Table 16.4.5-1 Existing Knowledge (Construction): Effects of Similar Projects on Economy, Employment and Business

Reference	Study / Project Context	Summary of Findings
Wagner (2010, internet site)	Employment and economic effects of transmission line construction in Montana	Concludes that in-state contracting generates 2.45 direct jobs/$million of capex and 4.70 total jobs, as compared with 1.20 direct and a total of 1.95 jobs/$million for out-of-state contractors.
North Star Economics (2009, internet site)	Report on the economic effect of transmission line construction in the United States of America Midwest	The authors demonstrate that the economic benefits per mile of transmission line construction included: – Direct economic effects of US$1.5 million – 11.6 (per mile) jobs generated / supported – Tax revenues of US$45,000 annually – A total economic effect of US$2.1 million.
Voisey's Bay Nickel Company Limited (2005)	Employment and economic effects of Voisey's Bay Mine / Mill Construction in Newfoundland and Labrador	– Between 2002 and 2005, more than 4,500 people supported construction of the mine and concentrator in Labrador, of which 92% were residents of the province. During 2005, expenditures in Newfoundland and Labrador totalled approximately $396 million or 80% of total expenditures.

16.4.5.3 Construction Effects: Economy

The economic outcomes of the Project will include direct, indirect and induced effects, which are generally defined as follows:

- *Direct effects* result from the direct hire of persons, and include employment and labour income effects;
- *Indirect effects* result from the supply of goods and services, and are measured in terms of employment, labour income and business income; and
- *Induced effects* result from the expenditures of money in the economy by those employed directly or indirectly on the Project, and are measured in terms of employment, labour income and business income.

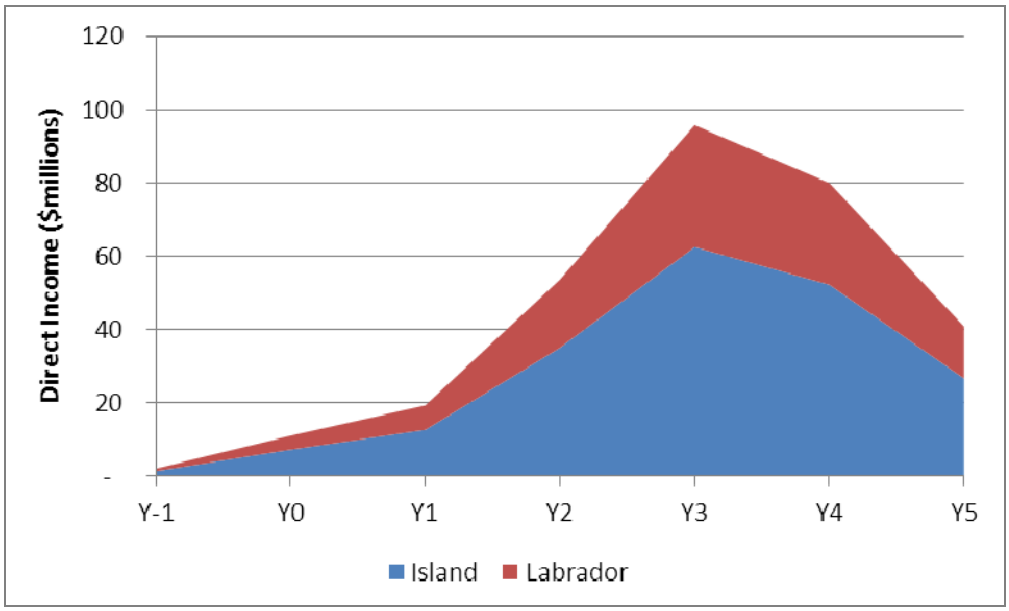
The predicted annual direct labour and business income effects are illustrated in Figure 16.4.5-1. Unless otherwise indicated, all estimates are in 2010 Canadian dollars.

The nature of Project requirements, particularly in terms of goods and materials, equipment and specialized services, makes it inevitable that a portion of the approximately $2.1 billion in total Project capital expenditures will be made outside of the province. Materials and services from outside the province will include several that comprise key and significant Project requirements, such as steel for the transmission towers, submarine cables, converter station equipment and other items, that cannot be sourced from within the province.

Based on previous analysis undertaken for Nalcor relative to economic impacts of transmission line construction, it was estimated that direct income in Newfoundland and Labrador accounts for 16.7% of total capital expenditures. As illustrated in Figure 16.4.5-1, total direct income generated in the province during the Project Construction period is estimated to be approximately $300 million, of which $95 million is expected in Year 3, the peak of Construction activity.

Of this total, approximately $195 million in direct income will be generated on the Island of Newfoundland and $105 million will occur in Labrador.

Figure 16.4.5-1 Annual Profile of Direct Project-related Income: Construction, Newfoundland and Labrador

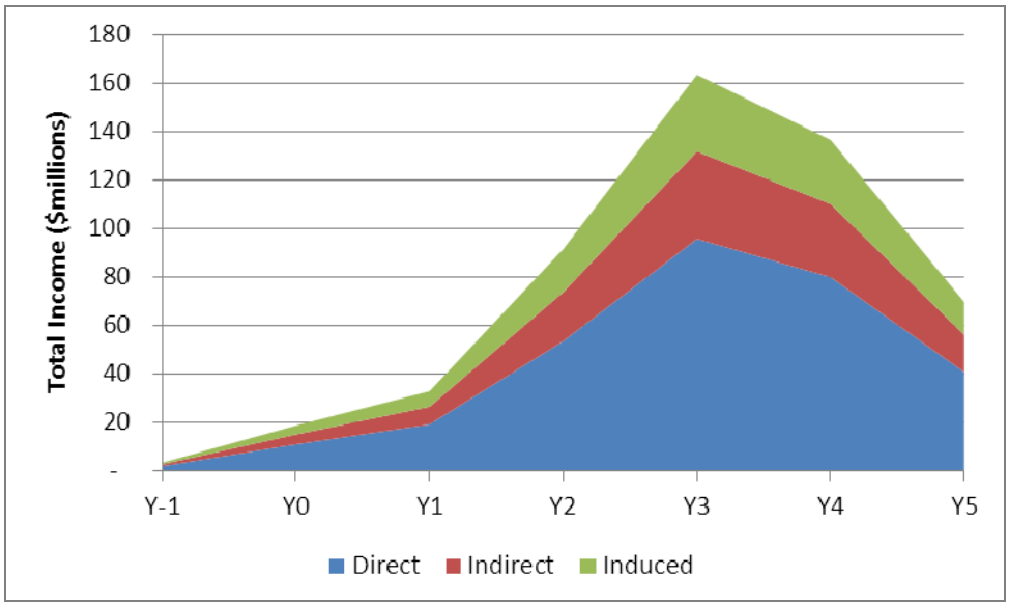


In addition to the above-described direct income effects of the Project, indirect and induced income will also be generated by Project expenditures.

The annual profile of total provincial Project-related income from direct, indirect and induced expenditures is illustrated in Figure 16.4.5-2. Total provincial income is estimated at approximately $520 million, peaking in Year 3 of Project Construction at approximately $160 million.

Approximately $385 million of the Project-related income will be generated on the Island of Newfoundland and $135 million will be generated in Labrador. Much of the difference between incomes generated on the Island and in Labrador is attributable to the differences in the size and complexity of the respective economies and the greater resulting leakage from the Labrador economy.

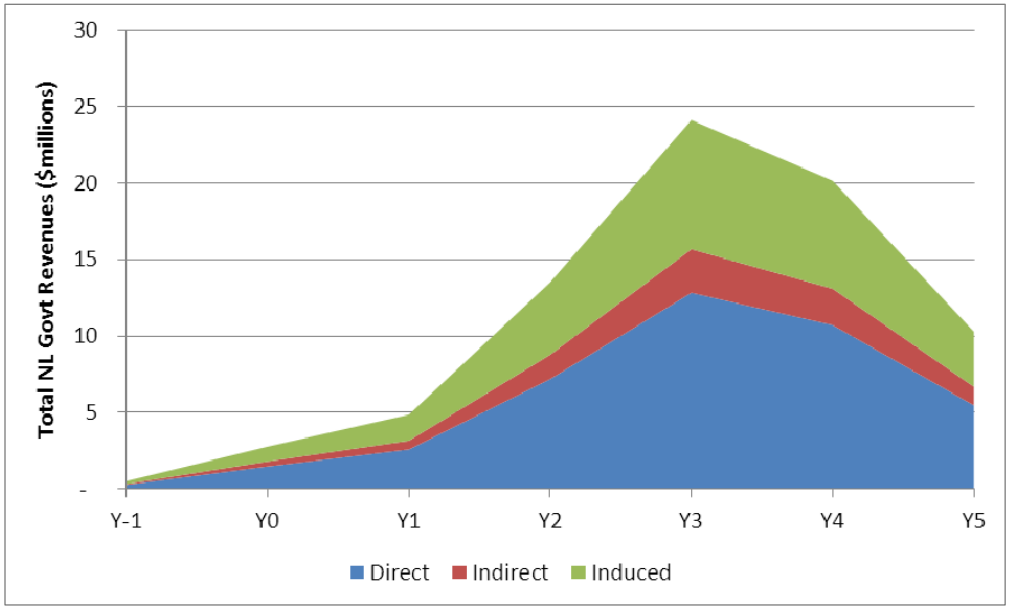
Figure 16.4.5-2 Annual Profile of Total Project-related Income: Construction, Newfoundland and Labrador



Government revenues during the Construction phase of the Project will be derived from direct income taxes, primarily those paid by workers, indirect taxes paid by the owners of companies supplying goods and services to the Project, and induced taxes that result from increased economic activity that can be traced to the incomes earned as a result of the Project.

The annual tax revenues generated from direct, indirect and induced Project incomes are illustrated in Figure 16.4.5-3. For the Project Construction phase, provincial government revenues will be approximately $76 million, peaking in Year 3 at $24 million.

Figure 16.4.5-3 Annual Profile of Project-related Government Tax Revenues: Construction, Newfoundland and Labrador



Summary of Likely Residual Environmental Effects

The likely residual effects of Project Construction on the Economy KI are as follows:

- Direction: Beneficial, because the Project will help to further strengthen the economy through its direct, indirect and induced labour and business income and government revenue generating effects.
- Magnitude: The Project will serve to increase total income levels to individuals and companies beyond existing levels by an estimated $520 million during Construction, with a peak of $160 million in Year 3 of the Project. The Project will also contribute an estimated $76 million in taxes and other revenues to government during this phase, with a peak of $24 million in Year 2 of the Project.
- Geographic Extent: Regional, because the effects of the Project will be experienced across the province. There will also be effects beyond the province (elsewhere in Canada and internationally).
- Duration: Medium-term, because these effects will occur throughout the Project's Construction phase.

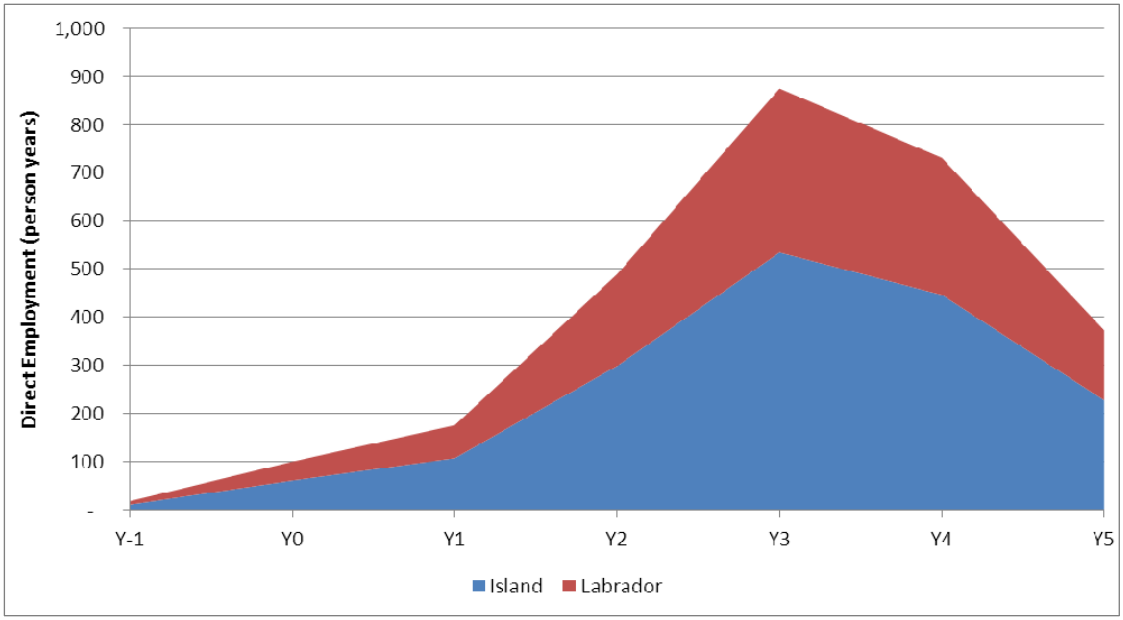
There is a high degree of confidence that the actual effects of Project Construction on the Economy KI will be as predicted because Project expenditures will result in the injection of a substantial level of new investment into the economy that in turn will result in new direct income and employment effects and further new, additional, indirect and induced income and revenue effects resulting from successive rounds of spending.

16.4.5.4 Construction Effects: Employment

A detailed overview of the estimated labour force requirements associated with Project Construction, and Operations and Maintenance was provided previously, in Chapter 3, Project Description.

Total direct employment during Project Construction is expected to be approximately 3,070 person-years (Figure 16.4.5-4). Of this total, approximately 2,760 is expected to occur in Newfoundland and Labrador, including 1,690 on the Island of Newfoundland and 1,080 in Labrador. Peak direct construction employment is expected in Year 3, with 540 person-years of work occurring on the Island and 340 person-years in Labrador.

Figure 16.4.5-4 Annual Profile of Project-related Direct Employment (Person-years): Construction, Newfoundland and Labrador



The main occupations required are listed in Table 16.4.5-2. These ten categories are estimated to account for nearly 70% of the required workforce during Project Construction (see Chapter 3, Project Description, Section 3.7 for additional information on the Project workforce, and Section 3.7.3 for additional details regarding labour demand by NOCCode).

Table 16.4.5-2 Main Occupations Required During Construction (in Descending Order of Estimated Requirements)

National Occupation Classification Code	Description
H611	Heavy Equipment Operators
H822	Construction Trades Labourers and Helpers
C031	Civil Engineers
C033	Electrical Engineers
H324	Ironworkers
J216	Mechanical Assemblers and Inspectors
A371	Construction Managers
H214	Electric Powerline and Cable Workers
C032	Mechanical Engineers
H017	Construction Supervisors (Heavy Equipment)

Labour in several of these and other categories may be in insufficient supply during peak Project Construction, as described below.

According to the Canadian Construction Sector Council (CSC), across the 2011 to 2019 scenario, overall Canadian labour requirements for residential and non-residential new construction will reach 111,000 workers – an increase of 12%. The CSC is a national industry-led organization that produces annual forecasts of the labour force requirements in each province and for Canada as a whole for the construction industry. While growth exceeds 20% for the non-residential workforce, these are not huge gains in comparison to the strength of the last decade. Demographic changes will drive requirements related to retirements and mortality to 208,000 workers – double the need resulting from new construction.

In terms of the supply response to the overall labour requirements of 320,000 workers for new construction, retirements and mortality across the 2011 to 2019 scenario, half of the total requirements are estimated to be met with 163,000 first-time new entrants to the workforce, leaving a net-in mobility requirement of 157,000 workers. This will necessitate expanded recruitment efforts to meet this demand for skilled workers.

For Newfoundland and Labrador, the CSC projects that shortages are expected, particularly in the 2012 to 2015 period, in key engineering and industrial trades including:

- boilermakers;
- non-residential construction managers;
- construction estimators;
- contractors and supervisors;
- crane operators;
- heavy equipment operators / mechanics;
- electricians;
- ironworkers;
- truck drivers; and
- welders.

To the extent that these trades will be required for the Project, there is a potential for labour shortages. The CSC's supply-side analysis (Canadian Construction Sector Council 2010, internet site) indicates that tight market conditions will require extensive labour mobility, with movement across trades, industries and provinces all being important. Addressing this problem also requires investment to expand and train the construction workforce, which remains a priority for the construction sector through such initiatives as:

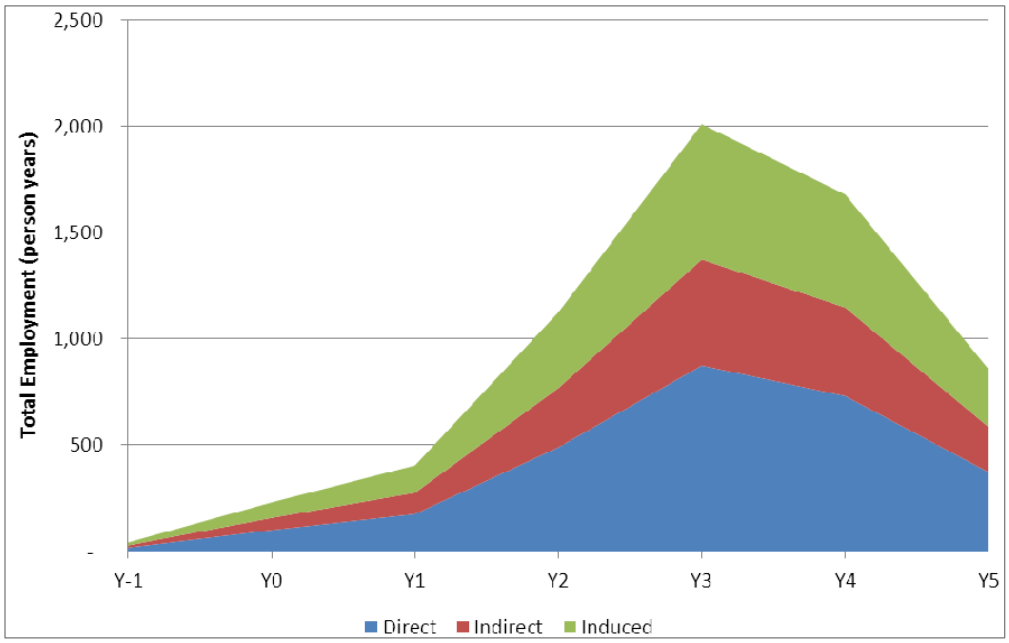
- apprenticeship, college, safety, supervisory skills and management programs;
- career promotions and events targeting all labour sources;
- promotion of inter-provincial labour mobility; and
- programs to integrate and train new Canadians entering construction (Canadian Construction Sector Council 2010, internet site).

Nalcor will make efforts to hire qualified people from within the province and encourage training for residents of Newfoundland and Labrador in those occupational categories in which it is warranted and feasible.

In addition to the direct employment generated, indirect employment will be generated in those companies supplying goods and services to the Project and in other businesses throughout the economy as a consequence of expenditures by individuals and businesses directly or indirectly associated with Project Construction.

The total direct, indirect and induced employment in Newfoundland and Labrador is estimated at approximately 6,350 person-years during Project Construction (Figure 16.4.5-5). Peak employment is in Year 3 of Construction at approximately 2,000 person-years.

Figure 16.4.5-5 Annual Profile of Total Project-related Employment (Person-years): Construction, Newfoundland and Labrador



Summary of Likely Residual Environmental Effects

The likely residual effects of Project Construction on the Employment KI are as follows:

- Direction: Project Construction effects will be beneficial, because the Project will help to further strengthen the economy through its direct, indirect and induced employment effects, which has the potential to improve the quality of life of those employed through income earning, training and work experience opportunities and to reduce unemployment / under-employment levels within the province.
- Magnitude: The Project will serve to increase current overall levels of employment within the province, adding an estimated total of 6,350 person-years of employment during Project Construction, with a peak of 2,000 person-years in Year 3.
- Geographic Extent: Regional, because the effects of the Project will be experienced across the province. There will also be effects beyond the province.
- Duration: Medium-term, because these effects will occur throughout the Project Construction phase.

There is a high degree of confidence that the actual effects of Project Construction on the Employment KI will be as predicted because Project expenditures will result in the injection of a substantial level of new investment into the economy that in turn will result in new direct employment and further new, additional, indirect and induced employment resulting from successive rounds of spending.

16.4.5.5 Construction Effects: Business

Of the total Project cost of approximately $2.1 billion, an estimated 60 to 70% will be spent on goods, materials, permanent equipment, services and construction equipment. Newfoundland and Labrador

businesses will have full and fair opportunity to provide supplies and services to the Project. Some of the key supplies and services required during Project Construction include, for example:

- accommodation and lodging;
- aggregate supply (for cable protection in the Strait of Belle Isle);
- catering;
- communications network services;
- construction quarry material;
- fire and emergency response services;
- freight forwarding and transport;
- ground and air transportation;
- health and medical services;
- helicopter charters;
- land acquisition services;
- machinery and equipment services (including tires);
- marine observers / consultants;
- port facilities;
- ROV supply and operation;
- ROW clearing;
- security services;
- snow clearing and road maintenance;
- supply and erection of structural steel;
- supply of bulk fuels, lubes and grease;
- supply of construction consumables, tools and temporary power supply;
- supply of lumber and formwork;
- supply of specialty construction equipment;
- supply of Portland cement and rebar;
- survey and mapping services;
- vehicle rentals and maintenance;
- warehouse and marshalling yard management;
- waste and garbage disposal;
- weather and ice forecasting services; and
- wire fence supply and erection.

The type and magnitude of effects of the Project on Business will be a function of the degree to which companies in the province secure contracts to provide materials, services and equipment to the Project. As noted earlier, goods and services will be acquired on a Best Value basis, and the procurement and contracting

philosophy for the Project will provide for full and fair opportunity for all suppliers. Previous experience with other large-scale projects in the province indicates that businesses in Newfoundland and Labrador have the capability to provide many of the key goods and services listed above.

However, businesses in the province, or even Canada, will not be able to provide some of these requirements. For example, in terms of commodities required, specialized electrical equipment, structural steel, conductors and insulators represent a significant amount of the overall capital costs. Most of these items will not be available from either Newfoundland and Labrador or Canada and the nature, scale and duration of demand associated with the Project is such that this supply picture will not change. There will, however, be opportunities for local companies that act as agents, distributors or stockists for the manufacturers, and from transportation, installation, commissioning and maintenance activities related to these commodities.

The provision of required services for the Project is expected to follow the same pattern. Companies in the province will have the opportunity to provide such services as accommodations, catering, freight forwarding or security. However, large-scale and specialist services such as transmission tower installation and subsea cable installation, may require non-local resources either because such service providers do not exist within the province or because local service providers do not have the capacity to undertake all the work involved.

Given the nature and extensive geographic scale of the proposed Project, Project activity will be spread across much of the province, helping to enhance the potential for local enterprises to participate in Project Construction activities, especially where local capabilities and capacities are aligned with Project needs. Geographic proximity plays a key role in service provision and competitiveness. Local business opportunities will be enhanced through the application of the Benefits Strategy and Nalcor's contracting policies and practices, as described above.

Business opportunities arising from the Project will be beneficial to firms across the province because of the associated income earning, potential expansion and development opportunities and experience-related effects. Some companies may, however, be adversely affected if skilled and experienced workers are lost to the Project and if replacement personnel are difficult to find. Similarly, companies may be adversely affected if competition for labour results in wage inflation, which reduces their competitive capability. While workers will benefit from increased demand for their labour, labour shortages and increased costs could adversely affect the type, cost and quality of some services provided by employers in both the corporate and government sectors, thereby reducing the overall benefits that the Project could bring to the business sector and the provincial economy in general.

In the recent past the economy of Newfoundland and Labrador has been based on the development of, and worker participation in, large-scale projects such as Hibernia and the Trans-Labrador Highway. This Project will require and use a range of skilled trades and other occupations, likely drawing upon a provincial labour force and business community that is increasingly experienced with and involved in large-scale projects.

Overall, therefore, the Project will provide substantial and positive opportunities for the Newfoundland and Labrador business community.

Summary of Likely Residual Environmental Effects

The likely residual effects of Project Construction on the Business KI are as follows:

- Direction: Project effects will be beneficial, because the Project will help to further strengthen the economy through its business revenue generation, as well as increased growth and experience for provincial businesses;
- Magnitude: Some 60-70% of the $2.1 billion in total Project expenditures will be spent on goods, materials, equipment and services. Project contracts for these items will be awarded on a competitive bidding basis. As such, the specific value of Project-related business effects cannot be estimated at this time. However, given local business capabilities and experience with many of the goods and services that will be required during Project Construction, the Project is expected to lead to an increase in revenues from existing levels

for provincial businesses. The magnitude of these benefits will be enhanced by the consideration of Newfoundland and Labrador content in the evaluation of bids, but will be primarily dependent upon the ability of provincial companies to bid for and provide the required goods and services on a competitive basis;

- Geographic Extent: Regional, because the economic effects of the Project will be experienced throughout Newfoundland and Labrador within the regions that see Project-related activity. There will also be effects beyond the province.
- Duration: Medium-term, because these effects will occur throughout the Project Construction phase.

There is a high degree of confidence that the actual effects of Project Construction on the Business KI will be as predicted because Project expenditures will result in the injection of a substantial level of new investment into the provincial economy that will result in new business opportunities to directly supply labour, materials, goods and services. In addition, there will be indirect and induced business opportunities generated from successive rounds of spending.

16.4.5.6 Construction Effects: Summary

Accidents and malfunctions could occur during Construction, as discussed in Chapter 5. The effects of the low-risk incidents (e.g., small brush fire, motor vehicle collisions or waste spill) on Economy, Employment and Business are likely to be positive, by creating emergency response, repair and clean-up work for companies and their workers. These effects may be local or, to the degree that specialist resources are required, provincial or even national. They will result in some indirect and induced positive effects.

Overall, the Project will result in benefits for the Newfoundland and Labrador economy, including direct, indirect and induced economic effects through the substantial employment and business opportunities that will be generated throughout the Project Construction phase.

Although it is inevitable that some required goods and services will have to be sourced from outside the province, the nature of the Project and its requirements, along with the employment and procurement initiatives and measures outlined above, including the Benefits Strategy, will help to optimize benefits to Newfoundland and Labrador workers and businesses, and thus to the overall provincial tax base.

16.4.6 Operations and Maintenance

16.4.6.1 Overview of Project Operations and Maintenance and Associated Effects Management

Once Project Construction is completed, and following Project commissioning, the Project will be operated on a continuous basis. Project maintenance activities will include regular inspection of all Project components, repair of the system as required, and vegetation management along the ROW (Chapter 3).

The transmission lines will be 100% inspected each year. The inspections for the on-land portions of the lines will be completed from the air (fixed-wing aircraft or helicopter) or from the ground (ATVs during summer or snowmobiles in the winter). A further 10% to 20% of the transmission line will be inspected via climbing inspections on a yearly basis by Nalcor personnel. The submarine cables and electrodes will be inspected through ROV surveys and / or appropriate relevant means. Vegetation management will commence eight years after Project Construction is completed and will be conducted every seven years thereafter during the Project Operations and Maintenance phase. Activities associated with the operation of the HVdc system will be integrated into Nalcor's existing inspection and maintenance program.

The Project will be operated indefinitely, and decommissioning is not contemplated at this time. Should decommissioning activities eventually be considered for all or part of the HVdc system, these will be planned and conducted in accordance with the relevant standards and regulatory requirements in place at that time.

Compared to the activities and economic effects associated with the Construction phase of the Project, those associated with Operations and Maintenance are likely to be relatively small, particularly when considered on an annual basis. Over the life of the Project, however, total expenditures, employment and business contracts will be considerable. Nalcor will adopt similar hiring and business contract protocols during the Operations and Maintenance phase as for Construction.

The following sections assess the effects of Project Operations and Maintenance on Economy, Employment and Business, with a focus on the activities outlined above. This VEC does not assess the likely economic benefits that will be associated with the operation of the transmission system, particularly with regard to revenue generation or other such economic outcomes, as these are outlined as part of the overall need, purpose and rationale for the Project (Chapter 2, Project Rationale and Planning).

16.4.6.2 Existing Knowledge

As discussed previously, the Construction, and Operations and Maintenance of electrical transmission systems is common throughout North America and worldwide. However, there is little available published "existing knowledge" which has measured and evaluated the actual economic effects and benefits of similar projects and their operation, likely because of the relatively minor nature and degree of such activities from an economic perspective.

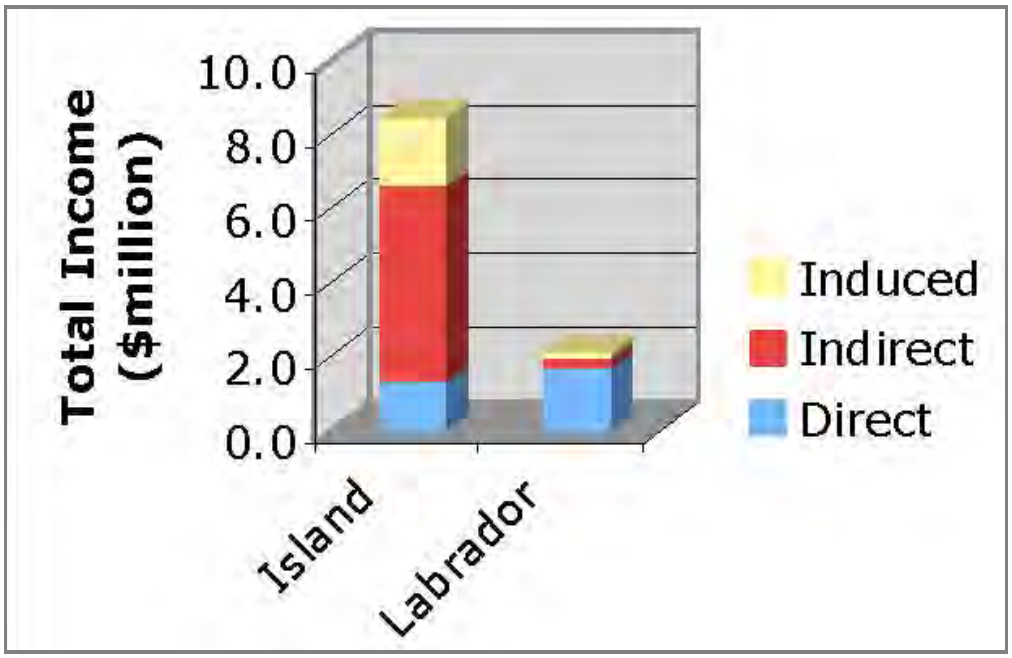
Operations and Maintenance activities for the Project will be integrated into the overall operations and maintenance programs currently undertaken by Nalcor within the province. As such, this assessment considers the knowledge and experience of Nalcor personnel in operating and maintaining transmission lines and associated components throughout the province.

16.4.6.3 Operations and Maintenance Effects: Economy

As with Project Construction, Project Operations and Maintenance will generate labour and business income and government revenue effects. The annual Project-related effects are relatively small compared to those from Construction, but they will continue for the life of the Project. To illustrate the likely effects of Project Operations and Maintenance on Economy, the Project-related income and government revenues are estimated for a typical year.

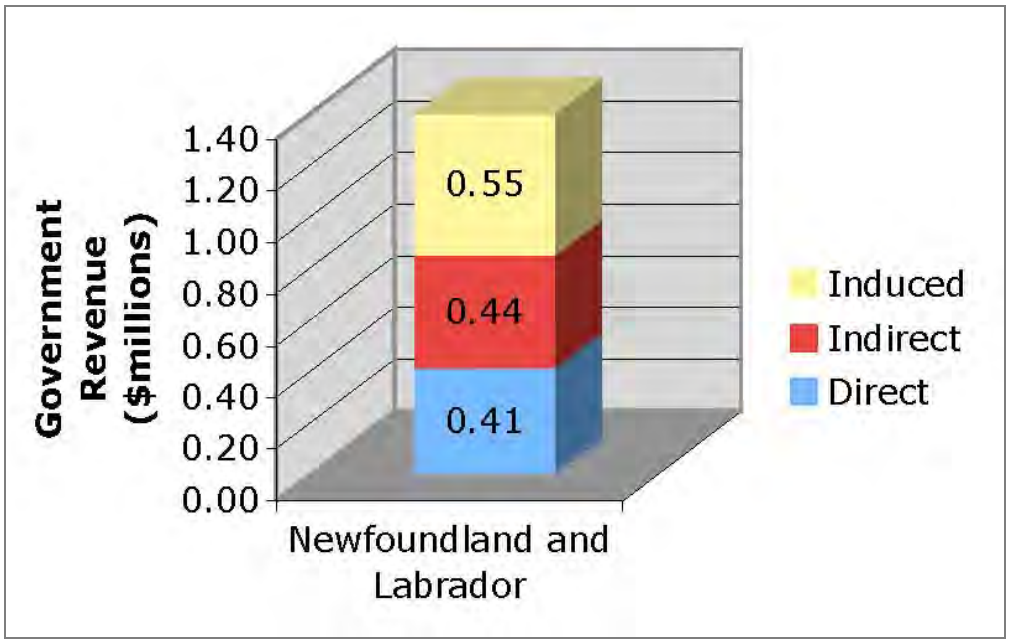
Total annual Operations and Maintenance expenditures in a typical year are estimated to be approximately $18 million. Direct, indirect and induced income effects in Newfoundland and Labrador as a result of these expenditures will generate total income of approximately $10.6 million in a typical year (Figure 16.4.6-1). While direct incomes generated on the Island of Newfoundland and in Labrador are generally comparable, as discussed earlier, more of the indirect and induced income will likely be generated on the Island because of its larger and relatively more diverse economy.

Figure 16.4.6-1 Total Project-related Income: Operations and Maintenance, Typical Year, Newfoundland and Labrador



Projected revenues to government from Project Operations and Maintenance activities are shown in Figure 16.4.6-2. In a typical year, government revenues are anticipated to be approximately $1.4 million, generated from personal income taxes, corporate income taxes, payroll taxes and Harmonized Sales Tax (HST), directly, indirectly or from induced individual or business incomes, which stem from direct, indirect and induced incomes.

Figure 16.4.6-2 Government Revenues: Operations and Maintenance, Typical Year, Newfoundland and Labrador



Summary of Likely Residual Environmental Effects

The likely residual effects of Project Operations and Maintenance on the Economy KI are as follows:

- Direction: Project effects will be beneficial because the Project will help to further strengthen the economy through its direct, indirect and induced labour and business income and government revenue generating effect.
- Magnitude: The Project will serve to increase pre-Project labour and business incomes beyond existing levels by approximately $10.6 million in a typical year and government revenues by an estimated $1.4 million annually.
- Geographic Extent: Regional, because the effects of the Project will be experienced across the province. In some cases there will be effects beyond the province.
- Duration: Far future, as these effects will occur throughout the Project's Operations and Maintenance phase.

There is a high degree of confidence that the actual effects of Project Operations and Maintenance on the Economy KI will be as predicted because Project expenditures will result in the injection of an ongoing investment into the economy that in turn will result in new direct income and employment effects and further new, additional, indirect and induced income and revenue effects resulting from successive rounds of spending.

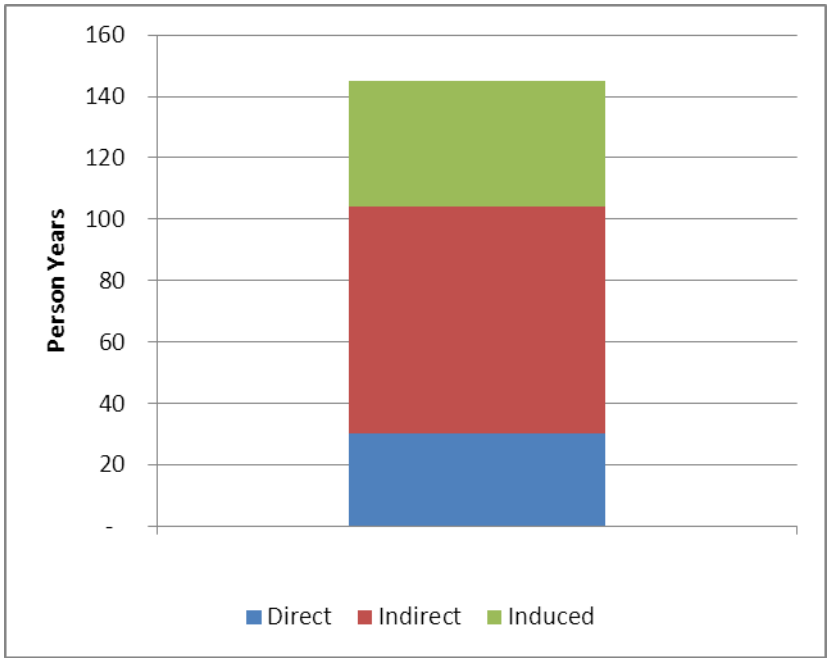
16.4.6.4 Operations and Maintenance Effects: Employment

During a typical year, total employment generated during Operations and Maintenance is estimated at 145 person-years as illustrated in Figure 16.4.6-3. In addition to direct employment of 30 person-years, an estimated 74 person-years of indirect and 41 person-years of induced employment will be generated. Of this, 12 person-years of direct employment will be in Labrador, but only a relatively small proportion (7 person-years) of indirect and induced employment will be generated in Labrador.

A range of administrative, supervisory and technical skills will be required for Project Operations and Maintenance, with many of these positions being of the same general type as those currently required in the operations and maintenance of other Nalcor transmission facilities.

The occupational categories requiring the largest numbers of workers are line-persons and electricians / electrical maintenance personnel.

Figure 16.4.6-3 Total Employment (Person-years): Operations and Maintenance, Typical Year, Newfoundland and Labrador



Nalcor's hiring and training policies described in Section 16.4.5 will apply to the Operations and Maintenance of the Project. The number of personnel required for Project Operations and Maintenance is relatively small; however, the available lead-time and the long-term nature of the permanent positions will help facilitate local hiring and any associated training requirements.

Summary of Likely Residual Environmental Effects

The likely residual effects of Project Operations and Maintenance on the Employment KI are as follows:

- Direction: Project effects on employment will be beneficial as Operations and Maintenance will require that a number of permanent jobs are created, which will benefit those securing employment through, among other things, from the income earned, the security of long-term employment and the experience gained.
- Magnitude: The Project will serve to increase pre-Project annual existing levels of employment by a total of 145 person-years.
- Geographic Extent: Regional, because the effects of the Project will be experienced across the province. In some cases there will be effects beyond the province.
- Duration: Far future, as these effects will occur throughout the Project Operations and Maintenance phase.

There is a high degree of confidence that the actual effects of Project Operations and Maintenance on the Employment KI will be as predicted because Project expenditures will result in the injection of an ongoing investment into the economy that in turn will result in new direct employment effects and new indirect and induced employment resulting from successive rounds of spending.

16.4.6.5 Operations and Maintenance Effects: Business

Nalcor will undertake much of the Operations and Maintenance activities for the Project as part of its normal operations and maintenance programs. There will be opportunities for businesses within the province to supply goods, services and equipment to the Project. As described previously, inspections and maintenance activities will be performed annually and on a rotational basis for different sections of the transmission line and its components.

Business opportunities resulting from Project Operations and Maintenance have the potential to be long-term in nature. Services required during Project Operations and Maintenance are primarily associated with vegetation management and would include provision of specialized equipment and services such as helicopter rentals. There will also be opportunities associated with maintenance, equipment repair and replacement at the converter stations over the long-term, and ROV surveys of the cable will be required; however, as indicated earlier, these activities will only occur intermittently. Any potential major repairs that may be required to aspects of the transmissions system have the potential to involve considerable work activity, and thus, greater degrees of economic effect.

Nalcor's contracting and purchasing practices, described in Section 16.4.5, will apply to the Operations and Maintenance phase of the Project, with full and fair opportunity given to all suppliers, and with goods and services being acquired on a Best Value basis.

Summary of Likely Residual Environmental Effects

The likely residual effects of Project Operations and Maintenance on the Business KI are as follows:

- Direction: The effects of the Project will be beneficial, because the Project will help to further strengthen the economy through its income, employment and revenue generating effects, which is viewed as a desirable outcome.
- Magnitude: The Project will serve to increase pre-Project levels of business revenues. Nalcor's contracting and purchasing practices (see Section 16.4.5) will apply to Project Operations and Maintenance, with full and fair opportunity given to all suppliers, and with goods and services being acquired on a Best Value basis and with Newfoundland and Labrador benefits included in the selection factors for contract awards. Compared to annual Project expenditures during Construction, annual expenditures and business effects during Operations and Maintenance are small, however, the effects are continuous.
- Geographic Extent: Regional, because the effects of the Project will be experienced across the province. In some cases there will be effects beyond the province.
- Duration: Far future, as these effects will occur throughout the Project Operations and Maintenance phase.

There is a high degree of confidence that the actual effects of Project Operations and Maintenance on the Business KI will be as predicted because Project expenditures will result in the injection of an ongoing investment into the economy that in turn will result in new direct business opportunities and consequent business revenues together with additional new indirect and induced business revenues from successive rounds of spending.

16.4.6.6 Operations and Maintenance Effects – Summary

Accidents and malfunctions could occur during Operations and Maintenance, as discussed in Chapter 5. The effects of the low-risk incidents (e.g., small brush fire, motor vehicle collisions or waste spill) on Economy, Employment and Business would likely be the same as during Construction, and similarly positive. However, a multiple tower failure would result in an interruption in the supply of power, with the possibility of disruption of business and other activity. Nalcor's Emergency Response Plan will be implemented as the main mitigation measure in the case of a multiple tower failure or other interruption to power transmission. The geographic

extent of the interruption, and the time and effort required to correct it, however, will be variable, and hence the extent and duration of the interruption of economic activity is unknown.

As during Construction, the Project will have an overall beneficial effect on the Newfoundland and Labrador economy during the Operations and Maintenance phase. Although numbers and levels will be smaller, permanent and occasional employment and business opportunities to supply goods and services will continue through the ongoing requirement to operate and maintain the transmission system.

16.4.7 Environmental Effects Summary and Evaluation of Significance

16.4.7.1 Summary of Environmental Effects

The likely effects of the Project on the Economy, Employment and Business VEC are summarized in Table 16.4.7-1. For each of the associated KIs, the outcomes are beneficial overall, with anticipated increases occurring in measures that reflect the strength of the economy, employment and business. These effects will benefit the province and beyond throughout both Construction, and Operations and Maintenance of the Project.

16.4.7.2 Definition and Determination of Significance

Significant residual adverse socioeconomic effects on the Economy, Employment and Business VEC would result if the Project caused an overall, detectable and sustained decrease in one or more of the KIs / MPs throughout any phase of the Project. An effect that does not meet these criteria is not significant.

The effects of Project Construction on Economy, Employment and Business are predicted to be primarily positive, and will be substantial. The provincial economy will benefit from the injection of approximately $570 million in individual and business incomes and another $84 million in government revenues. Individuals will also benefit from Project-related training and experience, and businesses from Project-related growth and development. Project-generated government revenues will benefit the province when reinvested in infrastructure and services. Similar benefits will also be experienced beyond the province, elsewhere in Canada and internationally, where Project labour, materials, goods and services cannot be supplied from within the province.

Annual Project Operations and Maintenance expenditures within the province are estimated at $17.6 million, which will translate to over $10 million in income to businesses and individuals in the province. Individual and business income effects, government revenues, employment and business contract opportunities are similar in type, but smaller in magnitude, when compared to those associated with Project Construction, but they are continuous throughout the life of the Project. Similar benefits will also be experienced beyond the province, elsewhere in Canada and internationally, where Project labour, materials, goods and services cannot be supplied within Newfoundland and Labrador.

Although effects of the Project on Economy, Employment and Business will be positive, there is some potential for adverse effects to local businesses, due to possible labour force competition and wage inflation due to Project-related employment, particularly during Construction.

As described above, however, given the occupations and skill set requirements of the Project workforce, and the characteristics of the current provincial labour supply and recent experience in large scale construction projects, the Project is not anticipated to result in such effects. The Project will require and use a range of skilled trades and other occupations, likely drawing upon a provincial labour force and business community that is increasingly experienced with and involved in large scale development projects.

The overall (net) economic outcomes of the Project are predicted to be overwhelmingly positive, and no significant adverse effects to this VEC are therefore likely to occur.

Table 16.4.7-1 Environmental Effects Analysis Summary: Economy, Employment and Business

Project Phase / Key Indicator	Likely Residual Environmental Effects Summary Descriptors			
	Direction	**Magnitude**	**Geographic Extent**	**Duration**
Construction Phase				
Economy	– Beneficial: Project will result in increased incomes and tax revenues to the province	– Increase in income levels of $520 million during construction, with peak of $160 million in Year 3 – Increase in government revenues of $76 million during construction, with peak of $24 million in Year 3	– Effects on incomes and tax revenues will be experienced throughout the province	– Effects will be experienced throughout construction
Employment	– Beneficial: Project will lead to increased employment within the province	– Increase in employment levels adding estimated 6,350 person-years of employment during construction, with a peak of 2,000 person-years in Year 3	– Effects on employment will be experienced throughout the province	– Effects will be experienced throughout construction
Business	– Beneficial: Project will lead to increased business activity within the province	– Increase in business with 60 to 70% of the $2.1 billion in total Project expenditures to be spent on goods, materials, equipment, and services	– Effects on the business sector will be experienced throughout the province	– Effects will be experienced throughout construction
Summary of Likely Residual Construction Effects on Economy, Employment and Business: Project Construction expenditures will be experienced for approximately four years, peaking in Year 2. Construction will result in an increase in all MPs for all KIs over the medium-term. Effects will be experienced throughout the province.				
Operations and Maintenance				
Economy	– Beneficial: Project will result in increased incomes and tax revenues to the province	– Increase in pre-Project labour and business incomes beyond existing levels by approximately $10.6 million in a typical year and government revenues by an estimated $1.4 million annually	– Effects on incomes and tax revenues will be experienced throughout the province	– Effects will be experienced throughout the life of the Project
Employment	– Beneficial: Project will lead to increased employment levels within the province	– Increase in pre-Project annual existing levels of employment by a total of 145 person-years	– Effects on employment will be experienced throughout the province	– Effects will be experienced throughout the life of the Project
Business	– Beneficial: Project will lead to increased business activity within the province	– Increase in pre-Project levels of business revenues; however, compared to construction, annual expenditures will be small	– Effects on business will be experienced throughout the province	– Effects will be experienced throughout the life of the Project
Summary of Likely Residual Operations and Maintenance Environmental Effects on Economy, Employment and Business: Operations and Maintenance effects will be beneficial for the VEC and each of the KIs, although not to the same level as likely Project Construction effects. Effects will, however, be consistent and throughout the life of the Project. Effects will be experienced throughout the province.				

16.4.8 Evaluation of Project Alternatives

Project alternatives considered by Nalcor include alternative segments for the transmission corridor in particular areas, as influenced by terrain, ecology, land use and other physical and human environment factors. The alternative segments, and any environmental implications of these alternative segments as compared to the proposed transmission corridor, are summarized in Table 16.4.8-1.

The main differences between the proposed and alternative corridor segments are that alternative segments may be somewhat longer or shorter in length than those segments which they would replace, and therefore cost somewhat more or less to construct, employ more or less labour in construction, or result in somewhat larger or smaller value contracts for businesses.

The combination of alternatives yields a large number of potentially different outcomes. However, the overall effect of adoption of any or all of these alternatives on the Economy, Employment and Business KIs is not anticipated to be substantially different in nature, direction, magnitude, geographic extent or duration from those discussed above for the proposed corridor. Any such changes are not expected to measurably change the predicted level of effects / benefits as a result of the Project, or their significance.

Table 16.4.8-1 Summary Evaluation of Project Alternative Means: Economy, Employment and Business

Project Alternative Means[(a)]	Environmental Implications (compared to the proposed Transmission Corridor)[(b)]		
	Economy	**Employment**	**Business**
A2 to A11	– Potential differences (increases or decreases) in labour and business activities during construction where alternative segments involve greater or less overall Project expenditures. – However, any such differences are not expected to measurably change the predicted level of effects / benefits as a result of the Project, or their significance. – Any differences associated with alternative segments regarding Operations and Maintenance are anticipated to be negligible.	– Potential differences (increases or decreases) in labour during construction where alternative segments involve greater or less overall Project expenditures. – However, any such differences are not expected to measurably change the predicted level of effects / benefits as a result of the Project, or their significance. – Any differences associated with alternative segments regarding Operations and Maintenance are anticipated to be negligible.	– Potential differences (increases or decreases) in business activities during construction where alternative segments involve greater or less overall Project expenditures. – However, any such differences are not expected to measurably change the predicted level of effects / benefits as a result of the Project, or their significance. – Any differences associated with alternative segments regarding Operations and Maintenance are anticipated to be negligible.

(a) As identified and described in Chapter 2, Project Rationale and Planning.

(b) Namely, the proposed Project described in Chapter 3, Project Description, and assessed in the preceding Environmental Effects Analysis.

No technically and economically feasible alternatives for the submarine cable crossing or the shoreline electrode sites were identified (see Chapter 2, Section 2.12.3), and therefore marine Project alternatives are not evaluated for Economy, Employment and Business.

16.4.9 Cumulative Environmental Effects

This section assesses and evaluates the likely cumulative effects on the Economy, Employment and Business VEC as a result of the Project in combination with the effects of other past, present and reasonably foreseeable

future projects or activities that overlap with those of the Project. This includes other projects and activities that will draw upon the same labour and business resources and contribute to the same government tax base as those that will be affected by the Project, with a particular focus on the Newfoundland and Labrador economy.

The Newfoundland and Labrador economy has performed well since the mid-1990s, with substantial growth in GDP, average employment, and an overall decline in unemployment. This change in the province's economic circumstances was illustrated in April 2008 when the provincial government declared a budget surplus of $1.4 billion, the largest in its history. This growth path was set back somewhat by the economic recession of 2008. Despite robust growth of capital spending in the first-quarter of 2009, plunging energy prices plus declining petroleum production caused the value of the province's energy exports to drop by 36% from the previous year and total manufacturing exports to fall by 29%, each of which contributed to a negative effect on provincial GDP, total employment and overall business activity.

Despite the weakening in Newfoundland's employment growth in 2009, housing demand has continued to remain robust, due in part to a reversal of the province's chronic pattern of out-migration that started in the first-quarter of 2008 and which has continued through 2010, together with low interest rates and consumer confidence in the economy. Consumer confidence continues to be bolstered by the current strength of the economy and future prospects. Spending on the $3-billion Vale nickel processing facility, the Hibernia South Extension and an increase in mining investment is expected to push annual major project investment in the province to over $4 billion in 2011 (Atlantic Provinces Economic Council 2010). This major project forecast did not include the Hebron Project.

Overall, therefore, the economy of Newfoundland and Labrador is relatively strong at present, showing substantial growth over the last decade and again in 2011. This growth will be substantially enhanced with the development of the Project, as well as other ongoing and imminent projects and other economic development activities throughout the province. As discussed in earlier sections, the Project will generate benefits to the province in terms of increased total incomes, employment and business opportunities. Other ongoing and future projects will have similar positive economic effects on Economy, Employment and Business throughout the province.

Where the capacity exists or can be developed in the province to expand employment and business activity in light of these concurrent development projects, the result will be the generation of higher individual and business income levels and government revenues, increased employment and training opportunities and opportunities for business activity and growth. The cumulative outcome will generate immediate direct benefits to the economy, but also lead to longer-term indirect changes. For example, a labour force with higher skills and experience levels can command higher wages and employment opportunities in an economy where labour shortages in the construction sector are likely to continue for some time. Similarly, project experience can help provincial businesses to become more competitive locally, nationally and internationally. However, where overlapping projects result in the inability of provincial labour and business to meet input requirements because of lack of capacity, overall benefits to the province may be less than would be the case if projects were temporally sequenced.

The current Project schedule involves an approximately four year construction phase commencing after EA approval and Project sanctioning, followed by commissioning and system operation. Other major proposed development projects in Newfoundland and Labrador that could overlap temporally with the Project include:

- Lower Churchill Hydroelectric Generation Project (assuming construction begins in 2012, peak employment would occur in 2017);
- Hebron offshore oilfield development (assuming construction begins in 2012, peak employment would occur in 2014);
- Long Harbour Processing Plant (construction began in 2009 and employment is expected to peak in 2011; a permanent workforce of approximately 450 people will be required to operate the plant);

- Iron Ore Company of Canada expansion (construction began in 2010 and is expected to be completed by 2013, other iron ore projects might extend such activity beyond this date); and
- Maritime Link (construction is expected to begin in 2014 and end in 2016).

Other projects, such as the Hibernia Southern Extension, are not expected to overlap with the Project, but ongoing investment in economic infrastructure, commercial forestry projects and other oil and gas developments, for example, could also increase demands on labour during the Project Construction period.

The major issue from a cumulative effects perspective for this VEC is having multiple competing sources of demands for local labour, which may reduce the full realization of potential socioeconomic benefits of this and other projects in the province in the coming years.

A number of factors could affect the labour supply for the Project, such as a shrinking construction labour supply pool associated with expected retirements and mortality in the province (discussed in Section 16.4.5), and competing demands for labour from other projects in the province and elsewhere. For example, the Project will require heavy equipment operators and construction trades labourers and helpers for forest-clearing work along the transmission line ROW, the same occupational groups that will be required to clear forest in the proposed reservoir area for the Lower Churchill Hydroelectric Generation Project and the Maritime Link. Demands for construction labour may also be exacerbated if tradespersons change their occupation sector or job categorization (e.g., to become operations personnel at the Long Harbour nickel processing facility or at the expanded iron ore operations in Labrador). Furthermore, construction projects in the province may have difficulty attracting workers who presently travel outside of the province for employment (e.g., to oil sands projects in Alberta), if wage differentials are perceived by those workers to be significant.

The availability of skilled labour is also an issue. While the recession through 2009 provided temporary relief from labour pressures, it is believed that labour force requirements for major projects in Newfoundland and Labrador will peak in 2014-2015, with possible shortages in a number of key trades.

Competition for labour between projects can also tend to drive up the cost of labour. As a result, some businesses might be adversely affected if skilled and experienced workers are lost to other projects, particularly in a highly competitive labour supply environment. Replacing personnel might be difficult, and wage inflation could increase operating costs, reducing the competitive capabilities of those firms. While workers will benefit from increased demand for their labour, labour shortages and increased costs could adversely affect the type, cost and quality of some services provided by employers in both the corporate and government sectors, thereby reducing the overall benefits that multiple projects could bring to the business sector and the provincial economy generally. Cumulative effects on labour supply and business capacity are most likely to occur during Construction as this is when Project demand for labour is greatest and when demands from other projects are anticipated to be highest (Canadian Construction Sector Council 2010, internet site).

Concern over potential labour shortages are not unique to the Project and, as discussed in Section 16.4.5, a variety of measures at both the provincial, national and individual project levels have been initiated to address this issue. Initiatives include training, labour attraction and retention, and labour in-migration programs.

The potential cumulative effects on the Economy, Employment and Business VEC as a result of the Project in combination with the effects of other past, present and reasonably foreseeable future projects or activities are summarized in Table 16.4.9-1. As indicated in Table 16.4.9-1, these cumulative effects will be positive given the nature and health of the provincial economy at present, the economic benefits that will be realized through the Project, and similar outcomes from other projects and activities. Therefore, significant adverse cumulative effects on the Economy, Employment and Business VEC are not likely to occur.

Table 16.4.9-1 Cumulative Environmental Effects Summary: Economy, Employment and Business

Cumulative Effects Analysis	Economy	Employment	Business
Current (Baseline) VEC Condition	– The provincial economy is characterized by recent strong performance and a high potential for further growth, with offshore oil and mining being primary drivers. – Regionally, rural economies have generally performed less well than the urban economy of St. John's and its region.	– Provincial employment rates are relatively high given the recent growth in the provincial economy. – The availability of skilled labour is a concern. While the recession through 2009 provided temporary relief from labour pressures, it is believed that labour force requirements for major projects in Newfoundland and Labrador will peak in 2014-2015, with possible shortages in a number of key trades.	– Between 2001 and 2005, the total number of businesses in the province declined from 17,707 to 16,812. – Although the number of businesses has rebounded, it has not returned to 2001 levels. This decline has been offset somewhat by an increase in the size of some operations.
Likely Residual Environmental Effects of Labrador - Island Transmission Link	– The Project will result in a provincial increase in personal and business incomes, and government tax revenues. – Approximately $520 million in individual and business incomes and another $76 million in government revenues will serve to increase individual and business incomes and government revenues directly, indirectly and through additional rounds of spending. – Benefits will be regional and provincial.	– The Project will result in a provincial increase in employment, particularly during construction. – Individuals will also benefit from Project-related training and experience. – Benefits will be regional and provincial. – Project Construction labour effects will be experienced for approximately four years, peaking in Year 3.	– The Project will result in a provincial increase in business activity, and businesses will benefit from Project-related growth and development. – Benefits will be regional and provincial. – Project construction effects will be experienced for approximately four years, peaking in Year 3.

Table 16.4.9-1 Cumulative Environmental Effects Summary: Economy, Employment and Business (continued)

Cumulative Effects Analysis	Economy	Employment	Business
Likely Cumulative Environmental Effects (within RSA) of Other Future Projects and Activities	– Given the extensive and dynamic nature of socioeconomic systems, any project which requires labour or goods and services and generates revenue may overlap with the effects of the Project. – Provincial revenue will benefit from the cumulative effects of this and other projects throughout the province.	– Given the extensive and dynamic nature of socioeconomic systems, any project which requires labour or goods and services and generates revenue may overlap with the effects of the Project. – The adverse consequences of overlapping future projects will be associated with competition for construction labour among projects that may increase the price of labour.	– Given the extensive and dynamic nature of socioeconomic systems, any project which requires labour or goods and services and generates revenue may overlap with the effects of the Project. – For those businesses or agencies unable to afford or otherwise secure labour, as a result of increased labour shortages and high labour prices there could be adverse effects on production or service delivery and as a consequence the long-term sustainability of affected businesses. – Other effects are associated with the capacity of provincial companies to supply materials, goods and services to overlapping projects; opportunities may be missed that might not be the case if projects were sequential.
Cumulative Environmental Effects Summary	**Not Significant** – Substantial overall economic benefits to Newfoundland and Labrador as a result of this Project and others. – Any adverse effects will not be significant, individually or cumulatively.	**Not Significant** – Substantial overall employment benefits to Newfoundland and Labrador as a result of this Project and others. – Any adverse effects will not be significant as there will be an overall increase in employment. – Potential labour shortages are being and will continue to be addressed through a variety of effects management strategies to mitigate potential effects both by Nalcor in terms of the Project and the construction industry generally.	**Not Significant** – Substantial overall business benefits to Newfoundland and Labrador as a result of this Project and others – Any adverse effects will not be significant as there will be an overall increase in business activity. The cumulative effects of multiple projects with respect to business capacity are not unique to the Project.

16.4.10 Monitoring and Follow-up

Monitoring programs are those implemented to meet regulatory requirements and / or demonstrate compliance to commitments made in the EA. Follow-up programs are those implemented to verify EIS predictions and / or deal with issues of uncertainty, such as the effectiveness of effects management measures.

Under the terms of the Benefits Strategy (GNL 2010, internet site), Nalcor will, on a monthly basis from the date of sanction of the Project and throughout the Construction phase, provide information to the GNL on the following (broken out by National Occupation Classification Code, location, contractor, Aboriginal affiliation and gender relating to the Project for the period):

- total number of person-hours of all work on the Project in that month and to date;
- number of person-hours of Project management in the province in that month and to date;
- number of person-hours of engineering design work in the province in that month and to date;
- number of person-hours of construction and assembly in the province in that month and to date;
- number of provincial residents hired for the Project Team and the percentage of Project Team members who are provincial residents;
- number of provincial residents hired for engineering design work and the percentage of engineering design workers who are provincial residents;
- number of provincial residents hired for construction and the percentage of construction workers who are provincial residents; and
- number of person-hours of specialized engineering performed outside the province (if any) by component.

Monthly reports will also provide the following information:

- total value of goods and services purchased;
- total value of services purchased from businesses in the province by geographic location;
- total value of purchases by industry category (e.g., transportation, fuel, equipment);
- cumulative total value of goods and services referred to above for the year to date; and
- details of contracts awarded in that month.

Nalcor will report on hiring and employment objectives and targets on a quarterly basis. In addition, quarterly reports will be provided on:

- the level of compliance with the Benefits Strategy over the reporting period;
- information regarding supplier development workshops performed during the reporting period;
- activities carried out pursuant to the Gender Equity Program;
- activities carried out pursuant to the Diversity Program; and
- procurement forecasts.

In addition to the above, Nalcor will continue to provide information and updates on Project activities and effects related to Economy, Employment and Business on a regular basis as part of its ongoing governmental, Aboriginal, stakeholder and public consultation activities throughout the Project. Such information and consultation will also be used, as necessary, to facilitate planning and continuous improvement through modification of Nalcor strategies to optimize Project benefits to Newfoundland and Labrador.

16.5 Land and Resource Use

16.5.1 Introduction

The lands and resources within and adjacent to the proposed Project areas are used for a variety of commercial, recreational and traditional purposes, and some are protected by provincial and / or federal legislation for their particular ecological and cultural importance. Land and resource use is an important and integral component of Newfoundland and Labrador's human environment and overall cultural landscape, and reflects the characteristics, traditions and values of its people; the communities they live in, how they travel from place to place, the manner in which they make a living or supplement their incomes, the outdoor activities that they partake in and enjoy for recreational purposes, and their resolve to protect the natural and cultural heritage of the areas in which they live.

Newfoundland and Labrador's population of over 500,000 residents is widely distributed in more than 600 communities of varying sizes, ranging from several large urban centres to numerous small settlements along the province's extensive coastline and throughout its interior. The province's economy has long been focused on natural resource-based industries. These industries remain key economic components and important revenue generators in the province, particularly in more rural areas, and include forestry, mining, agriculture and outfitting. Residents of the province also have a long tradition of participating in outdoor activities including traditional and recreational activities such as fishing, hunting and gathering, snowmobiling and ATV use, boating and hiking, as well as building cabins and other infrastructure from which to undertake these pursuits.

In recent years there have been important changes in many land and resource use activities, as reflected in, for example, the difficulties being experienced in the forestry (lumber and newsprint) industry, the rapid expansion of mineral exploration and mining activities in various areas, and conservation concern for the health and status of particular wildlife populations such as caribou. The success, enjoyment and sustainability of many land and resource use activities are related to the availability and quality of, and access to, land and resources.

This section assesses and evaluates the potential effects of the Project on current land and resource use activities. As a relatively long, linear development that crosses much of the province and a wide range of socioeconomic landscapes, the Project has the potential to interact with a number of land and resource uses and users throughout Newfoundland and Labrador. Questions and concerns regarding possible interactions and environmental effects were identified through consultation with government departments and agencies, Aboriginal communities, stakeholder groups and the general public.

As a result of its nature, the Land and Resource Use VEC overlaps strongly with other components of the natural and socioeconomic environments, including several of the other VECs and KIs considered elsewhere in the EIS. Potential effects on land and resource use activities, and particularly the overall enjoyment and quality of the activities, may result from changes in air quality and noise levels in an area (Chapter 11), the availability and quality of vegetation, wildlife, water and / or fish resources (Chapter 12, Chapter 13, Chapter 14), or effects on viewscapes and the remoteness and wilderness character of an area (Visual Aesthetics VEC, Section 16.8). These potential interactions and overlaps are considered integrally within the environmental effects assessment for Land and Resource Use.

16.5.2 Environmental Assessment Study Areas

The following spatial and temporal boundaries have been established for the environmental effects assessment for the Land and Resource Use VEC.

16.5.2.1 Spatial Boundaries

The various components and activities that will be associated with the Construction, and Operations and Maintenance of the Project are located within and adjacent to a number of regions and communities throughout Newfoundland and Labrador. For purposes of this assessment, several geographical sub-regions are considered as relevant: Central and Southeastern Labrador, Northern Peninsula, Strait of Belle Isle, Central and Eastern Newfoundland and the Avalon Peninsula.

The LSA for Land and Resource Use is defined as the area within which Project-related elements and activities that may affect components of this VEC will occur. The LSA focuses on the 2 km wide proposed transmission corridor extending from Muskrat Falls on the Churchill River to the Strait of Belle Isle in Labrador, and from the cable landing point on the Northern Peninsula to Soldiers Pond on the Avalon Peninsula in Newfoundland. Although the eventual ROW for the transmission line will occupy a much smaller cleared footprint (averaging approximately 60 m) selected from within this larger corridor, the ROW and associated Project activities could occur anywhere within this corridor, and so the entire corridor is conservatively used to define the LSA. Also included in the LSA is the proposed 500 m wide submarine cable crossing corridor in the Strait of Belle Isle. The LSA also considers known and potential areas and locations where other Project activities may occur (e.g., the footprints of the electrode sites, access trails, marshalling yards and laydown areas, construction camps) as described in Chapter 3, Project Description.

The RSA extends beyond the above described areas to capture the land and resource use activities that overlap with, but extend beyond, the LSA (e.g., outfitting, hunting, trapping, angling, forestry). The assessment of Project effects on Land and Resource Use takes on a regional perspective by considering the land use activities that occur in the regions through which the Project extends.

16.5.2.2 Temporal Boundaries

The temporal boundaries of the assessment for the Land and Resource Use VEC encompass the Project's Construction phase, as well as the Operations and Maintenance phase that will extend through the life of the Project.

16.5.3 Potential Environmental Issues, Indicators and Interactions

This section describes potential issues, KIs and likely interactions of the Project on Land and Resource Use.

16.5.3.1 Potential Environmental Issues

Potential issues and questions associated with the potential effects of the Project on Land and Resource Use were identified in the *Environmental Impact Statement Guidelines and Scoping Document* for the Project (Government of Newfoundland and Labrador and Government of Canada 2011), as well as through regulatory, Aboriginal and stakeholder consultation by Nalcor and the EIS study team.

Relevant issues are associated primarily with how construction-related activities and the eventual presence of the transmission system, may overlap physically with existing land uses on the landscape, as well as how Project activities and components may generally disturb and affect the quality and enjoyment of outdoor pursuits.

Transmission lines have the potential for both negative and positive implications for Land and Resource Use. Land and resource use activities may also be affected by development projects both directly and indirectly. Direct effects occur where established activities are disturbed or otherwise interfered with by project-related components or activities during the construction, or operations phases (e.g., reduced access to harvesting areas). Indirect effects can occur when a project adversely affects fish or wildlife resources themselves which, then results in reduced opportunities or success rates for resource users.

The potential effects of the Project on fish and wildlife resources have been assessed in Chapter 12, which concluded that the Project will likely cause no significant adverse environmental effects on these aspects of the biophysical environment. It is therefore considered unlikely that the Project would result in significant effects on the commercial, recreational or traditional users of these resources. The Land and Resource Use VEC focuses primarily on the potential effects of the Project that may occur through any overlaps with other land users, interference and disturbances or other such interactions during the Construction and / or Operations and Maintenance phases of the Project.

The questions and issues identified by government and stakeholders to date concerning Land and Resource Use are summarized in Table 16.5.3-1.

Table 16.5.3-1 Identified Issues and Questions: Land and Resource Use

Issue / Question	Nature and Rationale	Specific Considerations
Municipalities and their associated planning areas and other development zones and infrastructure	– Various segments of the transmission corridor and other Project components cross, or are in close proximity to, communities.	– Strait of Belle Isle, Central Newfoundland, Avalon Peninsula and Isthmus.
Forest harvesting and management	– Transmission line ROW clearing and maintenance will result in some productive forest areas being permanently removed.	– Commercially productive forests in Labrador are restricted primarily to the western end of the Project area. Forest areas (timber rights, history of logging, extensive road networks) also exist on the Northern Peninsula and in central Newfoundland.
Commercial outfitting (hunting and fishing camps)	– Potential property issues, disturbance and aesthetic / wilderness issues. The outfitting industry is already in a relatively vulnerable condition overall (e.g., due to decreased numbers of caribou and licences).	– The transmission corridor is located in general proximity to several outfitters in the south-central portion of the Northern Peninsula. This proximity is unavoidable given the high density of camps and the adjacent federal / provincial park areas.
Military flight training activity in Labrador	– Potential disturbance of such activities during Project construction and the presence of transmission towers.	– The transmission corridor passes through a small portion of the east-central part of the defined flight training area.
Hunting, trapping, fishing, cabin use	– Construction and operation of the Project may result in direct interactions with existing properties (e.g., cabins) and / or increased access to them. May also reduce harvesting areas, opportunities, success, and enjoyment. – Any new access created by the Project or other infrastructure may be generally beneficial to some resource users (especially snowmobilers, cabin owners).	– Beneficial effects of increased access will be experienced particularly in areas where no development activity and / or access exists.
Recreational vehicle use	– Project crosses or occurs in proximity to snowmobile / ATV trails.	– Labrador Straits, Northern Peninsula, Central and Eastern Newfoundland.

Table 16.5.3-1 Identified Issues and Questions: Land and Resource Use (continued)

Issue / Question	Nature and Rationale	Specific Considerations
Use of watercourses for navigation	– Project-related components and vessel traffic in the Strait of Belle Isle. On-land conductors required for the Project will also span several rivers and streams across the province.	– Strait of Belle Isle, major inland waterways.
Hiking trails	– Project crosses or occurs in proximity to existing and proposed hiking trails. No specific land use conflict, but may affect visual aesthetics / remoteness qualities and overall enjoyment or use.	– Northern Peninsula (including International Appalachian Trail).
Aboriginal contemporary hunting, trapping, and gathering for traditional purposes	– Construction of transmission system may result in direct interactions with resource harvesting areas. – Vegetation management may result in direct interaction with harvestable resources. – Any new access created by the Project or other infrastructure may be generally beneficial to some resource users.	– Central and Southeastern Labrador. – Gathering includes resource collection of wood for domestic, purposes, berries and medicinal plants.
Aboriginal contemporary campsites and travel routes for traditional purposes	– Construction and operation of transmission system may result in direct interaction with existing campsites and travel routes. – Any new access created by the Project or other infrastructure may be generally beneficial to some resource users.	– Central and Southeastern Labrador. – Travel routes for traditional purposes, including the use of vehicles, snowmobiles and motorized boats.
Protected areas	– Special and valued places, protected by legislation. – Potential direct interaction (Project crossing over existing protected areas) or disturbance and aesthetic / wilderness issues due to proximity of the Project to protected areas.	– Existing and formally proposed protected areas in Labrador, Northern Peninsula (Main River), central Newfoundland and Avalon Peninsula.

16.5.3.2 Key Indicators and Measurable Parameters

Various KIs and MPs were identified for this VEC to frame and focus the associated environmental effects analysis (Table 16.5.3-2). Their selection was based on consideration of the various key elements of the VEC as well as the questions and issues that have been identified about potential Project effects.

Given the overall size and scale of the Land and Resource Use VEC, including the number and diversity of the various uses that comprise it, the selected KIs represent key subsets of the overall VEC. Each of the KIs include activities that occur in the LSA and / or RSA, are important for cultural, economic or other societal reasons, may be protected by legislation, and for which questions and issues have been raised regarding the potential effects of the Project.

The Commercial and Municipal Land and Resource Use KI considers the Project effects on communities, outfitting, commercial hunting and trapping, forestry, mining and mineral exploration and agriculture. The Recreational Land and Resource Use KI considers the effects of the Project on activities that are undertaken in leisure or to provide food or fuel for personal or family use. These activities include hunting, fishing, canoeing, kayaking, hiking, camping, wood cutting, berry picking, and use of cabins and motorized recreational vehicles. The Aboriginal Contemporary Traditional Land Use KI includes traditional Aboriginal land use activities that overlap with the Project-related components. This KI includes travel routes and camp sites, hunting and trapping, fishing, plant harvesting and places of cultural significance. The Protected Areas KI considers the effect of the Project on existing parks, ecological reserves and other such areas that are protected through legislation.

Based on the information available, contemporary traditional land use activities of the Innu Nation of Labrador, NunatuKavut Community Council (NCC) members, and Innu of Pakua Shipi may overlap with Project-related components. Therefore, effects of the Project on contemporary traditional land use activities of the Innu Nation of Labrador, NCC members and Innu of Pakua Shipi are discussed further in this assessment.

Based on available information, there is no evidence of Labrador Inuit contemporary land use overlapping with Project-related components, as described in Section 15.5.7.2 and illustrated in Figure 15.5.7-2. Therefore, effects of the Project on contemporary land use activities of the Labrador Inuit are not discussed further in this assessment.

Based on available information, as presented in Section 15.5.7.5, and Figure 15.5.7.5, available data indicate that contemporary traditional land use activities by the Innu of Unamen Shipu do not overlap with Project-related components. Therefore, effects of the Project on contemporary traditional land use activities of the Innu of Unamen Shipu are not discussed further in this assessment. Detailed maps derived from the data collected under the community engagement agreement will be considered by Nalcor and incorporated where relevant.

Based on available information, as presented in Section 15.5.7.6, and Figure 15.5.7-6, available data indicate that contemporary traditional land use activities by the Innu of Nutashkuan do not overlap with Project-related components. Therefore, effects of the Project on contemporary traditional land use activities of the Innu of Nutashkuan are not discussed further in this assessment.

Based on available information, as presented in Section 15.5.7.7, and Figure 15.5.7-7, available data indicate that contemporary traditional land use activities by the Innu of Ekuanitshit do not overlap with Project-related components. Therefore, effects of the Project on contemporary traditional land use activities of the Innu of Ekuanitshit are not discussed further in this assessment.

Based on available information, as presented in Section 15.5.7.8, and Figure 15.5.7-8, available data indicate that contemporary traditional land use activities by the Innu of Uashat mak Mani-Utenam do not overlap with Project-related components. Therefore, effects of the Project on contemporary traditional land use activities of the Innu of Uashat mak Mani-Utenam are not discussed further in this assessment.

Based on available information, as presented in Section 15.5.7.9, and Figure 15.5.7-9 and Figure 15.5.7-10, available data indicate that contemporary traditional land use activities by the Innu of Matimekush-Lac John do not overlap with Project-related components. Therefore, effects of the Project on contemporary traditional land use activities of the Innu of Matimekush-Lac John are not discussed further in this assessment.

Based on available information, as presented in Section 15.5.7.10, and Figure 15.5.7-11, available data indicate that contemporary traditional land use activities by the Naskapi Nation of Kawawachikamach do not overlap with Project-related components. Therefore, effects of the Project on contemporary traditional land use activities of the Naskapi Nation of Kawawachikamach are not discussed further in this assessment.

Each KI for Land and Resource Use has associated MPs, which represent aspects of the KI for which changes could possibly be detected or measured. Some Project effects may be "measured" (e.g., overlap or intersection between the LSA and communities, mineral areas, cabins, protected areas). For other potential social effects, such as decreased enjoyment of a hunting experience, quantitative predictions are neither possible nor particularly meaningful. In these cases, the identified MPs are primarily used as key concepts upon which to focus the effects assessment, rather than to generate quantitative predictions.

The KIs and MPs identified for the Land and Resource Use VEC along with the rationales for their selection are provided in Table 16.5.3-2.

Table 16.5.3-2 Key Indicators and Associated Measurable Parameters: Land and Resource Use

Key Indicator	Rationale for Key Indicator	Measurable Parameter	Rationale for Measurable Parameter
Commercial / Municipal Land and Resource Use	– Present within LSA and RSA – Socioeconomic importance	– Land area used and available – Economic revenues	– Overlap between identifiable land and resource use components / areas and Project can be defined and measured – Any Project-related disturbances of commercial activities will be important if they translate into a change in overall revenues / income
Recreational Land and Resource Use (General)	– Present within LSA and RSA – Socio-cultural importance	– Land area / resources used and available – Participation rates – Quality of experience	– Overlap between identifiable spatial land and resource use areas and transmission corridor or ROW can be determined
Aboriginal Contemporary Traditional Land Use	– Present within LSA and RSA (Labrador) – Socio-cultural importance – Aboriginal rights, where they exist, are constitutionally protected	– Land area / resources used and available – Participation rates – Quality of experience	– Overlap between identifiable spatial land and resource use areas and transmission corridor or ROW can be determined
Protected Areas	– Present within LSA and RSA – Protected by legislation – Ecological importance – Valued by society	– Undisturbed land within Protected Area – Ecological integrity – Societal / cultural value	– Overlap between Project and existing protected areas can be defined and measured – Potential Project-related disturbances (proximity, noise, visual intrusion) may affect ecological integrity or other values associated with existing protected areas

16.5.3.3 Potential Project-Land and Resource Use Interactions

Potential Project-Land and Resource Use interactions have been identified through consultation, literature review and analysis of the existing environment and Project description. These potential interactions have been organized by KI (i.e., Commercial / Municipal, Recreational, Aboriginal Contemporary Traditional Land Use, Protected Areas) and are listed by key Project component and activity in Table 16.5.3-3.

Table 16.5.3-3 Potential Project Interactions: Land and Resource Use

Project Phase / Activity	Key Indicator			
	Commercial / Municipal	**Recreational**	**Aboriginal Contemporary Traditional Land Use**	**Protected Areas**
Construction				
Construction access trails and roads	Potential disturbances (component footprints, activity, visual, noise, dust, human presence)	Potential disturbances (component footprints, activity, visual, noise, dust, human presence)	Potential disturbances (component footprints, activity, visual, noise, dust, human presence)	Potential disturbances (component footprints, activity, visual, noise, dust, human presence)
Movement and presence of personnel, equipment and materials				
Construction camps				
Marshalling yards and staging areas				
ROW clearing and preparation				
Quarrying and borrowing				
Transmission tower assembly and installation				
Conductor installation				
Converter station site preparation and construction				
Preparation and construction of submarine cable landing sites (on-land works)	Potential disturbances (component footprints, activity, visual, noise, dust, human presence)	Potential disturbances (component footprints, activity, visual, noise, dust, human presence)	Potential disturbances (component footprints, activity, visual, noise, dust, human presence)	—
Construction and installation of submarine cables (Marine works)				
Electrode site preparation and installation				

Table 16.5.3-3 Potential Project Interactions: Land and Resource Use (continued)

Project Phase / Activity	Key Indicator			
	Commercial / Municipal	**Recreational**	**Aboriginal Contemporary Traditional Land Use**	**Protected Areas**
Island system upgrades	—	—	—	—
Employment / presence of workers	Potential disturbances (component footprints, activity, visual, noise, dust, human presence)	Potential disturbances (component footprints, activity, visual, noise, dust, human presence)	Potential disturbances (component footprints, activity, visual, noise, dust, human presence)	Potential disturbances (component footprints, activity, visual, noise, dust, human presence)
Contracting / expenditures	—	—	—	—
System commissioning				
Operations and Maintenance				
Operations and maintenance access trails and roads	Potential disturbances (component footprints, activity, visual, noise, dust, human presence)	Potential disturbances (component footprints, activity, visual, noise, dust, human presence)	Potential disturbances (component footprints, activity, visual, noise, dust, human presence)	Potential disturbances (component footprints, activity, visual, noise, dust, human presence)
Presence and Operation of the transmission system	Potential disturbance (structures, footprints, visual)	Potential disturbance (structures, footprints, visual)	Potential disturbance (structures, footprints, visual)	Potential disturbance (structures, footprints, visual)
Routine line inspections and repairs	—	—	—	—
Vegetation management	Potential disturbances (component footprints, activity, visual, noise, dust, human presence)	Potential disturbances (component footprints, activity, visual, noise, dust, human presence)	Potential disturbances (component footprints, activity, visual, noise, dust, human presence)	Potential disturbances (component footprints, activity, visual, noise, dust, human presence)
Potential major system repairs				
Operation of the electrodes	—	—	—	—
Employment / presence of workers				
Contracting / expenditures				

— No likely or detectable interaction identified.

16.5.4 Approach to the Environmental Effects Analysis

16.5.4.1 Analytical Methods

The various information sources and methods used to describe and understand current Land and Resource Use in Newfoundland and Labrador that are relevant to the Project and its EA were described in detail in Chapter 15, Existing Socioeconomic Environment.

The assessment of potential Project effects on this VEC involved a general approach of "overlaying" what is known about existing commercial / municipal, recreational and Aboriginal activities and protected areas in the LSA and RSA with the nature of planned Project components and activities (Chapter 3, Project Description), to identify likely interactions and resulting effects on the VEC and its various KIs. This included a mapping approach utilizing a geographic information system (GIS) database where applicable. The mapping approach identified and illustrated areas where the LSA, including the 2 km wide transmission corridor, may overlap with existing Land and Resource Use elements. This represents a conservative approach, given that the eventual ROW will be considerably smaller than this, averaging approximately 60 m wide. The assessment of potential Project effects on this VEC also made use of Nalcor's recent analysis of existing types and levels of human access within and near the transmission corridor (Integrated Informatics Inc. 2011), as described earlier.

For Aboriginal Contemporary Traditional Land Use, a comprehensive list of information sources was identified, compiled and reviewed. Sources included published and unpublished literature, information and data provided to Nalcor by the Aboriginal communities and organizations, and the results of recent consultation activities and socioeconomic data collection initiatives completed for the EA by Aboriginal communities and organizations in cooperation with, and through funding and resources provided by, Nalcor.

Data presented in the Socioeconomic Environment: Aboriginal Communities and Land Use Component Study (Nalcor et al. 2011) were mapped in relation to the Project components and areas of potential overlap were identified. Project activities were considered in relation to how they might affect Aboriginal contemporary traditional land use. For example, vegetation management procedures and products used (e.g., herbicides) were reviewed to determine any effects these might have on land use activities (e.g., berry harvesting, hunting). The land use activities of the Labrador Innu, Labrador Inuit,NCC, Pakua Shipi, Unamen Shipu, Nutashkuan, Ekuanitshit, Uashat mak Mani-Utenam, Matimekush-Lac John, and Naskapi Nation of Kawawachikamach were considered for this assessment. At present, consultation activities with several Aboriginal communities and organizations are ongoing. The assessment in this section is based upon information that has been collected as of the time of preparation of this assessment.

Mitigation is an integral element of the Project design and implementation, and the effects assessment is based on the Project with identified mitigation measures in place.

16.5.4.2 Environmental Effects Descriptors

The potential effects of Project activities on the various aspects of the Land and Resource Use VEC are generally described in terms of a set of descriptors which are summarized in Table 16.5.4-1.

Table 16.5.4-1 Effects Descriptors: Land and Resource Use

Effects Descriptor	Definition
Direction	
Adverse	Effect is negative and undesirable, reducing land and resource use revenues, opportunities, success, participation and / or enjoyment.
Neutral	Effect is neither adverse nor positive.
Positive	Effect is beneficial and desirable, enhancing land and resource use revenues, opportunities, success, participation and / or enjoyment.

Table 16.5.4-1 Effects Descriptors: Land and Resource Use (continued)

Effects Descriptor	Definition
Magnitude	
No effect	Project results in no change in the existing (baseline) condition.
Low	Project results in a small change in the existing condition that may or may not be detectable.
Moderate	Project results in a clear change in the existing condition, but this is generally in keeping with the natural variability of the parameter in question. Clearly an effect but unlikely to result in a risk to overall income stability, or overall participation rates, enjoyment or societal values, and / or to become a management issue.
High	Project results in a major change in the existing condition / baseline value, that is well outside the natural variability of the parameter in question. Effect is likely to result in a risk to overall income stability, or overall participation rates, enjoyment or societal values, and / or to become a management issue.
Geographic Extent	
Local	Effect will be evident within the LSA.
Regional	Effect will be evident within the RSA.
Beyond regional	Effect will be evident beyond the RSA.
Duration	
Short-term	Effect will be evident for less than one year.
Medium-term	Effect will be evident for between one and four years.
Long-term	Effect will be evident for from four to ten years.
Far future	Effect will be evident throughout the life of the Project.
Frequency	
Low	Effect occurs no more than once per year.
Moderate	Effect occurs 2 to 10 times per year.
High	Effect occurs more than 10 times per year.
Continuous	Effect is continuous.

16.5.5 Construction

This section describes the potential effects of proposed Project Construction activities on Land and Resource Use, including each of the identified KIs.

16.5.5.1 Overview of Project Construction and Associated Effects Management

Project Construction will take place over an approximately four year period at locations throughout Newfoundland and Labrador, with different types of activities taking place at different sites, and with varying intensities over time.

The proposed Project is comprised of a number of components that will be constructed from central Labrador to the Avalon Peninsula, including converter stations at Muskrat Falls and Soldiers Pond, a cleared ROW with transmission towers and conductors over the approximately 1,100 km long area between these sites, submarine cable landing areas and subsea cables and berms across the Strait of Belle Isle, shoreline electrodes at L'Anse au Diable and Dowden's Point in Conception Bay and their associated transmission connections and other components. Construction activities such as vegetation clearing, transmission tower installation, movement of equipment and materials and the development of construction infrastructure such as access trails, camps, quarries and lay down areas will result in noise, dust, small leaks and spills, general human presence and other disturbances that may interact with land and resource use activities at these locations. Land and Resource Use may be affected both through direct interactions (physical overlap) and indirectly, as a result of visual and other perceptual issues.

During Project planning and design, Nalcor has sought to proactively anticipate and avoid the potential for adverse interaction between the Project and existing land and resource uses, including any associated adverse socioeconomic effects that may result from such interactions. The transmission system will be similar to other existing transmission infrastructure in the province, and Nalcor will use standard practices and procedures and will follow applicable regulatory requirements during the Construction phase of the Project.

Some key environmental effects management measures that relate to this VEC include the following:

- The avoidance of known land and resource use components and activities where possible during Project planning to date, including in the selection of the proposed transmission corridor, and in the identification of locations for other key Project components (e.g., electrodes, submarine cable landing sites, converter stations).
- This planning approach will be carried forward into the detailed route selection process for the transmission line ROW within this corridor, which will involve additional future consultation with government departments, Aboriginal and stakeholder groups and the public.
- The selection of the transmission corridor and planning of other Project components has been based on an approach to maximize the use of existing access roads and trails wherever possible, use existing industrial sites and other developed areas, use existing quarries and extract borrow material from within the ROW wherever practical, and follow existing transmission lines where possible (including for several hundred kilometres from Port Blandford in Eastern Newfoundland to Soldiers Pond on the Avalon Peninsula), while respecting technical design requirements.
- Designing, planning and scheduling Project-related elements and activities in specific areas to avoid interactions with land and resource users to the extent practical, and conducting regular communication and consultation with relevant agencies, organizations and representatives as part of such planning and eventual implementation.
- Nalcor has negotiated and concluded an IBA with the Labrador Innu, which was ratified by the Innu people in June 2011 and signed in November 2011 (Chapter 7, Aboriginal Consultation and Issues Scoping). The IBA covers both the Labrador-Island Transmission Link and the Lower Churchill Hydroelectric Generation Project, and defines how the Labrador Innu will participate in and benefit from these developments. The specific nature and provisions of the IBAs are and will remain confidential. However, the IBA will provide benefits to address any adverse effects on Labrador Innu as a result of these projects, including effects on Innu communities and their land and resource use and other activities. The IBA includes processes for continued consultation and cooperation throughout the construction and operations phases of both projects, including on environmental matters.
- Nalcor will continue to consult appropriately with other relevant Aboriginal communities and organizations in Labrador and Québec, particularly those with demonstrated contemporary land use near the Project. This will include the provision of Project information and updates on ongoing and planned activities, as well as discussion of any issues communities and groups may have and potential means of addressing them.

- Nalcor will work directly with any commercial outfitter with an existing and active hunting or fishing camp located within the proposed transmission corridor, or within 5 km of the corridor or of the planned location of any other permanent Project component. This will include consultation (e.g., regarding ROW selection, tower design and placement, scheduling) during detailed design and planning for sections of the proposed transmission line within the identified limit, to seek to avoid or reduce any potential issues or interactions during construction or operation of the Project. Nalcor will also explore possible routing approaches to help minimize the eventual use of the ROW by ATVs and snowmobiles in areas that are currently remote and inaccessible. This process will include meeting and consulting generally with the Newfoundland and Labrador Outfitters Association (NLOA) and other industry representatives to discuss general issues and potential effects management measures.

- Project components and activities will be routed and designed to avoid direct, physical interaction with existing protected areas in the province. Nalcor will work directly with the GNL Natural Heritage Branch, Parks and Natural Areas Division (and other organizations as applicable) during detailed engineering design and planning for those sections of the proposed transmission line that will occur within 1 km of the boundaries of an existing protected area, including for example with regard to ROW selection, tower design and placement, and scheduling, to seek to avoid or reduce any potential visual or other such interactions.

- Nalcor will consult directly with the Department of National Defense (DND) during detailed design and planning for sections of the proposed transmission line that will occur within the designated low level flight training area in Labrador, including with regard to ROW selection, tower design and placement, and scheduling. Nalcor will cooperate with DND to develop appropriate communication procedures for flight activity in the designated low level flight training area, as well as help to ensure that Project infrastructure is included on relevant DND maps and navigational charts.

- The application of other standard effects management measures used by Nalcor and its subsidiaries during past and ongoing transmission line construction and maintenance activities (e.g., discussion with private property owners regarding issues related to any intrusion on property both prior to and after such intrusion; limitation of noise along the transmission line by using only essential vehicles; limiting access to approved routes and specific vehicles).

- Wood (timber) cleared from the ROW will be limbed and stacked within the ROW, and will be available for removal by local residents.

- Nalcor and its contractors will identify, obtain and comply with all authorizations, approvals and permits from relevant provincial and federal agencies that are required in relation to its Project Construction, and Operations and Maintenance activities.

It is anticipated that many potential land use issues and interactions associated with the Project can and will be addressed through the planning and consultation measures outlined above. However, it is inevitable that a development project of this size and scale will overlap and interact with land uses and properties in specific areas, which will be unavoidable for technical, economic and / or environmental reasons. In such cases, it may be necessary for Nalcor to acquire property or other assets through one of a number of potential means.

When seeking to acquire property rights that are required for the Project, Nalcor's goal is to treat all property owners with respect and in a fair, transparent and consistent manner. Nalcor's *Property Acquisition Policy* seeks to provide a fair balance between the needs of property owners, Nalcor and the ratepayers and citizens of the province. The objective is to secure voluntary property settlements in a timely manner at a reasonable cost.

Where a need to acquire property is identified, Nalcor will seek to identify, contact and communicate with the owner in a timely manner. Nalcor will conduct negotiations for the purchase of property rights and present the property owner with an offer based on fair market value as indicated in a property valuation prepared by independent accredited appraisers. Signing incentives may also be offered to encourage early resolution of property acquisition interests. Upon reaching a negotiated agreement, the property owner will be required to execute an easement document, which Nalcor will have registered at the Registry of Deeds Office. Upon registration, Nalcor will direct the award of compensation to the property owner.

While most negotiations are settled amicably, there are instances where Nalcor is compelled to exercise its rights to secure land interests for public projects through the process of expropriation. This option is exercised only when all other avenues are exhausted. Expropriation will follow specific procedures as set out in provincial legislation and will include compensation to the property owner. Even after an expropriation is filed, Nalcor will continue to attempt to secure a negotiated settlement with affected property owners.

Other effects management measures that have been identified and proposed in relation to the natural and / or socioeconomic environments, as discussed in other VEC sections throughout this EIS, are also relevant to avoiding or reducing potential effects on Land and Resource Use (e.g., those relating to general landscape, visual issues, infrastructure and services).

16.5.5.2 Existing Knowledge

The construction of electrical transmission systems is common throughout North America and worldwide. The potential effects of transmission line construction on Land and Resource Use are, in many respects, similar to those which may be experienced with any large construction project, and particularly comparable with those of other large linear projects such as pipeline, road and railway construction.

There is little available published "existing knowledge" which has evaluated and measured the actual and known effects of similar projects and activities on this VEC. Some key findings from a selection of recent published literature that is relevant to transmission line construction, and which relate primarily to known and perceived land use issues often associated with such projects, and / or to the management of their associated effects are summarized in Table 16.5.5-1.

Table 16.5.5-1 Existing Knowledge (Construction): Effects of Similar Projects on Land and Resource Use

Reference	Study / Project Context	Summary of Findings
PSC Wisconsin (2010, internet site)	This overview reviews the environmental issues and concerns raised by the construction of electric transmission facilities. The first part of the overview provides a general summary of the methods to measure and identify environmental impacts. The second part of the overview is an A to Z directory of specific environmental issues and techniques to minimize or mitigate the impacts.	– Discussion of potential impacts and methods to minimize or mitigate the impacts on various land and resource use activities.

Table 16.5.5-1 Existing Knowledge (Construction): Effects of Similar Projects on Land and Resource Use (continued)

Reference	Study / Project Context	Summary of Findings
Taku Wilderness Association (2001)	The Impact of Resource Developments on Traditional Land-based Economies	– Resource developments have had many impacts on traditional land-based economies in the north. – Effects include increased competition for natural resources, theft and vandalism of property, and disproportionate impacts on family areas. – The report suggests that post impact studies of resource developments and traditional land-based economies means little is known about the short and long-term impacts on traditional economies, and therefore the cultures, of Aboriginal communities. This low level of knowledge about the range of impacts and their duration, and the corresponding uncertainty, demands that a precautionary approach be adopted.

16.5.5.3 Construction Effects: Commercial / Municipal Land and Resource Use

This section assesses the potential effects of Project Construction activities on commercial and municipal land and resource uses and users. The analysis is based on the nature and distribution of planned Project construction work, with integral consideration of the effects management strategies and measures that Nalcor will employ during this phase of the Project, as well as its experience with similar development projects.

The proposed transmission corridor and other Project components cross through or occur within or near the municipal boundaries, municipal planning areas, infilling lmits or protected road zones of various communities, particularly in the Strait of Belle Isle area (e.g., Forteau on the Labrador side and Shoal Cove East and neighbouring communities on the Northern Peninsula), Central and Eastern Newfoundland (e.g., Grand Falls-Windsor, Clarenville, Sunnyside, Arnold's Cove and Chapel Arm) and on the Avalon Peninsula (e.g., Whitbourne and Holyrood). The planning and engineering design of the Project, including route selection for the ROW, tower placement and conductor spanning will seek to avoid any adverse interactions with community lands and infrastructure. Nalcor will consult with all relevant communities in or near the Project area as part of such planning, as well as during Project Construction, to provide information and updates on ongoing and planned construction activities, identify questions or concerns, and to seek to address any issues through design and scheduling. Development within each type of community boundary named above requires permits and approvals from municipalities and / or provincial departments and agencies. Any construction or maintenance activities occurring within Protected Public Water Supply Areas will be subject to special and specific environmental protection and regulatory requirements, as discussed in Chapter 13, Freshwater Environment (Section 13.2.1).

The Project will cross over or along numerous public roadways and other public infrastructure throughout the province, as described in Chapter 15, Existing Socioeconomic Environment. These crossings will be designed and built to relevant standards, and conductor clearance (the distance between the ground and the closest point of the transmission line span) will be a minimum of 7.4 m, which will increase to approximately 9.2 m at highway crossings. Such crossings and other Project components will also be undertaken in accordance with required approvals and permits from applicable government agencies.

No airports, landing strips, heliports or aerodromes are located within the LSA, although the transmission corridor does occur in the general vicinity of several existing airports. The corridor also crosses a small portion of the east-central part of the defined military flight training area in central Labrador (although military flight training in Labrador has decreased over the past decade). Nalcor will work directly with Transport Canada, DND and other relevant authorities to ensure that the presence and characteristics of any transmission towers in the general vicinity of these facilities are in keeping with required guidelines and regulatory standards, so as to not interfere with the operations and safety of aircraft. Nalcor will cooperate with these authorities to include Project infrastructure on maps and navigational charts through the provision of information, and will coordinate and communicate regarding any Project-related aircraft activities in these areas during Project Construction.

Nalcor is aware of an existing float plane base at Long Pond within the LSA near Forteau in the Labrador Straits region, which is owned and used by several local operators and which serves as a refuelling stop for other aircraft. Nalcor has had extensive discussions and a site visit with the operator of this facility, to fully understand the nature of the existing operations at this site, and to explore possible means to address any potential for safety issues or restrictions that may occur with the presence of transmission towers and conductors in this area. These discussions have covered topics such as applicable aviation standards and regulations, as well as potential tower characteristics and placement, and topography in this area. Nalcor anticipates that these cooperative discussions will continue as the detailed engineering and design of the Project activities in this area progress, with the goal to avoid or reduce any adverse effect of the Project on this operation.

The proposed transmission corridor also passes through various regions of the province which have established commercial outfitting operations. In the interior of Central and Southeastern Labrador, no outfitting camps are located in the LSA but one is located within the RSA. Several camps in the Labrador Straits area, all of which are currently accessible by road, are situated in the general vicinity of proposed Project infrastructure. In Central and Eastern Newfoundland, the proposed transmission corridor does not overlap with any known outfitting camps, and the few camps that are located in the RSA are in locations that are characterized by existing access and / or other previous human development such as forest harvesting or existing transmission lines and, accordingly, the likely effects of the Project on these camps will be minimal.

The main potential for interaction between existing outfitting camps and the Project occurs on the Northern Peninsula, where several existing camps are located within the proposed Project corridor in the Portland Creek and Main River areas, or in relatively close proximity to it (Chapter 15, Existing Socioeconomic Environment). The large number and spatial density of outfitting camps in this region, coupled with the area's topographic and meteorological characteristics and the presence of national and provincial parks on both sides of the Peninsula, have made it inevitable that interactions between outfitting camps and the Project will occur. Indeed, local outfitters have confirmed in discussions with Nalcor that as a result of these factors, there is likely no better transmission corridor option which would completely avoid any interactions with outfitting camps in this area. In addition, while specific information is not available on the areas used by hunters and guides based at these camps, hunting activities can also extend considerably beyond the camp locations themselves. Although several camps are located in relatively remote areas (especially those on the high elevation barrens in the area where the transmission line will cross the Long Range Mountains), others are located in areas which already have considerable human access through networks of resource roads and trails.

In selecting a specific route for the transmission line ROW within the 2 km wide corridor during detailed engineering design, Nalcor will attempt to maximize its distance from existing and commercially active outfitting camps in this area. Nalcor will also work directly with any active commercial outfitter with an existing camp located within the transmission corridor or within 5 km of it or of any other planned permanent Project component. This will include consultation regarding ROW selection, tower design and placement, and scheduling during detailed design and planning for sections of the proposed transmission line within these limits, with the goal to avoid or reduce any potential issues or interactions during construction and / or operations. These discussions will involve exploring possible transmission line routing approaches (e.g., spanning natural topographic features which may serve as natural access barriers) in the Long Range

Mountains and possibly other areas to minimize the eventual use of the ROW by ATVs and other means of public access. Consultation activities will also include meeting and consulting generally with the Newfoundland and Labrador Outfitters Association (NLOA) and other industry representatives to discuss issues and potential effects management measures.

The proposed Project will overlap with various Forest Management Districts across Newfoundland and Labrador, as well as areas of particular forest tenure / timber rights and various types and intensities of ongoing forest harvesting activity. Although still an important industry and economic component overall, commercial forestry has declined significantly in recent years as a result of the closure of two of the province's pulp and paper mills. Forestry and forest management activity are subject to detailed planning processes at provincial and district levels, including the preparation, regulatory review and implementation of operating plans for each district. Many of these operating plans will expire and be renewed prior to the commencement or completion of the Project Construction phase. Nalcor will cooperate with provincial forest planners and managers by providing Project information and updates so that future operational plans (5 year or annual) can incorporate the Project ROW and any associated forest clearing.

As calculated in the Vegetation VEC environmental effects assessment (Section 12.2), the total volume of timber resource estimated to be harvested as a result of ROW clearing for the Project is 171,432 m^3, which represents less than 7% of the current annual allowable cut (AAC) in the province (Section 12.2), and less than 4% of the total volume of timber approved to be harvested under the most recent 5-year forestry operating plans in the 13 forest management districts crossed by the Project (AMEC 2010). The footprints of those sections of the transmission line ROW and other permanent Project components that occur within productive forest areas will be removed from potential use for future forestry activities. However, this land area is small relative to the remainder of available productive forest areas. Consequently, the Project is not likely to have an effect on the overall level of forestry activity in the province or on the economic revenue associated with Newfoundland and Labrador's forestry industry.

The proposed transmission corridor and other Project components similarly overlap with various other commercial land and resource use activities across the province, including existing quarries, staked claims, oil and gas exploration parcels, impost land, mining leases, agricultural areas and Crown titles. During detailed routing for the transmission line ROW, Nalcor will attempt to avoid interactions with these activities where possible, and Nalcor will consult with operators and land owners throughout this process as required, as well as during Construction to ensure that adjacent operations have up to date information on planned Construction activities and to optimize planning and scheduling. The land permitting process for the Project will serve to highlight and address potential land use conflicts. The creation of the ROW and access trails may in fact have a beneficial effect for some land uses, such as mineral exploration and commercial berry harvesting industries, by providing additional access into some areas.

The Strait of Belle Isle is an important shipping lane, which experiences considerable marine vessel traffic during the ice-free period, as well as ferry service across the Strait between St. Barbe / Corner Brook and Blanc Sablon. Project Construction in the Strait of Belle Isle will involve vessel traffic and work activity associated with the installation of the submarine cables and associated rock-laying / berming components, which will require restrictions on vessel movements in the active marine work areas and on anchoring in the area immediately around the submarine cables once these are laid on the seabed. The overall "zone of influence" of this disturbance will be reflected by a Safety Zone of 500 m radius around the marine construction activities, within which no other vessels will be permitted to operate. The primary purpose of the Safety Zone will be to minimize the potential for physical contact between Project Construction and other vessels and activities, thereby ensuring a safe and efficient operating environment for all parties. All Project-related vessels will be required to stay within the Safety Zone except when transiting to and from their home port or service base or, in the case of rock-laying (fallpipe) vessels, to any onshore supply facilities. When transiting to and through the Strait of Belle Isle, these Project vessels will follow the existing Canadian Coast Guard (CCG) voluntary traffic separation scheme. Beyond the Safety Zone(s), marine vessels unrelated to the Project will be able to transit the Strait of Belle Isle in accordance with the relevant regulations and vessel traffic procedures.

A Vessel Traffic Management Plan (VTMP) developed for the Project will outline the "rules of the road" for marine traffic activities associated with the Project during Construction, including communications protocols and the prescribed routes that all Project vessels will be expected to follow when operating outside the Safety Zone. The VTMP will help to minimize the "footprint" of Project marine activities that might interfere with vessel traffic by ensuring their containment within relatively focused and prescribed areas. Through mechanisms such as the CCG's Notices to Shipping and the Canadian Broadcasting Corporation's Fisheries Broadcast, Nalcor will ensure that all non-Project vessels operating in the Strait of Belle Isle are given advanced notice of planned construction work. These standard and proven effects management measures will help to avoid interactions and issues between the Project and general vessel traffic in the Strait of Belle Isle area, and are further described under the Marine Fisheries VEC (Section 16.6).

As a result of the relatively small area that will be subject to Project-related marine construction work at any one time, the overall size of the Strait of Belle Isle area, the relatively short-term duration of cable construction activities in the marine environment (likely one season), and the proposed effects management measures outlined above, Project Construction is not likely to result in measurably adverse effects on marine vessel activity in the Strait. Similarly, activities associated with construction work at the L'Anse au Diable and Dowden's Point electrode sites, given their nature (i.e., small areas and on-land work) are not expected to disrupt or otherwise adversely affect existing marine activities in these areas.

Summary of Likely Residual Environmental Effects

The likely residual effects of Project Construction on the Commercial / Municipal Land and Resource Use KI are as follows:

- Adverse, as construction activities may cause disruptions to existing land and resource users and will occupy land areas that may prevent or restrict their use by others. The creation of access in certain areas may prove beneficial for some uses as well;
- Of low to moderate magnitude, as in many cases the land area occupied by the Project will be small compared to that used by or available to existing users, and because Project design, associated consultation and / or permitting procedures will serve to identify and address most issues;
- Local in geographic extent, as most if not all relevant interactions will occur within the LSA, and particularly, at the site of construction activity as it occurs;
- Of short to medium-term duration, as many disturbances will end relatively quickly, whereas others (such as ROW clearing or infrastructure placement) will continue throughout the Construction phase of the Project (and then beyond, see Operations and Maintenance); and
- Of low to continuous frequency, as some disruptions will occur only once or occasionally whereas others will extend throughout the Construction phase and beyond.

Despite the lack of detailed Project design information for some aspects at this stage of the EA process (e.g., specific ROW and tower locations) there is a high degree of certainty in these effects predictions given the general nature of the Project, the effects management approaches and measures proposed, and experience with similar projects.

16.5.5.4 Construction Effects: Recreational Land and Resource Use

Project Construction activity will occur throughout the province in areas used for a variety of recreational land and resource use activities. These activities include hunting for large and small game at various times of the year, angling in lakes, ponds and streams within and near the Project area, berry picking, firewood cutting, ATV use and snowmobiling, hiking, bird watching, camping, skiing and various other consumptive and non-consumptive outdoor recreational activities, many of which are focused in particular locations and / or seasons.

During Project Construction, the presence of personnel and the use of equipment in the LSA, including during vegetation clearing along the transmission line ROW, installation of tower foundations and tower assembly and erection, and the establishment and use of access trails, camps, laydown areas and quarries, will create noise, dust and a visual human presence in Project areas. For some recreational users, this may detract from the experience of going into the country, causing them to reduce their use of or stop using certain areas near Project work sites during periods of construction activity. In addition, access to some areas will be restricted at certain times by the nature of the work undertaken or for safety reasons (e.g., during blasting). Hunters, anglers, cabin owners or other users that normally engage in recreational activities in these areas may therefore be disturbed.

As described in Chapter 3, Project Description, Project Construction will progress as a sequence of activities at each location, with crews clearing the ROW passing through a given area, followed by crews installing towers, crews stringing conductors, and so on. As a result, the intensity and particularly, the duration of work activity at any one location will be relatively low over the four year construction period. In addition, the construction activities will occur in defined, localized areas representing a small portion of the land area available for recreational activities in any given region. Recreational resource users that feel disturbed by the presence of construction work activity at a given location may therefore use other areas during these times.

Nalcor will provide information and updates to organizations and the general public as appropriate regarding ongoing and planned construction activities, with the goal to facilitate good communication and planning to proactively avoid interactions with recreational uses and any safety issues. Therefore, while construction-related activities and disturbances may alter the geographic distribution of certain land and resource use activities in a region at specific times, an overall decrease in the levels of recreational activities or their enjoyment in any region is not anticipated as a result of the Project.

Project construction activities will occur near and, in many cases will cross over, watercourses and waterbodies of varying sizes and other physical and hydrological characteristics within the transmission corridor. Although specific information on the current navigational use of each watercourse that will be crossed by the transmission line is not available, this assessment is conservatively based on an assumption that any watercourse that could support navigation may indeed be used for such purpose at the location where the Project crosses that watercourse. As described in Chapter 3, Project Description, Project construction work will be planned and implemented to avoid or minimize any direct interaction with waterbodies and watercourses, and a vegetative buffer will be maintained along both sides of waterbodies and watercourses during ROW clearing. Direct interaction with the freshwater environment during Project Construction will occur primarily during periodic fording where it is required, and during the installation of culverts or bridges to establish access trails or roads. These are both regulated activities, and will be undertaken in accordance with all applicable permits and approval conditions. In addition, the transmission towers and conductors will be designed and built to meet applicable Canadian standards (Section 3.3), which ensure that overhead transmission lines have sufficient clearance to allow navigation on water and road crossings. No issues related to the navigational use of inland waters by boats or snowmobiles are therefore anticipated.

Marine activities in the Strait of Belle Isle and Conception Bay areas include the use of small vessels and larger pleasure craft for recreational purposes. Given the nature and location of both Project Construction activities in the marine environments and marine recreational activities (each of which is limited in extent and time), little if any likely interaction or disturbance is anticipated. Any recreational activity that would occur in the proposed Project Construction areas and times can easily be transferred to other locations during the short time period of Project Construction activities, with no consequent reduction in marine recreational participation rates or overall enjoyment levels. The effects management measures discussed in Section 16.5.5.3 (i.e., Safety Zones, VTMP, communications) will also apply to recreational activities.

Many individuals and families in Newfoundland and Labrador have cabins which are used as retreats during weekends, holidays or vacation periods. These cabins range from isolated, simple structures in the woods to large dwellings accessed by road and located in areas with considerable cottage development. The proposed transmission corridor will cross through several designated cottage planning and development areas in various

parts of the Island of Newfoundland, and many existing cabins are located in various parts of the proposed Project corridor. This includes pockets of cabins in areas such as north of Forteau on the Labrador Straits; on Northern Peninsula lakes (e.g., Ten Mile Lake) near the submarine cable landing location and inland of communities from Hawke's Bay to River of Ponds; on the Gander River and Terra Nova River systems and on the Avalon Isthmus in Central and Eastern Newfoundland; and, through several extensive cottage areas around Placentia Junction and in the centre of the Avalon Peninsula. Many cabins located within or near the LSA are in areas where human activities have occurred or are ongoing, including existing forest roads or other access infrastructure such as the T'Railway Provincial Park. Others are accessed primarily by snowmobile in the winter months, by boat and / or on foot.

Although cabins and their use are more stationary in nature than other types of recreational land and resource use activities, the presence of short-term and intermittent Project construction activities is unlikely to affect their overall use or user enjoyment levels. As described in Chapter 15, Existing Socioeconomic Environment, some of the more concentrated cabin development in the LSA occurs on or near the Avalon Peninsula, where a relatively large population and limited land space have resulted in a relatively high density of cabins in particular areas. In this region, the proposed transmission line will parallel existing large, high voltage transmission systems (from approximately Port Blandford to Soldiers Pond) for several hundred kilometres, which will further minimize any disruptions to existing cabins and their users in that region.

Nalcor will select the eventual route for the approximately 60 m wide ROW within the transmission corridor with the goal to avoid direct interactions between Project activities and existing cabins. In the event that such an interaction cannot be avoided through Project planning and design or other means, Nalcor will acquire these properties, in accordance with the processes outlined in Section 16.5.5.1 Acquisitions will be conducted with the goal to achieve a fair balance between the needs of property owners, Nalcor and the ratepayers and citizens of the province.

Summary of Likely Residual Environmental Effects

The likely residual effects of Project Construction on the Recreational Land and Resource Use KI are as follows:

- Adverse, as construction activities may cause disruptions to existing land and resource users and will occupy land areas that may prevent or restrict their use by others. The creation of access in certain areas may prove beneficial for some recreational land uses and users.
- Of low to moderate magnitude, as in many cases the land area occupied by the Project will be small compared to that used by or available to existing recreational users, and because Project design, consultation and / or other effects management measures will identify and address most issues.
- Local in geographic extent, as most if not all interactions with recreational land users will occur within the LSA, and particularly, at the site of construction activity as it occurs, with regional effects potentially occurring due to an expanded zone of influence (e.g., in relation to visual or noise issues).
- Of short to medium-term duration, as many potential disturbances end quickly, whereas others (such as clearing or infrastructure placement) will continue throughout the Construction phase (and then beyond, see Operations and Maintenance).
- Of low to continuous frequency, as some disruptions will occur only once or occasionally, whereas others will extend throughout Construction and beyond.

There is a high degree of certainty in these effects predictions given the general nature of the Project, the effects management approaches and measures planned, and experience with similar projects.

16.5.5.5 Construction Effects: Aboriginal Contemporary Traditional Land Use

This section assesses potential interactions between Project Construction activities and their possible effects on Aboriginal Contemporary Traditional Land Use within Central and Southeastern Labrador where a number

of Aboriginal groups reside and / or claim Aboriginal rights. Aboriginal contemporary traditional land use activities take place at travel routes and campsites which are used, at times, for hunting and trapping and gathering at various times of the year, fishing within and near the LSA and travelling on the land to places of cultural significance.

During the Construction phase of the Project, the presence of personnel and the use of equipment in the LSA, including during vegetation clearing along the transmission line ROW, the installation of tower foundations and tower assembly and erection, and the establishment and use of access trails, camps, laydown areas and quarries, will create noise, dust and a visual human presence in Project areas. For some Aboriginal users, this may detract from the experience of going into the country, causing them to reduce their use of or stop using certain areas near Project work sites during periods of construction activity. In addition, access to some areas will be restricted at certain times by the nature of the work undertaken or for safety reasons (e.g., during blasting). Any land use activities in these areas may therefore be disturbed. As described in Chapter 3, Project Description, however, construction work activity will progress as a sequence of activities at each location, with crews involved in clearing the ROW passing through a given area, followed by those involved in tower installation, conductor stringing, and so on. As a result, the intensity and duration, of work activity at any one location will be relatively low over the four year construction period. In addition, construction activities will occur in defined, localized areas representing a small portion of the land area available for land use activities in any given region. Any member(s) of an Aboriginal group or community that feels disturbed by the presence of construction work activity at a given location may therefore use other areas during these times.

Nalcor will provide information and updates to Aboriginal groups and organizations, as appropriate, regarding ongoing and planned construction activities, with the goal to facilitate good communication and planning to proactively avoid interactions between the Project and Aboriginal land users and any safety issues. Therefore, while construction-related activities and disturbances may alter the geographic distribution of certain Aboriginal contemporary traditional land and resource use activities in a region at specific times, an overall decrease in the levels of such activities or their enjoyment in any region is not anticipated.

Through currently available information and data collection, it is known that members of Aboriginal communities and organizations have campsites or cabins that are used in several or all seasons of the year to carry out various land use activities. These campsites or cabins range from isolated, simple structures in the woods to larger dwellings accessed by road. Over the past decade the trend for members of Innu Nation has been to use road-based camps which allow people to commute between their camps and their homes and engage in harvesting activities of a shorter duration, such as on weekends and during vacation.

Data collected at the time of this submission indicates that there are areas, primarily along the TLH, which are used for campsites and contemporary travel routes. Current information indicates the cabins located within or near the LSA are in areas where activities have occurred or are ongoing, including existing forest roads or other access infrastructure, while other locations are accessed primarily by snowmobile in the winter months and / or on foot. Based on the information provided by Innu Nation, most campsite / cabin activity on the land occurs outside the LSA and pertains to Outpost Programme cabin locations. Outpost camps potentially within the LSA, noted as “A” and “B” on Figure 15.5.7-1 have not been used since 1993 and 1984, respectively (Armitage 2010).

Innu Nation travel routes, which include road, snowmobile, walking, canoe and motorboat routes, were recorded outside the LSA, along the Churchill River and TLH. Other documented routes range in distances 65 km or greater from the LSA.

The members of NCC who reside in communities throughout Central and Southeastern Labrador travel along many routes, in particular from the coast and along the TLH. Based on information obtained by Nalcor through the Phase II Community Engagement Agreement contemporary land and resource use study involving interviews with NCC members, travel routes were identified that follow the TLH3, and branch off. Some of these travel routes overlap, or intersect with the LSA in the area where the transmission corridor follows the

TLH3. Travel routes also intersect with the LSA near the Labrador Straits and approximately 50 km north of the Strait of Belle Isle. These travel routes are primarily accessed during the winter via snowmobile.

Based on the data and reports collected at the time of this submission, some travel routes and camp sites used by Innu of Pakua Shipi are in the LSA and more broadly in the RSA. Based on the data collected and mapped under the Phase I Community Engagement Agreement between Nalcor and Pakua Shipi, Pakua Shipi indicated polygons of contemporary land use; however, these polygons do not provide specific details as to whether the area is used for a travel route or campsite, since both are plotted together and are not detailed in their location. The ongoing data collection and resulting report under the Phase II Community Engagement Agreement with the community is expected to result in more detailed mapping and information. Nalcor will consider and incorporate information where relevant, including the potential for mitigation and adaptive management.

Nalcor will select the eventual route for the approximately 60 m wide ROW within the transmission corridor with the goal to avoid interaction with existing Aboriginal campsites and cabins. In the event that such an interaction cannot be avoided through Project planning and design or other means, Nalcor will acquire these properties in accordance with the processes outlined in Section 16.5.5.1.

Project Construction activity will generate disturbances related to noise, dust, presence of people, equipment and materials that could affect the overall quality (aesthetics, tranquility) of the traditional land use experience, including gathering of plants for medicinal purposes. The majority of land use and resource harvesting by members of Innu Nation within the general Project area remains centred on a series of lakes situated at the headwaters of the Eagle River and on the Eagle River plateau outside the LSA and RSA. Some sources have identified harvesting locations distributed across Central and Southeastern Labrador; however, in the area of the Mealy Mountains, the majority of the group's activities occur outside the LSA and RSA and it is unlikely that there would be any decrease in harvesting by Innu Nation as a result of the Project.

Data from Innu Nation indicates that medicinal plants are harvested near Gull Island. None of the references provided by Innu Nation in regard to medicinal plant gathering occur in the LSA or RSA.

Based on the data obtained from interviews conducted with NCC members in 2011 through the Phase II Community Engagement Agreement, NCC members identified areas in the LSA and the RSA used for harvesting large animals, furbearers and birds. The harvesting areas in the LSA and RSA are primarily in the area where the transmission corridor follows the TLH3, and near the Labrador Straits (Figure 15.5.7-3b, c).

A large area identified as being used for hunting large animals near the headwaters of the Eagle River extends to, and overlaps with, a section of the transmission corridor (Figure 15.5.7-3c). In the area where the transmission corridor follows the TLH3, locations were identified by NCC members where they have hunted birds, and trapped furbearers (e.g., marten, fox, and beaver). Several linear areas for trapping were identified along the TLH3 where the transmission corridor follows the TLH3 (Figure 15.5.7-3c). A small portion of the areas identified for harvesting large animals, overlap with the transmission corridor (Figure 15.5.7-3c).

NCC members identified areas in the southern section of the corridor, in the area near the Labrador Straits including the Strait of Belle Isle, used for hunting birds. Members of NCC also identified locations in this area where they have trapped furbearers (e.g., foxes, beaver, marten), and two areas which partially overlap with the LSA were identified as areas used for hunting large animals (Figure 15.5.7-3c).

Marine activities in the Strait of Belle Isle include the use of small vessels and larger pleasure craft by Aboriginals for resource harvesting (e.g., hunting birds and fishing). Given the nature and location of both Project construction activities in the marine environments and these resource harvesting activities (each of which is limited in geographical extent and time), little if any likely interaction or disturbance is anticipated. Any activity that may overlap spatially and temporally with the proposed construction activities can easily be transferred to other locations during the short time period of construction activity, with no consequent reduction in participation rates or overall enjoyment levels of Aboriginal resource users. The effects

management measures discussed in Section 16.5.5.3 (e.g., safety zones, VTMP, communications) will also help to avoid or reduce effects on these Aboriginal resource use activities.

Within the Strait of Belle Isle, seal hunting areas were identified (Figure 15.5.7-3c); these areas overlap with the submarine cable corridor, and are therefore in the LSA. However, interaction between this resource harvesting activity and Project Construction in the Strait of Belle Isle is not likely due to the scheduling of Project activities during the ice-free months. Therefore, a temporal overlap of marine Project and seal harvesting activities is not likely to occur, and it is not discussed further in this assessment.

Berry harvesting areas were identified in three locations along the transmission corridor where the corridor follows the TLH3 (Figure 15.5.7-3c), and therefore occur in the LSA. Two locations along the TLH3 were identified as areas used for wood harvesting.

Berry harvesting areas that overlap with the transmission corridor were also identified in the Forteau Point area, including the general area near the Strait of Belle Isle extending north for approximately 25 km; portions of this area overlap with the LSA (Figure 15.5.7-3c).

In the southern section of the corridor, near the Strait of Belle Isle, two wood harvesting areas that overlap with the LSA were identified (Figure 15.5.7-3c).

Information obtained from the Phase II Community Engagement Agreement with NCC identified one location in the LSA where plants were harvested for medicinal purposes. This location was near the Labrador Straits (Figure 15.5.7-3c).

Maps produced under the Phase I Agreement with Pakua Shipi indicate that members of the community carry out resource harvesting in the RSA. One location was identified within the LSA in the area to the east of the Saint-Augustin River. No temporal designation was given to this location, therefore, further details on this area will be extracted from ongoing data collection with the community to ascertain whether it is a current resource harvesting area. Other hunting and trapping activities have been identified in the RSA near the Traverspine River and Kenamu River. As well, hunting and trapping activities have been identified outside the RSA west of Gull Island and in the area south of Lake Melville. More detailed information regarding specific locations of Innu of Pakua Shipi's land and resource use and the frequency of this use will be provided in the reports and data collected under the Phase II Community Engagement Agreement. Nalcor will consider and incorporate any information obtained under the Phase II Community Engagement Agreement, including the potential for mitigation and adaptive management during detailed design and routing, where relevant.

Places of cultural significance for Innu Nation have been identified within the LSA. *Manitu-utshu*, or the rock knoll, is located on the north side of Muskrat Falls and within the proposed transmission corridor. One birth place was recorded approximately 10 km from Muskrat Falls, outside the LSA and RSA. Muskrat Falls is also the known location of a former shaking tent ceremony, located within the LSA. No construction is planned on the north side of the river and therefore, no interaction between the Project and these places of cultural significance is expected.

Birth and death places, gathering places, shaking tent locations, burial grounds and a place of religious significance were recorded along the Churchill River between Gull Island and Muskrat Falls, and near Happy Valley-Goose Bay and Mud Lake, and elsewhere in the Central and Southeastern Labrador region; all are outside the RSA.

During interviews conducted with Pakua Shipi community members in 2010, four birth places and five burial grounds were identified. One of the burial grounds identified is potentially located within the LSA, near the area where the St. Paul River overlaps with the transmission corridor. Two other places of cultural significance were identified north-east of the St. Augustin River, east of the transmission corridor and outside the RSA. Additional details on places of cultural significance are being collected as part of the Phase II Community Engagement Agreement and will be considered and incorporated, including the potential for mitigation and adaptive management, where relevant.

Based on the information gathered during interviews with members of NCC, places of cultural significance were not identified within the LSA or RSA.

Project Construction activities will also occur near, and in many cases will cross over, watercourses and waterbodies of varying sizes and other physical and hydrological characteristics. Specific information on the current navigational use by Aboriginal groups and communities of the hundreds of watercourses that will be crossed by the transmission line is limited, thus this assessment is conservatively based on an assumption that any watercourse that could support such travel may indeed be used for such purposes at the eventual Project crossing point. As described in Chapter 3, Project Description, Nalcor will plan and implement Project Construction work with the goal to avoid or minimize any direct interaction with waterbodies and watercourses, and will maintain a vegetative buffer along both sides of watercourses and waterbodies during ROW clearing. Direct interaction with the freshwater environment during Project Construction will occur primarily during periodic fording, where required, and during the installation of culverts or bridges to establish access trails or roads. These are both regulated activities, and will be undertaken in accordance with all applicable permits and approval conditions. In addition, the transmission towers and conductors will be designed and built to meet applicable Canadian standards (Section 3.3.2.1), which ensure that overhead transmission lines have sufficient clearance to allow navigation on water and road crossings. Issues related to the navigational use of inland waters by boats or snowmobiles are therefore not anticipated.

Summary of Likely Residual Environmental Effects

The likely residual effects of Project Construction on the Aboriginal Contemporary Traditional Land Use KI are as follows:

- Adverse, as construction activities may cause disruptions to or restrictions on existing land and resource use by members of Aboriginal communities or organizations. The creation of access in certain areas may prove beneficial for some land uses where members of Aboriginal communities and organizations can pursue contemporary land use activities for traditional purposes.
- Of low to moderate magnitude, as in many cases the land area occupied by the Project will be small compared to that used by or available to members of Aboriginal communities or organizations to carry out contemporary activities for traditional purposes, and because Project design, consultation and / or other effects management measures will serve to identify and address most issues. The effect is unlikely to result in a risk to overall participation rates, user enjoyment or societal values.
- Local in geographic extent, as most if not all interactions between the Project and Aboriginal land use will occur within the LSA, and particularly, at the site of construction activity as it occurs, with regional effects potentially occurring due to an expanded zone of influence.
- Of short to medium-term duration, as many potential disturbances will end quickly, whereas others (such as ROW clearing or infrastructure placement) will continue throughout the Construction phase of the Project (and then beyond, see Operations and Maintenance).
- Of low to continuous frequency, as some disruptions will occur only once or occasionally whereas others will extend throughout Construction and beyond.

Based on a comprehensive review of available literature and data collected from Aboriginal communities and organizations to date, there is a moderate to high degree of certainty in these effects predictions given the general nature of the Project, the effects management approaches and measures planned, and experience with similar projects. The amount of land that will be affected or removed from use as a result of the Project is a small percentage of the land available for any one of the land uses in the region.

In addition, Nalcor will continue to use information collected during past and ongoing discussions with potentially affected Aboriginal groups and communities to avoid conflicts with contemporary land use for traditional purposes to the extent practical. Where an overlap of the Project and Aboriginal land use occurs, adverse effects can be addressed through mitigation (e.g., adherence to regulations, avoidance, limited access

and communication). The information pertaining to the contemporary traditional land use of Innu Nation and the Nunatsiavut Government in the LSA and RSA is considered complete. Nalcor has a continued commitment to support information gathering and land and resource use studies under the current community engagement agreements with NunatuKavut, Pakua Shipu and Unamen Shipu. Nalcor will consider and incorporate information where relevant, including the potential for mitigation and adaptive management.

16.5.5.6 Construction Effects: Protected Areas

Land areas across Newfoundland and Labrador have been identified as being special and particularly important or representative for ecological and / or cultural reasons, and have therefore been afforded protection under provincial or federal legislation or through other means. An important principle and objective of Project planning to date has been to avoid existing protected areas during transmission corridor selection and in the placement and design of other components of the Project, and this will continue into detailed engineering and design.

As described in Section 15.5.12, the proposed Project completely avoids most protected areas across the province. However, there are a number of locations where the currently identified 2 km wide transmission corridor does overlap slightly with the edges of protected areas. This is due solely to the fact that topographical constraints and Nalcor's objective to follow existing transmission lines or other developments have restricted transmission line placement to specific areas. However, this "interaction" is purely artificial and Nalcor commits to completely avoiding existing protected areas in the eventual selection of a specific routing for the transmission line ROW and the siting of other Project infrastructure. Consequently, direct effects on these existing protected areas in Newfoundland and Labrador will not occur.

The proposed transmission line will also cross the Newfoundland T'Railway Provincial Park at multiple locations in Central and Eastern Newfoundland and on the Avalon Peninsula. In these locations, the T'Railway Provincial Park can be easily and completely spanned and direct interactions or issues are not anticipated. Nalcor and its contactors may also seek to use a portion of the T'Railway Provincial Park to provide construction access for specific worksites, and would do so only following discussions with the GNL Natural Heritage Branch, Parks and Natural Areas Division and the Newfoundland T'Railway Council and with the necessary approvals. The most important likely interaction between the Project and the T'Railway Provincial Park will occur in the Conception Bay South area, where the site of the proposed electrode structure at Dowden's Point overlaps with the T'Railway Provicial Park. Nalcor has discussed this with the GNL Natural Heritage Branch, Parks and Natural Areas Division, and will continue to explore options to address the interaction, including the possible modification of the small section of the railbed around the Project site. This section of the T'Railway Provincial Park is reportedly prone to effects by wave action, and such minor relocations have reportedly occurred in other areas. Nalcor will continue to work with the provincial government to arrive at a mutually acceptable approach, which will be implemented in compliance with the necessary approvals.

In locations where proposed Project sites and associated construction activities occur in close proximity to protected areas, there is the potential that the Project may be perceived to affect the overall integrity and enjoyment of these areas during times of active construction. Issues and interactions relating to protected areas would be similar to those discussed above under the Recreational Land and Resource Use KI; for example, potential effects of the Project on the wilderness character and aesthetic quality of existing areas and their use due to Project related equipment use, noise, human presence, or other perceived disturbance. These issues would be particularly relevant to protected areas, given that the designation, protection and use of protected areas is often based on their undisturbed nature.

In Central and Southeastern Labrador, the transmission corridor avoids the proposed Mealy Mountain National Park area and the proposed Eagle River Waterway Provincial Park. The edge of the corridor is over 5 km from the southwestern portion of the proposed Eagle River Waterway Provincial Park, through which the existing highway passes. The proposed transmission line, Strait of Belle Isle cable landing site and proposed shore electrode are also more than 10 km from the Pinware River Provincial Park in the Labrador Straits. However,

on the Northern Peninsula, the transmission corridor skirts the western edge of the Main River Provincial Park; in Central Newfoundland it skirts the edge of the West Brook Ecological Reserve. The transmission corridor also overlaps slightly with the Jack's Pond and Butterpot Provincial Parks and the Hawke Hill Ecological Reserve which are located on the Avalon Peninsula or Isthmus, but in this area the transmission line will be constructed adjacent to existing high voltage transmission lines and / or the highway.

Project Construction will progress as a sequence of activities at each location, where the intensity and duration of work activity at any one location will be low. The nature and low number of Project sites near existing protected areas, as well as the distances and topographies involved and the timing and intensity of human presence in these areas, will make the likelihood of any effects on these sites and their use low, and of short duration. Adverse effects on the ecological integrity or cultural value of any existing protected area in Newfoundland and Labrador are not likely to occur as a result of Project construction activity.

Summary of Likely Residual Environmental Effects

The likely residual effects of Project Construction on the Protected Areas KI are as follows:

- Adverse, as the Newfoundland T'Railway Provincial Park will be spanned, and may be relocated in one segment, with the approval of and in cooperation with the province and the Newfoundland and T'Railway Council. The Project has and will be planned and designed so that no Project components occur within existing protected areas. However, the Project will be visible from some protected areas.
- Of low magnitude, because only users in locations of protected areas near construction sites during Project Construction activities may experience effects.
- Local in geographic extent, as most interactions will occur within or near the LSA, and near the periphery of protected areas.
- Of short to medium-term duration, as many potential disturbances will last for only a short time, whereas others (such as clearing or infrastructure placement) will continue throughout the Construction phase of the Project and beyond (see Operations and Maintenance).
- Of low to continuous frequency, as some disruptions will occur only once or occasionally, whereas others will extend throughout Construction and beyond.

Based on the known locations of protected areas discussed in this section, there is a high degree of confidence in these effects predictions given the nature of the effects management measures and approvals and Nalcor`s experience with similar projects.

It should be reiterated that this assessment has, of necessity, focused on existing and known protected areas in Newfoundland and Labrador, as well as those which have been formally proposed and publicly announced by governments. Nalcor understands that the Government of Newfoundland has also developed a new Natural Areas Systems Plan (NASP) which identifies various other proposed protected areas throughout the province. The NASP has not been released for public review, and as such, these proposed protected areas cannot be presented or assessed for the VEC in this EIS.

Nalcor will continue to work and consult with the GNL Natural Heritage Branch, Parks and Natural Areas Division and other relevant organizations as it proceeds with Project planning, and incorporate any information on these proposed protected areas that becomes available during ongoing Project planning, design and implementation. Nalcor expects this process to build on their approach to avoid protected areas, and other pristine areas, such as the Highlands of St. John and the Soufflets – Main River areas, to the extent practical.

16.5.6 Operations and Maintenance

This section describes the potential effects of Project Operations and Maintenance on the Land and Resource Use VEC.

16.5.6.1 Overview of Project Operations and Maintenance and Associated Effects Management

Once the construction of the Project is completed, levels of activity along the Project components will decrease substantially, and temporary construction infrastructure such as construction camps, marshalling yards and staging areas, and most access roads and trails will be decommissioned.

Following Project commissioning, the Project will be operated on a continuous basis. Project maintenance activities will include regular inspection of all Project components, repairs to the system as required, and periodic vegetation management along the cleared ROW (Chapter 3, Project Description). The transmission lines will be 100% inspected through ground and / or aerial patrols, with 10% to 20% of the line being inspected via climbing inspections each year. The inspections for the on-land portions of the lines will be completed from the air (helicopter) or from the ground (ATVs during summer or snowmobiles in winter). The submarine cables and electrodes will be inspected through ROV surveys and / or other appropriate means. Vegetation management will commence eight years after construction is completed and will be conducted every seven years thereafter during Project operations. Activities associated with the operation of the HVdc system will be integrated into Nalcor's existing system-wide inspection and maintenance program. Project Operations and Maintenance activities will be carried out in accordance with standard procedures and relevant environmental protection measures. These are discussed in the environmental effects assessment sections that follow.

The aspect of the Operations and Maintenance phase of the Project that will be most relevant to land and resource use activities is the ongoing presence of the Project, including the cleared ROW, transmission towers and conductors, submarine cables, electrodes and other elements on the landscape.

Environmental effects management strategies and measures for Project Operations and Maintenance will be similar to those summarized for the Construction phase above. Of particular relevance will be ongoing communications about upcoming maintenance activities and the overall operation of the transmission system, as well as general planning and scheduling of Operations and Maintenance activities to avoid interfering with adjacent land and resource uses and users within or adjacent to the ROW as much as possible.

16.5.6.2 Existing Knowledge

The presence and operation of high voltage electrical transmission systems is common worldwide, and the potential effects of transmission lines on land and resource use are, in many respects, similar to those which may be experienced with any large project, and particularly comparable with those of other linear projects such as pipeline, road and railway construction.

However, little available published "existing knowledge" which has evaluated and measured the actual and known effects of similar projects and activities. Some key findings from a selection of recent published literature that is relevant to transmission line operation are provided in Table 16.5.6-1.

Table 16.5.6-1 Existing Knowledge (Operations and Maintenance): Effects of Similar Projects on Land and Resource Use

Reference	Study / Project Context	Summary of Findings
PSC Wisconsin (2010, internet site)	This overview reviews the environmental issues and concerns raised by the construction of electric transmission facilities. The first part of the overview provides a general summary of the methods to measure and identify environmental impacts. The second part of the overview is an A to Z directory of specific environmental issues and techniques to minimize or mitigate the impacts.	– Discussion of potential impacts and methods to minimize or mitigate the impacts on various land and resource use activities.
Soini et al. (2009)	Article identifies and describes factors that are assumed to contribute to local residents' perceptions of power transmission lines as a part of their everyday landscape. It analyses how transmission lines are perceived in comparison to other landscape elements and examines whether in their present location they are perceived as landscape damage.	– Transmission lines are generally perceived as negative, both as existing and new landscape elements. – Negative perceptions of transmission lines are particularly strong among people with positive environmental attitudes and nature orientation in leisure activities.
Taku Wilderness Association (2001)	The Impact of Resource Developments on Traditional Land-based Economies	– Resource developments have had many impacts on traditional land-based economies in the north. – Effects include increased competition for natural resources, theft and vandalism of property, and disproportionate impacts on family areas. – The report suggests that post impact studies of resource developments and traditional land-based economies means little is known about the short and long-term impacts on traditional economies, and therefore the cultures, of Aboriginal communities. This low level of knowledge about the range of impacts and their duration, and the corresponding uncertainty, demands that a precautionary approach be adopted.

16.5.6.3 Operations and Maintenance Effects: Commercial / Municipal and Recreational Land and Resource Use

This section examines the potential effects of Project Operations and Maintenance activities on the Commercial / Municipal Land and Resource Use KI and the Recreational Land and Resource Use KI within the regions crossed by the Project. These KIs are discussed in a common section, given that relevant Project elements and potential issues and interactions for both are similar. Any important differences between these KIs are highlighted where relevant.

In terms of direct interaction (overlap) between Project Operations and Maintenance and existing land and resource uses, many effects will be a continuation of those that originated during Construction. Little or no

new land or ground disturbance will be required during operations, and decommissioning of some Project infrastructure will occur upon completion of construction (e.g., most access trails, camps, marshalling yards). Any direct effects on land will have already occurred or been avoided or addressed through the planning and other mitigation measures implemented prior to and during Project Construction.

Most "mobile" land and resource use activities (e.g., forestry, mineral exploration, marine vessel traffic and other similar activities) will be able to continue uninterrupted in or near the Project throughout the life of the Project. This is the case except at specific areas and times when some activities (e.g., forest harvesting along the cleared ROW) will not be able to continue at a given location when system maintenance, repairs and vegetation management activities are occurring. However, the relatively small scale, intermittent and short-term duration of these Project activities will limit the potential for any interactions or likely effects to occur.

A key issue raised through consultation relates to the potential effects of the presence of the Project transmission towers and cleared ROW on commercial outfitters and their operations, particularly on the Northern Peninsula. Although several outfitter camps are located in areas with ground access and other existing human activities, several are fly-in operations situated in relatively remote and pristine areas. For these outfitters, the remoteness and wilderness character of their camps are important factors to their clients.

Transmission line routing in the Long Range Mountains area and possibly other areas will be explored during Project planning and detailed route selection to limit the potential for the eventual use of the ROW by ATVs and other modes of public access, to help reduce human access to these areas and any associated harvesting which may have an effect on the wildlife populations that the outfitters depend upon.

During Project Operations and Maintenance, Nalcor will work directly with any active commercial outfitter with an existing camp located within the transmission corridor, or within 5 km of the corridor or of any other permanent Project component, to schedule Project activities to avoid or reduce any potential issues or interactions resulting from Operations and Maintenance activities.

It is anticipated that these planning and consultation measures will help to address the issues and concerns of those active and remote outfitters that the transmission line will pass close to or in the general vicinity of. Good resource management and active regulatory enforcement by relevant government agencies will also be a key measure to address any such effects.

Based on viewshed modelling produced for the Project (Stantec 2011b), the transmission line will be visible from Hynes Hunting and Fishing Lodge on Portland Creek Pond, and from Parsons Pond Outfitting (Snowy Lake Lodge). It is possible that the transmission line will not be visible from Four Ponds Outfitting, which is located at the headwaters of the Main River. Whether and to what degree the hunters who visit these camps either notice or dislike the presence of the transmission line will likely vary, and this is a personal and subjective matter. However, it is anticipated that outfitters will be able to eventually incorporate the presence of the Project into their operations, and adjust the specific areas in which they take any guests to avoid areas where the transmission line is visible.

Various components of the Project will be located in areas used for other recreational activities, including hunting, trapping, angling, ATV and snowmobile use, boating, berry picking, firewood cutting, hiking, bird watching, camping, skiing and other consumptive and non-consumptive outdoor recreational activities.

As described above, the presence of the Project will generally not prevent or otherwise restrict the conduct of these activities in or near the Project areas. For some recreational users, the visible presence of large transmission towers, a cleared ROW and / or other Project elements may detract from the experience of going into the country, and cause them to access certain areas less often or stop using certain areas where the Project is located or visible from. Whether and to what degree these land users are aware of and concerned by the presence of the transmission line is a personal and subjective matter. This will vary between individuals, as will the degree to which the Project will affect their use of certain areas and / or overall participation and enjoyment levels.

Any recreational resource users that feel disturbed by the presence of the Project at a given location will be able to use other areas, given the overall land area available for such recreational activities in any given region. Therefore, an overall decrease in the levels of recreational land use activities or their enjoyment in any region is not anticipated.

International Appalachian Trail Newfoundland and Labrador (IATNL) is developing a system of hiking trails from southwestern to northern Newfoundland (Chapter 15, Existing Socioeconomic Environment). This includes an extensive network of existing and proposed trails in the south-central portion of the Northern Peninsula (Section 15.5), which connect existing trails and resource roads to create a network of backcountry trails that expands each year. Trails have been developed from south of River of Ponds to Gros Morne National Park. The most extensive development is the Indian Lookout Trail south of Portland Creek, Inner Pond. New trail connections are proposed from Eastern Blue Pond in the north to the Main River area in the south. Based on the most recent mapping information provided by the IATNL, the existing trail system crosses the proposed transmission corridor along parts of the existing Indian Lookout Trail and the proposed trails in that area and near the Main River. Given the overall size and geographic extent of existing and proposed trails across the Island's Northern Peninsula, some degree of interaction between the Project and IATNL's existing and / or future trail network is inevitable. However, this will not result in a direct land use conflict as the transmission towers and conductors can easily span trails as required. The most likely potential interaction between the IATNL's trail system and the Project will be visual in nature, since the transmission line will be visible from some points along this large network of hiking trails. Nalcor has met and will continue to meet with the IATNL as engineering progresses, to discuss the specific Project routing and tower placement to reduce visual affects in key areas where technical and cost considerations will facilitate this.

The Project has the potential to be used by local residents and resource users as a transportation corridor. As described in Chapter 3, Project Description, vegetation will be cleared along the ROW during Construction, and ongoing vegetation management will keep vegetation to below 2 m in height over the life of the Project. Therefore, while the ROW will not be accessible to automobile traffic, an access trail along the ROW to facilitate ongoing inspection and maintenance (similar to existing transmission lines throughout the province) will likely be used by operators of ATVs and snowmobiles. Although Nalcor does not condone or promote the use of its transmission line ROWs for this purpose, it is aware that these activities occur elsewhere in the province and considers prevention of such activities difficult, if not impossible. It has been noted through public consultation and in other forums that such access may have an overall positive effect on some land and resource users, as it will provide better or new access to currently remote areas, for general passage (such as snowmobile travel) and to access new areas for activities such as hunting and fishing.

Whether and to what degree, and for what purpose, persons will use portions of the transmission ROW as a transportation corridor cannot be known with certainty, and will vary considerably by region. A detailed analysis of existing access within and adjacent to the proposed transmission corridor was completed as part of its Socioeconomic Environment Component Study for this EA (Nalcor et al. 2011). The analysis determined that while certain parts of the corridor have little or no existing access (for example, the eastern half of the corridor in Central and Southeastern Labrador, after it leaves the TLH; and, the area where it crosses the Long Range Mountains on the southern part of the Island's Northern Peninsula), most parts of the corridor already have considerable existing accessibility due to forest access roads and other trails. Indeed, the presence of existing access was a key consideration in the selection of the transmission corridor, including decisions to route the corridor along the western portion of the TLH in Labrador, use existing forest access road networks wherever possible and, while respecting technical design requirements, follow existing transmission lines from Port Blandford to Soldiers Pond, both to allow for better construction access and to avoid opening up new areas for human activities and use. Therefore, in many instances the Project will likely not create or enhance access to any particular wilderness area. In other areas, people may choose to use the ROW to access cabins or other sites rather than using existing routes, with little or no change in the nature or intensity of human presence or activities.

Nalcor will consult with government departments, Aboriginal groups, outfitters and other groups and individuals to explore possible transmission line routing approaches (e.g., spanning natural topographic

features which would serve as natural access barriers) in currently remote areas and identified sensitive areas to minimize the eventual use of the ROW by ATVs and other modes of public access. This will help to reduce human access and any associated harvesting in currently less accessible areas. The management of improved access into previously remote areas will be primarily achieved through sound resource management and active regulatory enforcement by relevant government agencies.

Summary of Likely Residual Environmental Effects

The likely residual effects of Project Operations and Maintenance on the Commercial / Municipal and Recreational Land and Resource Use KIs are as follows:

- Adverse, as maintenance activities and / or the presence of Project infrastructure will disrupt existing land and resource users. Ongoing access in certain areas will likely prove beneficial for some.
- Of low to moderate magnitude, as in many cases the land area occupied by the Project will be small compared to that used by or available to existing users, and because Project design, consultation and / or other effects management measures will serve to identify and address most issues.
- Local in geographic extent, as most if not all Project interactions will occur within the LSA, and particularly, at the Project sites and adjacent areas, with regional effects potentially occurring due to an expanded zone of influence (e.g., visual).
- Of short-term to far future duration, as maintenance-related disturbances will end quickly, whereas others (such as the presence of the ROW and transmission towers) will continue throughout the life of the Project.
- Of low to continuous frequency, as some disruptions will occur only once or occasionally, whereas others will extend throughout the life of the Project.

There is a high degree of certainty in these effects predictions given the general nature of the Project, the effects management approaches and measures proposed, and experiences with similar projects.

16.5.6.4 Operations and Maintenance Effects: Aboriginal Contemporary Traditional Land Use

This section examines the potential effects of Project Operations and Maintenance activities on the Aboriginal Contemporary Traditional Land and Resource Use KI within the Central and Southeastern Labrador region crossed by the Project.

In terms of direct interaction (overlap) between Project Operations and Maintenance and existing land and resource use by members of Aboriginal communities and organizations, most effects will be a continuation of those that originated during Project Construction. Little or no new land or ground disturbance will be required during operations, and in some areas Project infrastructure will be decommissioned (e.g., access trails, camps, marshalling yards) upon completion of construction. Any direct effects on land will have already occurred, or been avoided or addressed through the planning and other mitigation measures implemented prior to and during construction.

Various components of the Project will be located in areas used by members of Aboriginal communities and organizations for the purpose of hunting, trapping, gathering and fishing at various times of the year, and travelling on the land to places of cultural significance.

The presence of the Project will generally not prevent or otherwise restrict the conduct of these activities in or near the LSA. For some Aboriginal users, the visible presence of large transmission towers, or a cleared ROW and / or other Project elements may detract from the experience of going into the country, and cause them to reduce their use of or stop using certain areas where the Project is located or visible. Again, whether and to what degree Aboriginal land users are aware of and concerned by the presence of the transmission line is a

personal and subjective matter. This will vary considerably between individuals, as will the degree to which the Project will affect their use of certain areas and / or overall participation and enjoyment levels.

In addition, the Project will be located in a defined, localized area representing a small portion of the land area available for Aboriginal contemporary traditional land use activities in any given region. Any member of an Aboriginal group or community that feels disturbed by the presence of the Project at a given location may use other areas. Therefore, an overall decrease in the level of Aboriginal activities for traditional purposes on the land is not anticipated.

The proposed transmission line has the potential to be used by Aboriginal users as a travel route. As described in Chapter 3, Project Description, vegetation will be cleared along the ROW during construction, and ongoing vegetation management will keep vegetation below 2 m in height over the life of the Project. The ROW will therefore not be accessible to automobile traffic, although an access trail along the ROW to facilitate ongoing inspection and maintenance (similar to existing transmission lines throughout the province) will likely be used as an access route by Aboriginal users at various times of the year. Although Nalcor does not condone or promote the use of its transmission lines for this purpose, it is aware that this activity occurs elsewhere in the province and considers prevention of such activities difficult if not impossible. Through Nalcor's ongoing engagement with Aboriginal communities and organizations, some members have indicated that such access may have an overall positive effect on some Aboriginal land and resource users, as it will provide better or new access to currently remote areas, both for general passage (such as snowmobile travel) and to access areas for activities such as hunting and fishing. Whether and to what degree, and for what purpose, Aboriginal persons will use portions of the ROW as a transportation corridor cannot be known with certainty and will likely vary by group. As noted previously, Nalcor will consult with Aboriginal communities and organizations to explore possible approaches to transmission line routing. Nalcor has a continued commitment to undertake and finalize land and resource use studies under the current community engagement agreements with NunatuKavut, Pakua Shipu and Unamen Shipu. Nalcor will consider and incorporate information where relevant, including the potential for mitigation and adaptive management during detailed design and routing.

Vegetation management during Project Operations and Maintenance will include herbicide application, which could adversely affect areas currently available for berry picking or harvesting of medicinal plants. Vegetation management (i.e., via mechanical and herbicide application) will be undertaken on the ROW to remove trees greater than 2 m in height. The herbicide to be used is Tordon 101 mixed with Sylgard 309; it will be applied in accordance with appropriate regulations and procedures by approved personnel. Vegetation management will likely start in year eight of operations and will be repeated every seven years thereafter, or as required for safety. As such, only a portion of the ROW would be managed every seven years, and only appropriate plants (i.e., tall growing species) will be treated. In addition, the herbicide is considered to be non residual and non toxic to wildlife or humans in the doses that would be applied to plants on the ROW. In any event, communities and Aboriginal groups would be advised of locations of the ROW scheduled for vegetation management, so that plant and berry harvesting would not occur in that location for a given time period.

Summary of Likely Residual Environmental Effects

The likely residual effects of Project Operations and Maintenance on the Aboriginal Contemporary Traditional Land Use KI are as follows:

- Adverse, as maintenance activities and / or the presence of Project infrastructure may disrupt Aboriginal contemporary traditional land and resource users. The creation of access in certain areas may prove beneficial for some.
- Of low to moderate magnitude, as in many cases the land area occupied by the Project will be small compared to that used by or available to members of Aboriginal communities or organizations and because Project design, consultation and / or other effects management measures will identify and address most issues.

- Local in geographic extent, as most if not all Project interactions will occur within the LSA, and particularly, at the Project sites and adjacent areas, with regional effects potentially occurring due to an expanded zone of influence (e.g., visual effects).
- Of short-term to far future duration, as maintenance-related disturbances will end quickly, whereas others (such as the presence of the ROW and transmission towers) will continue throughout the life of the Project.
- Of low to continuous frequency, as some disruptions will occur only once or occasionally, whereas others will extend throughout the life of the Project.

Based on a comprehensive review of available literature and data collected from Aboriginal communities and organizations to date, there is a moderate to high degree of certainty in these effects predictions given the general nature of the Project, the effects management approaches and measures proposed, and experience with similar projects. The amount of land that will be affected or removed from use is a small percentage of the land available for any specific land use in the region. Nalcor will continue to use information collected during past and ongoing discussions with potentially affected Aboriginal groups and communities to avoid conflicts with contemporary land use for traditional purposes to the extent practical. Where an overlap of the Project and traditional land use occurs, adverse effects can be addressed through mitigation (e.g., adherence to regulations, avoidance, limited access and communication). The information pertaining to the contemporary land use of Innu Nation and the Nunatsiavut Government in the LSA is considered complete. Nalcor has a continued commitment to undertake and finalize land and resource use studies under the current community engagement agreements with NunatuKavut, Pakua Shipu and Unamen Shipu. Nalcor will consider and incorporate information, including the potential for mitigation and adaptive management during detailed design and routing, where relevant.

16.5.6.5 Operations and Maintenance Effects: Protected Areas

This section examines the potential effects of Project Operations and Maintenance activities on existing protected areas.

As described previously, the planning and engineering design for the Project, including the specific routing of the ROW and the siting of all Project components and activities, will be completed with the goal to avoid any direct overlap with existing protected areas in Newfoundland and Labrador. The required transmission line crossings, access use and possible interaction of the Dowden`s Point electrode site with the Newfoundland T'Railway Provincial Park will be addressed through the planning and design measures discussed under Construction effects in Section 16.5.5.6. No effects will extend into the period of Project Operations and Maintenance. Maintenance and repair activities will occur at times in portions of the Project area close to existing protected areas, but these activities will be infrequent and of relatively short-term duration, and will not likely affect the integrity or use of protected areas.

The primary potential interaction between the Project during operations and the Protected Areas KI relates to the potential presence and visibility of the transmission towers and cleared ROW from nearby protected areas. This is particularly relevant for the Main River Provincial Park, the West Brook Ecological Reserve in central Newfoundland, and the Jack's Pond and Butterpot Provincial Parks, and Hawke Hill Ecological Reserve which are located on the Avalon Peninsula and its Isthmus.

Even with routing design to avoid these protected areas, the transmission towers will still likely be visible from some locations (depending on topography and vegetation cover). As described in Section 16.8 of this EIS, elements in the landscape may be discernable up to 4.8 km (i.e., at this distance, Project components lose detail and blend into the surrounding landscape). Other protected areas such as proposed parks in Central and Southeastern Labrador, Gros Morne National Park and Avalon Wilderness Reserve are located more than 4.8 km from the Project transmission corridor. Transmission towers may be visible from parts of Bay du Nord Wilderness Reserve and Terra Nova National Park as these are less than 5 km from the corridor. However, these locations are presently adjacent to the TCH and an existing transmission corridor.

Summary of Likely Residual Environmental Effects

The likely residual effects of Project Operations and Maintenance on the Protected Areas KI are as follows:

- Adverse, because although the Project has and will be planned and designed so that no Project components occur within existing protected areas, the transmission towers and construction activities will be visible from some protected areas. The presence of the Project is not likely to result in any change in the ecological integrity, cultural value or societal use and enjoyment of these protected areas.
- Of low magnitude, because users in locations of protected areas near Operations and Maintenance activities may experience effects. Users within most protected areas will not be able to see the Project. From within a few protected areas users may see portions of the Project from limited locations within the protected area.
- Local in geographic extent, as most interactions will occur within or near the LSA, near the periphery of protected areas.
- Of short-term to far future duration, as many potential disturbances will last for only a short time, whereas others (such as ongoing maintenance and repairs and the visual presence of the towers) will continue throughout the life of the Project.
- Of low to continuous frequency, as some disruptions will occur only once or occasionally, whereas others will extend throughout the life of the Project.

Nalcor will continue to work and consult with the GNL Natural Heritage Branch, Parks and Natural Areas Division and other relevant organizations as it proceeds with Project planning, to seek to incorporate any available information on proposed protected areas into its planning, design and implementation of the Project.

Based on the known locations of protected areas discussed in this section, there is a high degree of certainty in these effects predictions given the nature of the Project, the effects management measures and approaches, and experience with similar projects.

16.5.7 Environmental Effects Summary and Evaluation of Significance

16.5.7.1 Summary of Environmental Effects

A summary of likely Project-related effects are presented in Table 16.5.7-1. The information is organized by KI.

Table 16.5.7-1 Environmental Effects Analysis Summary: Land and Resource Use

Project Phase / Key Indicator	Likely Residual Environmental Effects Summary Descriptors				
	Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**
Construction					
Commercial / Municipal and Recreational Land Use	**Adverse** – Construction will disrupt existing users and will occupy areas that may prevent or restrict use – Creation of access in certain areas will be beneficial for some uses	**Low to Moderate** – In many cases, the land area occupied by the Project will be small compared to that used by or available to existing users – Design, consultation, permitting and / or other effects management will identify and address most issues	**Local** – Most interactions will occur within the LSA and at the site of construction activity as it occurs	**Short-term to Medium-term** – Many potential disturbances will end quickly – Others will continue throughout Construction, and Operations and Maintenance	**Low to Continuous** – Some potential disruptions will occur only once or occasionally – Others will extend throughout Construction and beyond
Aboriginal Contemporary Traditional Land Use	**Adverse** – May cause disruptions of land use – Increase in access will likey be beneficial for some land users	**Low to Moderate** – Land area occupied by the Project is small compared to that available for the same traditional purposes	**Local to Regional** – Most disturbances will occur within the LSA, with visual issues potentially extending into the RSA	**Short-term to Medium** – Many disturbances will occur quickly (e.g., clearing) while others will continue through Project Construction	**Low to Continuous** – Some disruptions will occur only once or occasionally whereas others will be continuous

Table 16.5.7-1 Environmental Effects Analysis Summary: Land and Resource Use (continued)

Project Phase / Key Indicator	Likely Residual Environmental Effects Summary Descriptors				
	Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**
Protected Areas	**Adverse** – No Project components are within existing protected areas – The T'Railway Provincial Park will be spanned a number of times and a small section may be relocated – The Project will be visible from some protected areas	**Low** – Only users in locations of protected areas near construction sites during construction activities may experience effects – Most issues will be identified and addressed through consultation and communications	**Local** – Most interactions will occur within or near the LSA, and near the periphery of protected areas	**Short-term to Medium-term** – Many potential disturbances will last for only a short time – Others will continue throughout Construction and beyond	**Low to Continuous** – Some disruptions will occur only once or occasionally – Others will extend throughout Construction and beyond
Summary of Likely Residual Construction Effects on Land and Resource Use: Although Project components will occupy areas that may prevent or restrict land and resource use, the land area occupied by the Project will be small compared to that used by or available to existing users. Creation of access in certain areas may be beneficial for some land users. Project-related effects may occasionally and temporarily disrupt existing users as it occurs and only at or near the site of construction activity (including in particular locations of protected areas). However, most issues will be identified and addressed through design, consultation, permitting, communications and / or other effects management. No Project components will be located within existing protected areas, but the T'Railway Provincial Park will be spanned a number of times and a small section may be relocated.					

Table 16.5.7-1 Environmental Effects Analysis Summary: Land and Resource Use (continued)

Project Phase / Key Indicator	Likely Residual Environmental Effects Summary Descriptors				
	Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**
Operations and Maintenance					
Commercial / Municipal and Recreational Land Use	**Adverse** – Maintenance activities and / or the presence of Project infrastructure may disrupt existing land and resource users – Ongoing access in certain areas may be beneficial for some land users	**Low to Moderate** – Land area occupied by the Project will be small compared to that used by or available to existing users – Design, consultation, permitting and / or other effects management will identify and address most issues	**Local** – Most if not all interactions will occur within the LSA, and particularly at the Project sites and adjacent areas	**Short-term to Far Future** – Maintenance-related disturbances will end quickly – Others will continue throughout the life of the Project	**Low to Continuous** – Some disruptions will occur only once or occasionally – Others will extend throughout the life of the Project
Aboriginal Contemporary Traditional Land Use	**Adverse** – May cause disruptions of land use – Increase in access may prove to be beneficial for some land users	**Low to Moderate** – Land area occupied by the Project is very small compared to that available to Aboriginal land and resource users for traditional purposes	**Local to Regional** – Most disturbances will occur within the LSA, with visual issues potentially extending into the RSA	**Short-term to Far Future** – Many disturbances will occur quickly (e.g., clearing) while others will continue throughout the life of the Project	**Low to Continuous** – Some disruptions will occur only once or occasionally whereas others will occur throughout the life of the Project

Table 16.5.7-1 Environmental Effects Analysis Summary: Land and Resource Use (continued)

Project Phase / Key Indicator	Likely Residual Environmental Effects Summary Descriptors				
	Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**
Protected Areas	**Adverse** – No Project components occur within existing protected areas – The transmission towers will likely be visible from some locations in protected areas – The presence of the Project is not likely to change the ecological integrity, cultural value or societal use and enjoyment of protected areas	**Low** – Only users in locations of protected areas near Operations and Maintenance activities may experience Project-related effects – Consultation and communications will identify and address most issues	**Local** – Most interactions will occur within or near the LSA, and near the periphery of protected areas	**Short-term to Far Future** – Many disturbances will last for only a short time – Others will continue throughout the life of the Project	**Low to Continuous** – Some disruptions will occur only once or occasionally – Others will extend throughout the life of the Project
Summary of Likely Residual Operations and Maintenance Effects on Land and Resource Use: Project maintenance activities may occasionally and temporarily disrupt existing land and resource users as they occur and only at or near work sites (including in particular locations of protected areas). Design, consultation, permitting, communications and / or other effects management will identify and address most issues. The Project components (particularly the ROW and towers) will be visible to some users including those in parts of some protected areas. However, the presence of the Project is not likely to change the ecological integrity, cultural value or societal use and enjoyment of protected areas.					

16.5.7.2 Definition and Determination of Significance

Significant effects are considered to be those that cause a change in the VEC that will alter its status, integrity and future viability / sustainability beyond an acceptable level. For the Land and Resource Use VEC, significant adverse environmental effects as a result of the Project are defined as follows:

- *Commercial Land and Resource Use*: An effect causing a detectable decrease in activity levels and overall revenues over several years for one or more commercial enterprises which currently operate in the RSA, which challenges the successful operation and overall economic viability of these enterprises.
- *Municipal Land and Resource Use*: The occurrence of Project components and activities within the boundaries of a community without the required approval(s) from the relevant authorities, and which prevents or substantially restricts overall levels of ongoing development and planned growth in the community.
- *Aboriginal Contemporary Traditional Land Use*: An effect causing an overall decrease in levels of contemporary land use for traditional purposes by those Aboriginal communities and organizations that currently undertake such activities within the RSA, resulting in a negative change in the nature and / or cultural value of such activities.
- *Recreational Land and Resource Use*: An effect causing an overall decrease in levels of recreational land and resource use by those who currently undertake such activities within the RSA.
- *Protected Areas*: The occurrence of Project components and activities within the boundaries of an existing protected area and / or adjacent to an existing protected area such that the overall ecological integrity, cultural value and / or societal use and enjoyment of that protected area is compromised.

An environmental effect on the VEC or its KIs that does not meet the above criteria is considered not significant.

Project components will occupy areas currently used for Commercial / Municipal Land and Resource Use purposes but these occupied areas will be a small proportion of the total land available to land users. Creation of new access will be minimal in most areas and in particular areas will be a benefit to some users. Project activities will likely disrupt some types of users and affect their quality of experience but users will be able to use alternative areas in the RSA. Project design, consultation, permitting, communications and other effects management measures will identify and address issues by avoiding sensitive areas as much as possible and complying with development regulations and guidelines. Given the large and alternative areas available to users and the effects management measures planned, it is anticipated that the Project will not result in a decrease in activity, compromise successful operation and overall economic viability of commercial enterprises, or substantially restrict ongoing or planned growth of any community. Therefore, the effects of the Project on the Commercial / Municipal Land and Resource Use KI are not likely to be significant.

Project components will occupy areas currently used for Recreational Land and Resource Use purposes but these occupied areas will be a small proportion of the total land available. Creation of new access will be minimal in most areas and in particular areas will be a benefit to some users. Project activities are likely to disrupt some types of users and affect their quality of experience but users will be able to use alternative areas in the RSA. Project design, consultation, permitting, communications and other effects management measures will identify and address issues by avoiding sensitive areas as much as possible and complying with development regulations and guidelines. Given the large and alternative areas available to users and effects management measures planned by Nalcor, it is anticipated that the Project will not result in a decrease in the current level of recreational activity in any area. Therefore, the effects of the Project on the Recreational Land and Resource Use KI are not likely to be significant.

Project components will occupy areas currently used by Aboriginal groups and organizations for land and resource use purposes but these areas will be a small proportion of the total land available. Creation of new access will be minimal, and the new access that is created will be a benefit to some users. Project activities will likely disrupt some types of users and affect their quality of experience but users will be able to use alternative areas in the RSA. Project design, consultation, permitting, communications and other effects management measures will identify and address issues by avoiding sensitive areas as much as possible and complying with development regulations and guidelines. Given the large and alternative areas available to Aboriginal users and the effects management measures planned by Nalcor, it is anticipated that the Project will not result in a decrease in the current level of land and resource use by Aboriginal groups and organizations for traditional purposes in any area. Therefore, the effects of the Project on the Aboriginal Contemporary Traditional Land Use KI are not likely to be significant.

Project activities will likely disrupt users in protected areas and affect their quality of experience. However, this will occur only in locations on the edge of protected areas which are for the most part currently located near highways and transmission lines. Project design, consultation, permitting, communications and other effects management measures will identify and address issues by avoiding sensitive areas as much as possible and complying with development regulations and guidelines. Given that no Project components or activities will be located within protected areas as well as the large and alternative areas available to users and the effects management measures proposed by Nalcor, it is anticipated that the Project will not result in effects that compromise the overall ecological integrity, cultural value and / or societal use and enjoyment of any protected areas. Therefore, the effects of the Project on the Protected Areas KI are not likely to be significant.

Therefore, the Project is not likely to result in significant adverse environmental effects to Land and Resource Use.

16.5.8 Evaluation of Project Alternatives

This section compares alternative transmission corridor segments with relevant portions of the preferred corridor alignment for the Project. The alternative transmission corridor segments cross the same geographic areas as those of the proposed corridor alignment. The comparison is illustrated in Table 16.5.8-1.

The alternative transmission corridor segments will not likely result in measurably different effects than the proposed transmission corridor with two exceptions. The alternative corridor recommended by the IATNL would mean that the transmission line would be more distant from IATNL trails. The alternative corridor segment suggested by the NLOA would mean that the transmission corridor would follow part of the Newfoundland T'Railway Provincial Park. Neither of these alternatives would result in a change in the overall prediction that the Project is not likely to have significant effects on Land and Resource Use.

Table 16.5.8-1 Summary Evaluation of Project Means: Land and Resource Use

Project Alternative Means[(a)]	Environmental Implications (Compared to the Proposed Transmission Corridor)[(b)]			
	Commercial / Municipal	**Recreational**	**Aboriginal Contemporary Traditional Land Use**	**Protected Areas**
A2: North-west of Strait of Belle Isle Alternative Segment	No difference	No difference	No difference	No difference
A3: Point Amour Alternative Segment	No difference	No difference	No difference	No difference

Table 16.5.8-1 Summary Evaluation of Project Alternatives: Land and Resource Use (continued)

Project Alternative Means[(a)]	Environmental Implications (Compared to the Proposed Transmission Corridor)[(b)]			
	Commercial / Municipal	**Recreational**	**Aboriginal Contemporary Traditional Land Use**	**Protected Areas**
A4: Strait of Belle Isle Newfoundland Side Alternative Segment	No difference	No difference	—	No difference
A5: GNP North-east Alternative Segment	No difference	No difference	—	No difference
A6: GNP West-central Alternative Segment	No difference	No difference	—	No difference
A7: GNP Eastern LRM Crossing Alternative Segment	No difference	No difference	—	No difference
A8: GNP IATNL Alternative Segment	No difference	Alternative route suggested by IATNL would be further away from trails	—	No difference
A9: Birchy Lake Alternative Segment	No difference	No difference	—	No difference
A10: NLOA Alternative Segment	No difference	No difference	—	Alternative suggested by NLOA partly aligns with the T'Railway Provincial Park
A11: Avalon Alternative Segment	No difference	No difference	—	No difference

— Not applicable to this KI as these alternatives are not within the Central and Southeastern Labrador region.

(a) As identified and described in Chapter 2, Project Rationale and Planning.

(b) Namely, the proposed Project described in the EIS Project Description, Chapter 3, and assessed in the preceding Environmental Effects Analysis.

5 No technically and economically feasible alternatives for the submarine cable crossing or the shoreline electrode sites were identified (see Chapter 2, Section 2.12.3), and therefore marine Project alternatives are not evaluated for Land and Resource Use.

16.5.9 Cumulative Environmental Effects

Cumulative environmental effects occur when the effects of a project interact and accumulate with those of other past, ongoing or reasonably foreseeable future projects. A number of other development projects or activities have affected, or may affect Land and Resource Use in the various regions that are included in the LSA and RSA for this VEC. This includes activities which occur in particular areas or times only (e.g., military flight training activity in Labrador), those which are relatively common and widespread throughout many areas of the province (e.g., hunting, mineral exploration) and several of which have experienced substantial change in their nature and intensity over recent years (e.g., commercial forestry). In the case of the Land and Resource Use VEC, these human activities comprise both the key elements of the VEC / KIs that may be affected, as well as the "other projects and activities" that are assessed for the purpose of the cumulative effects assessment.

Given the diversity and regional nature of such land and resource uses and the other relevant projects and activities, the following discussion is organized by region.

16.5.9.1 Central and Southeastern Labrador

Current land and resource use activity in the Central and Southeastern Labrador region is characterized by the presence of communities, infrastructure and human activities primarily at the western (Upper Lake Melville) and eastern (Labrador Straits) ends of the LSA / RSA, with a vast wilderness area throughout much of the central portion in which human activity (primarily recreational / traditional) has traditionally been limited. The presence of the TLH3 from Happy Valley-Goose Bay to Cartwright Junction and the TLH2 (Red Bay to Cartwright) has changed the character of this area in recent years, including influencing the land and resource patterns in the region. Changes are reflected in the existing (baseline) biophysical and socioeconomic environments, as well as in resource management and regulatory systems in the region.

As discussed in Section 16.5.7, the proposed Project will likely have no significant adverse environmental effects on land and resource use in this region. During Project Construction, any adverse effects are expected to be limited to minor and short-term disruptions to existing activities, with no likely change in the overall nature, intensity, value or enjoyment of land use activities. The Project will not overlap or interact directly with communities in the central Labrador area, and once leaving the Churchill River, will follow along a portion of the TLH3, which will avoid or minimize the adverse effects on existing land and resource activities (e.g., outfitting operations, cabin use) and on the existing and proposed protected areas in this area of Labrador. The southeastern half of the transmission line will pass through an area with no existing ground access and limited development activity, and may be used as a travel corridor for certain activities in that region. Where it approaches and passes through the Labrador Straits, the Project will interact with several communities and existing infrastructure, the potential effects of which will be addressed through good planning, communication and associated regulatory and permitting processes.

The construction and operation of the Lower Churchill Hydroelectric Generation Project will likely overlap in time with the phases and activities of this Project. However, with the exception of proposed work in the Muskrat Falls area, and the associated movement of personnel and materials to and through this region of Labrador, there is limited potential for direct geographic overlap between the effects of these two developments. Other potential future development activities, such as commercial forestry in Forest Management Districts 19 and 21, are subject to comprehensive planning and management processes, which will likely accommodate the presence of the Project. These and other commercial and municipal developments, the designation of new federal and provincial parks in the region, changes in land ownership and rights due to the future finalization and implementation of the Labrador Innu Land Claims Agreement and other future developments in combination with the effects of this Project, are unlikely to significantly affect land use activities given population levels, the nature and intensity of land and resource use and the overall vastness of the region.

16.5.9.2 Strait of Belle Isle

Other marine activities that are relevant to the Land and Resource Use VEC include Marine Fisheries (commercial and recreational, see Section 16.6) and general marine vessel (shipping) activities. These common and long established activities are reflected in the existing biophysical and socioeconomic environments and will not likely be significantly affected by the Project. There are no other identified and reasonably foreseeable development projects in the area that will overlap with the Project, nor are there any known or likely changes to the nature and intensity of fishing activity or other marine activities vessel traffic in these areas.

16.5.9.3 Island of Newfoundland

On the Island of Newfoundland's Northern Peninsula and in its Central and Eastern region, land and resource use is characterized by communities of various sizes along the coastlines, highways and roadways. The local economies of many areas are characterized by commercial activities such as forestry, mining and exploration, as well as various activities that are linked to the province's natural environment. such as commercial outfitting, recreational hunting and fishing, snowmobiling and various parks and protected areas. On the Avalon Peninsula, the population – and thus the diversity and intensity of land uses – is considerably larger, but land and resource use on the peninsula similarly includes industrial, commercial and municipal uses and recreational activities such as extensive cottage development areas. Types and levels of human land use activities in these regions are relatively stable overall, although some activities (such as forestry) have been the subject of considerable change in recent years, and others (such as outfitting) have experienced challenges due to fluctuations in wildlife populations and other pressures.

The proposed Project will likely have no significant adverse environmental effects on land and resource use on the Island of Newfoundland. During Project Construction, adverse effects are expected to be limited to minor and short-term disruptions; and, changes in overall participation rates, quality or revenues associated with land and resource use are not likely. While the Project will overlap or occur in proximity to some communities (particularly in the Strait of Belle Isle area, in Central Newfoundland and along the Avalon Isthmus), and various land uses (e.g., cabins, quarries, trail systems), appropriate planning, ongoing communication, and associated land and resource management and regulatory processes will address any potential conflicts. A large proportion of the proposed transmission corridor follows existing transmission lines and associated Project components are adjacent to other existing access or human activities, which will serve to further reduce any potential for adverse effects. The Project will not pass through, or affect the overall integrity or value, of any existing or formally proposed protected areas.

There are limited known development proposals whose effects will likely overlap spatially and temporally with effects of this Project. Ongoing activities such as forestry, mineral and energy exploration, quarrying, cabin developments, general industrial and residential developments will continue, likely in a similar manner and intensity as that experienced in recent years (although some have recently experienced decline), and will be subject to applicable resource management, planning, regulatory and enforcement measures which will help to avoid or reduce potential conflicts with current land and resource use. Similarly, the legislation and regulatory processes that restrict development activities within existing protected areas will also apply to other, future projects in the province. These activities may, to varying degrees, result in some areas being made unavailable or unsuitable for certain uses and / or users (even temporarily). However, significant effects on the nature, intensity or value of land and resource uses in Newfoundland are not expected, either as a result of the Project or in combination with other likely projects and activities.

Table 16.5.9-1 Cumulative Environmental Effects Summary: Land and Resource Use

Cumulative Effects Analysis	Central and Southeastern Labrador	Strait of Belle Isle[(a)]	Northern Peninsula	Central and Eastern Newfoundland	Avalon Peninsula
Current (Baseline) VEC Condition (Reflecting the Effects of Past and Ongoing Projects and Activities)	– Primarily remote area; human presence and activity is focused in and near communities at each end of the LSA / RSA and along the recently constructed TLH – Interior portion of LSA is not subject to substantial activity	– Marine vessel traffic (commercial and recreational) is well established and reflected in the baseline	– Wide and varied range of past and ongoing land and resource use activities (commercial, municipal, recreational) varies somewhat in type and intensity between regions – Well established and relatively stable overall level and type of activities, although some (e.g., forestry, outfitting) have experienced recent challenges and / or declines		
Likely Residual Environmental Effects of Labrador-Island Transmission Link (Reflecting Current VEC Condition, As Above)	– Likely minor and short-term disruptions during Construction – No significant and sustained adverse effects to overall land and resource use during Construction or Operations and Maintenance				
Likely Cumulative Environmental Effects (within RSA) of Other Future Projects and Activities	– Limited proposed development activity and / or potential for overlapping effects	– Limited proposed development activity or likely changes in nature and intensity of existing activities	– Limited proposed new development activity and / or potential for overlapping effects – Nature of Project helps avoid potential for cumulative effects (e.g., following existing transmission lines) – Minimal Project influence on / contribution to future nature and condition of adjacent land and resource uses (such as outfitting)		
Cumulative Environmental Effects Summary	**Not Significant** – Project-related environmental effects management measures and appropriate management, regulation and enforcement of other ongoing and future developments and activities will minimize cumulative effects – Significant adverse cumulative environmental effects on Land and Resource Use are not likely to occur as a result of the Project in combination with other projects and activities that have been or will be carried out				

(a) Marine environment.

Of particular note in relation to the Land and Resource Use VEC is the commercial outfitting industry in the province, which has been raised as a key issue for the EIS and in general. The proposed Project does not occur in proximity to existing outfitters in Labrador, or in the Central and Eastern or Avalon regions of Newfoundland. However, it will inevitably be located in the general vicinity of several commercial outfitters in the southern portion of the Island's Northern Peninsula. As described earlier, this will be a key consideration in Project design, and through good communication, consultation and planning on the part of Nalcor and by outfitters and industry representatives, it is anticipated that Project Construction, and Operations and Maintenance will not significantly affect the overall nature, level or economic value of the commercial outfitting industry in the province. Although it is recognized that the outfitting industry in the province is experiencing challenges, other pressures such as the condition of caribou populations and resulting licence quotas, will be more relevant to the future condition and viability of this industry, and the Project is not likely to contribute in any measurable degree to the future viability of this industry.

In summary, significant adverse cumulative environmental effects on Land and Resource Use are not likely to occur as a result of the Project in combination with other projects and activities that have been or will be carried out. The planning, consultative and other effects management measures identified in this chapter will serve to avoid or reduce potential interactions and adverse effects as result of the Project. Avoiding or managing potential land and resource use conflicts resulting from other ongoing and future projects and activities will require that appropriate resource management, planning, regulatory and enforcement measures are in place and implemented by the relevant agencies.

16.5.10 Monitoring and Follow-up

Land and resource use activities in Newfoundland and Labrador are the subject of ongoing planning, management, regulatory enforcement and monitoring by the federal, provincial and municipal governments and their respective departments and agencies. This includes regular monitoring and the collection of information and statistics on, for example, municipal land use, hunting and angling activity, cabin development, outfitting, resource exploration and development, for the purpose of licensing, enforcement and resource management. Nalcor has neither the mandate nor the expertise to monitor land and resource use activities in the Project area, but has provided and will continue to provide Project information to relevant agencies and organizations as required and requested.

As described earlier, a number of the effects management measures planned by Nalcor include initiatives related to ongoing communication and cooperation with communities, government departments, stakeholder groups and individual land and resource users. This will serve as a means to identify and help address any Project-related issues and effects as they arise throughout Project planning, Construction and into Operations and Maintenance.

Nalcor will continue to use information collected during past and ongoing discussions with potentially affected Aboriginal groups and communities to avoid conflicts with contemporary land use for traditional purposes, to the extent practical. Where an overlap of the Project and traditional land use occurs, adverse effects can be addressed through mitigation (e.g., adherence to regulations, avoidance, limited access and communication). Nalcor is committed to undertake and finalize land and resource use studies under the current community engagement agreements with NunatuKavut Community Council, Pakua Shipu and Unamen Shipu. Nalcor will consider and incorporate information where relevant, including the potential for mitigation and adaptive management during detailed design and routing.

Should any new relevant information regarding contemporary land use activities of the Labrador Inuit, Québec Innu of Uashat mak Mani-Utenam, Matimekush-Lac John, Nutashkuan, Ekuanitshit or the Naskapi Nation of Kawawachikamach become available, Nalcor will assess this information in relation to the Project-related components.

16.6 Marine Fisheries

16.6.1 Introduction

The Marine Fisheries VEC assesses the potential effects of the Project on marine fish harvesting activities throughout all Project phases. For commercial marine fisheries, this includes all activities conducted to generate fishing income, such as accessing fishing grounds, deploying and retrieving / hauling fishing gear to harvest the fish, getting the catch back to port, and selling the fish to buyers. For marine recreational fisheries this includes accessing fishing areas during designated periods and taking fish for food and / or leisure purposes. As discussed in Section 15.6, there is no known Aboriginal-specific fish harvesting within or adjacent to the proposed Project area, although it is recognized that members of Aboriginal organizations do participate in the general commercial and recreational fisheries undertaken in the Strait of Belle Isle area. There are no aquaculture developments in the general vicinity of, and which may be affected by, the Project.

Marine fisheries have a high degree of importance and value in Newfoundland and Labrador for economic, social and cultural reasons. Fishing for food, social and / or ceremonial purposes started with the earliest human occupation of Newfoundland and Labrador's coasts, and the history of its first use by Europeans (dating from ca. 1000 AD) and the later permanent settlement of the land (dating from the 1500s) is inextricably interwoven with fish and fishing. The same is true for many aspects of Newfoundland and Labrador's customs, art, music and other social and cultural characteristics.

For several centuries, fish harvesting was the mainstay of Newfoundland and Labrador's economy, and although in recent years it has been somewhat displaced by other industries, fisheries continue to play a key role in the livelihood of the provinces residents, particularly in rural areas. In 2010, `fisheries accounted for 1.5% of the goods producing sector of the provincial GDP, compared to about 8.5% in the late 1980s (The Economy 2011, internet site; The Economy 1989). In the 1990s, the province's fisheries underwent significant changes, due largely to the collapse of several demersal fisheries (mainly Atlantic cod), and consequent fisheries moratoria and quota reductions after 1993. Since then, the former groundfish-dominated industry has been replaced to a large extent by higher value shellfish harvesting, which employ fewer people. In terms of employment, fish harvesters made up about 18% of the province`s labour force in the early 1950s, but just 5% by 2010. Present day commercial fisheries in many areas are characterized by the participation of licensed enterprises, holding licences for particular species, involving certified professional fish harvesters.

Despite these changes, fishing continues to be an important component of the economy of the Strait of Belle Isle area. Fishing is the sole or primary occupation of many individuals and enterprises along its shores, and is also a source of work for fish processing plant employees. In the Conception Bay area of Newfoundland, fishing occurs together with a much greater level of economic diversification, particularly in the St. John's metropolitan area.

In both the Strait of Belle Isle and the Dowden's Point areas the primary marine fisheries have been commercial fish harvesting through capture fisheries. Marine recreational fisheries are limited in extent, consisting almost entirely of an annual recreational food (cod) fishery for two to three weeks a year and a maximum of five fish per person per day.

As described in Section 15.6, the key Strait of Belle Isle commercial fisheries at present are for lobster, scallops, herring and capelin, as well as a small amount of recently renewed cod harvesting. Maps in Section 15.6 also outline the general locations of relevant harvesting activities in relation to proposed Project activities. Although the Dowden`s Point shoreline electrode site is not situated on grounds where commercial fisheries usually occur, there is nearby harvesting of lobster and some pelagic species, as well as some recreational fishing.

16.6.2 Environmental Assessment Study Areas

16.6.2.1 Spatial Boundaries

For the Marine Fisheries VEC EA, the LSA has multiple components:

- the proposed 500 m wide submarine cable crossing corridor in the Strait of Belle Isle which will fully encompass the three proposed power cables and their associated rock berms (Figure 16.6.2-1); and
- the two marine areas defined by arcs of 500 m radius from the proposed shoreline electrode sites at L'Anse au Diable in the Strait of Belle Isle (Figure 16.6.2-1) and Dowden`s Point in Conception Bay (Figure 16.6.2-2).

The RSA for the Marine Fisheries VEC encompasses the Strait of Belle Isle area to the east and west of the cable corridor that represents the likely extent of fishing activity by enterprises from local area homeports. This area also encompasses the L'Anse au Diable shoreline electrode site (Figure 16.6.2-1).

Marine construction work in the Strait of Belle Isle will include considerable activity along the submarine cable routes within the corridor (LSA), as well as transits of construction and other supporting vessels to and from the work locations (including throughout the RSA). As noted, the RSA has been defined to reflect the geographic extent of fishing activity by local fishers, as well as to encompass the presence of vessels and their activities during cable construction and the movements of these and other construction vessels within this area. It does not, however, include the full geographic extent of all vessel movements to and from the Strait of Belle Isle, such as those associated with the delivery of the submarine cables and other components from their suppliers or the delivery of rock for the berms, as these vessel movements are considered to be part of the overall national and international shipping industry, and subject to applicable regulations.

The Conception Bay RSA consists of the marine area within a 2.5 km radius from the proposed shoreline electrode site (Figure 16.6.2-2).

16.6.2.2 Temporal Boundaries

The temporal boundaries of the assessment for the Marine Fisheries VEC encompass the Project's Construction phase, as well as the Operations and Maintenance phase that will extend through the life of the Project.

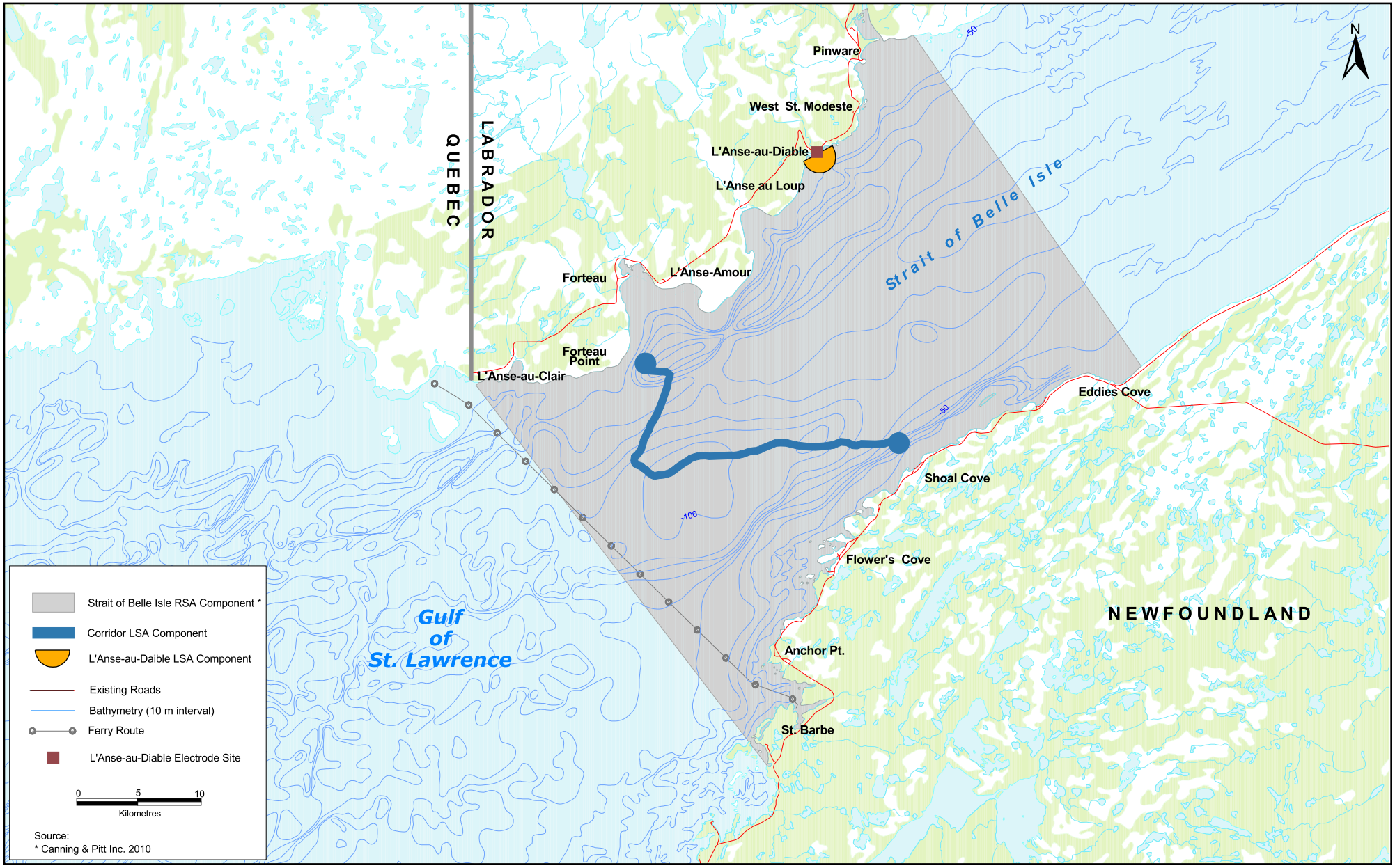


FIGURE 16.6.2-1

Strait of Belle Isle: Regional Study Area (RSA) and Local Study Area (LSA) Components, Marine Fisheries

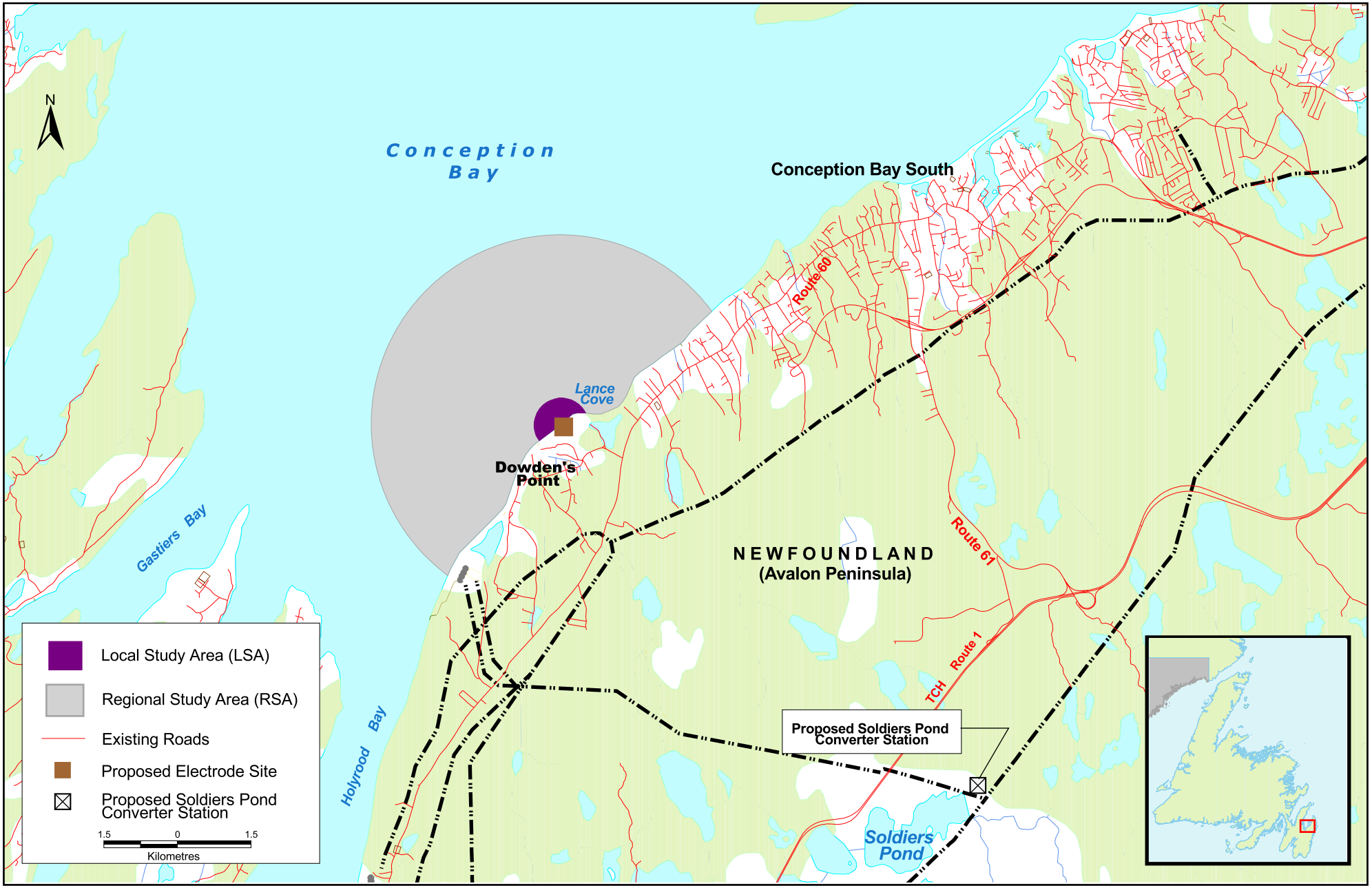


FIGURE 16.6.2-2

Dowden's Point Electrode Site: Regional Study Area (RSA) and Local Study Area (LSA), Marine Fisheries

16.6.3 Potential Environmental Issues, Indicators and Interactions

16.6.3.1 Potential Environmental Issues

Marine fisheries may be affected by development projects both directly and indirectly. Direct effects occur where established fishing activities are disturbed or otherwise interfered with by project-related components or activities during their construction or operations phases (e.g., reduced access to fishing areas, damage to fishing gear).

The potential effects of the Project for Marine Fish and Fish Habitat have been assessed in detail in Section 14.2 of this EIS, which concluded that the Project will not likely cause significant adverse environmental effects on the marine environment. It is therefore not considered likely that there will be any significant adverse effect on the users of these biophysical resources. The Marine Fisheries VEC therefore focuses on the potential direct effects of the Project on fishing activities, such as through disturbance or other direct interactions during the Construction and / or Operations and Maintenance phases.

Questions and issues related to the Marine Fisheries VEC were identified based on an analysis of the existing environment (such as harvesting data and fishing locations) and through consultations with area fishers and industry and government representatives. In general, fishing industry representatives have expressed concern that various aspects of Project activities, including construction works and the eventual permanent presence of the submarine cables and berms after construction, might affect fishing opportunities and thus reduce commercial fishing income. No specific concerns were raised about potential effects on recreational fisheries.

The questions and issues that have been raised about how fish harvesting could be affected during each Project phase, as well as the rationale for these concerns and specific considerations (where relevant), are provided in Table 16.6.3-1.

Table 16.6.3-1 Identified Issues and Questions: Marine Fisheries

Issue / Question	Nature and Rationale	Specific Considerations
Construction		
Potential loss of access to fishing grounds and other disturbances	Construction activities within the LSAs may prevent fishing in those areas, and / or result in other interferences due to vessel traffic, or other marine activity	– Fishing for all species will not be possible within or near active areas while construction activities are occurring – Possible restrictions on particular fishing activities / gear types (e.g., bottom dragging gear) in the LSA – Using alternative fishing grounds and avoiding interactions with Project works could result in increased expenses (more fuel) and lower efficiency (increased transit time) – Delays in transits could affect product quality and price
Possible lost or damaged fishing gear	Project vessels will be traversing areas near where fishing gear is normally used or set	– Gear might be damaged or lost because of Project vessel conflicts (Project vessels coming in contact with fixed gear)
Safety issues and risks	Project vessel presence and activities in the LSAs and on marine access routes to these areas might pose a safety risk for commercial / recreational fishing vessels and gear	– Personal safety – Concerns about safety might prevent fishers from reaching preferred fishing grounds, which might reduce catches and / or increase expenses
Operations and Maintenance		
Potential permanent loss of access to fishing grounds	The presence of permanent Project infrastructure in the marine environment may prevent fishing in those areas for certain species / gear types	– Even if the submarine cables are covered, otter trawls and scallop dredges may not be able to fish over or along the cable berms – Using alternative fishing grounds could result in increased expenses (more fuel) and lower efficiency (increased transit time)

16.6.3.2 Key Indicators and Measurable Parameters

Various KIs and MPs were identified for this VEC to frame and focus the associated environmental effects analysis. Their selection was based on consideration of the various key elements of the VEC as well as the questions and issues that have been identified about associated Project effects.

Two KIs have been selected for the Marine Fisheries VEC: (i) Commercial Fisheries and, (ii) Recreational Fisheries. These components of the Marine Fisheries VEC have commercial economic importance, and / or social / recreational importance. Additional rationale for the selection of these KIs is provided in Table 16.6.3-2. In addition, Table 16.6.3-2 indicates various MPs for each KI and the rationale for their selection. These MPs are relevant to and indicative of the potential changes to the KIs that may occur as a result of the Project.

Table 16.6.3-2 Key Indicators and Associated Measurable Parameters: Marine Fisheries

Key Indicator	Rationale for Key Indicator	Measurable Parameters	Rationale for Measurable Parameter
Commercial Fisheries	Important from a cultural and economic perspective	– Net income from fishing	– Effort expended by fishers can be affected by Project activities through change in access to fishing grounds, need to retrieve and relocate gear, and change in transit time to fishing grounds – Associated expenses incurred by fishers can be affected by Project activities through gear / vessel damage, gear fouling, and increased transit distance to fishing grounds – Landed value can be affected by Project activities through reduced catches, change in fish quality due to longer transit times, and perceived changes to fish quality – Any Project-related disturbances to marine fishing activity will be important if they translate into a change in overall income to fishery participants
Recreational Fisheries	Important from a cultural and supplementary economic perspective	– Quality of experience – Participation rates	– Recreational fishers may not be able to fish in preferred areas, or there may be a change in the catchability of recreational fish species, which may affect the quality of experience – This may in turn result in changes in participation rates

16.6.3.3 Potential Project-Marine Fisheries Interactions

This section describes potential interactions between the Marine Fisheries VEC and Project activities in each phase, which are summarized in Table 16.6.3-3. While some of these interactions will likely occur (e.g., for safety reasons, no fishing can occur around any Project vessels involved in Construction), others are of relatively low probability or likely degree (e.g., disruption of / interference with recreational fisheries). The nature of the effects that will likely occur as a result of the Project are assessed in detail in later sections.

Table 16.6.3-3 Potential Project Interactions: Marine Fisheries

Project Phase / Activity	Key Indicator	
	Commercial Fisheries	**Recreational Fisheries**
Construction		
Construction access trails and roads	—	—
Movement and presence of personnel, equipment and materials	—	—
Construction camps	—	—
Marshalling yards and staging areas	—	—
ROW clearing and preparation	—	—
Quarrying and borrowing	—	—
Transmission tower assembly and installation	—	—
Conductor installation	—	—
Converter station site preparation and construction	—	—
Preparation and construction of submarine cable landing sites (on-land works)	—	—
Construction and installation of submarine cables (Marine works)	Potential interference from construction activities / vessels with fishing activities (disturbance, restricted access, gear damage, safety considerations)	
Electrode site preparation and installation	—	—
Island system upgrades	—	—
Employment / presence of workers	—	—
Contracting / expenditures	Project expenditures could enhance employment opportunities / vessel service contracts for fisheries industry workers in the off-season	
System commissioning	—	—
Operations and Maintenance		
Operations / maintenance access trails and roads	—	—
Presence and operation of the transmission system	Possible restrictions on some fishing activities / gear types in the area of Project cables and other components	—
Routine line inspections and repairs	—	—
Vegetation management	—	—
Potential major system repairs	Potential interference of repair activities / vessels with fishing activities (disturbance, restricted access, gear damage, safety considerations)	
Operation of the electrodes	—	—
Employment / presence of workers	—	—
Contracting / expenditures	Ongoing operations could enhance employment opportunities / vessel service contracts for fisheries industry workers in the off-season	

— No likely or detectable interaction identified.

16.6.4 Approach to the Environmental Effects Analysis

16.6.4.1 Analytical Methods

The assessment of potential Project effects on Marine Fisheries was based on an approach of "overlaying" the nature of planned Project components and activities on what is known about existing fishing activity and patterns in the LSA and RSA to identify likely interactions and resulting effects on the VEC and its various KIs.

As described in Chapter 15, baseline conditions for Marine Fisheries were derived from Fisheries and Oceans Canada (DFO) geo-referenced catch and effort data, information provided by industry participants during consultations, and an analysis of potential interactions between types of fishing gear used in the area and specific Project components (e.g., interaction between scallop dredges and the rock berms constructed to protect submarine transmission cables, as determined by Nalcor). These baseline data and other information were used to identify, map and describe current fisheries resource harvesting activities, including usual locations, species, and catch success, which were then related to the proposed location(s) of key Project activities and components. Potential interactions between the location of Project activities and existing fishing operations, and the potential effects due to such interactions were identified. Specific issues related to the Marine Fisheries VEC were identified through consultations with area fishers and others, supplemented by the experience of the EIS study team who have worked on other cognate marine development projects throughout Atlantic Canada and elsewhere.

The effects assessment involves both quantitative analysis (e.g., review of DFO historical catch and effort data, historical trends and the distribution of catches, using GIS and other mapping methods) and qualitative considerations (e.g., discussions with fishers and fisheries managers). For the most part, the quantitative data identifies actual species and catch amounts and locations, and the qualitative information identifies cases of perceived potential loss of opportunity and / or income reported by individual commercial fishers or groups of fishers. Mitigation measures to address the potential adverse effects are then identified and the residual effects are assessed accordingly, assuming that mitigation is in place.

16.6.4.2 Environmental Effects Descriptors

The potential effects of Project activities on the various aspects of the Marine Fisheries VEC are described in terms of a set of descriptors which are summarized in Table 16.6.4-1.

Table 16.6.4-1 Effects Descriptors: Marine Fisheries

Effects Descriptor	Definition
Direction	
Adverse	Effect is negative and undesirable, reducing fishing income, opportunities, success, participation and / or enjoyment.
Neutral	Effect is neither adverse nor positive.
Positive	Effect is beneficial and desirable, enhancing fishing income, opportunities, success, participation and / or enjoyment.
Magnitude	
No effect	Project results in no change in the existing (baseline) condition.
Low	Project results in a small change in the existing condition / baseline value that may or may not be detectable, but is well within the natural condition / normal variability of the parameter in question (e.g., within the typical range of variability in the fishery within and between seasons).
Moderate	Project results in a clear change in the existing condition / baseline value, but is generally in keeping with the normal variability of the parameter in question. Clearly an effect but unlikely to pose a risk to overall fishing income stability or opportunities.

Table 16.6.4-1 Effects Descriptors: Marine Fisheries (continued)

Effects Descriptor	Definition
High	Project results in a major change in the existing condition / baseline value, that is well outside the natural condition / variability of the parameter in question. Effect is likely to pose a risk to overall fishing income stability or opportunities, and represents a challenge to the successful operation of fishing enterprises / recreational opportunities in the area.
Geographic Extent	
Local	Effect will be evident within the LSA.
Regional	Effect will be evident within the RSA.
Beyond regional	Effect will be evident beyond the RSA.
Duration	
Short-term	Effect will be evident for less than one year.
Medium-term	Effect will be evident for between one and four years.
Long-term	Effect will be evident for from four to ten years.
Far future	Effect will be evident throughout the life of the Project.
Frequency	
Low	Effect occurs no more than once per year.
Moderate	Effect occurs 2 to 10 times per year.
High	Effect occurs more than 10 times per year.
Continuous	Effect is continuous.

16.6.5 Construction

16.6.5.1 Overview of Construction and Associated Effects Management

Project Construction activities in the Strait of Belle Isle will include vessel activity associated with the installation of the three submarine cables and the placement of rock to create the protective berm for each cable. As described in Chapter 3, Project Description, marine construction work will likely take place over a single season, with cable placement commencing at or near the beginning of the ice-free period (approximately June) that year and continuing for several months, with the rock placement vessel commencing work within that period and continuing until later in the same year (likely November). Over this period, Project marine vessel work in the Strait of Belle Isle will include considerable activity along the submarine cable routes within the corridor, as well as transits to and from the work locations (including throughout the RSA). The presence of a Safety Zone around Project marine construction activities (as described below) will create a zone of influence of these Project components and activities during cable installation and berm creation.

Construction of the electrodes at L'Anse au Diable and Dowden's Point will include the development of a near shore structure with associated excavation and / or dredging activity and the installation of associated electrode components. Work in the marine environment will be completed primarily, if not exclusively, from on-land, and will occur within a relatively small area during the 13 to 17 month period of electrode construction.

The following effects management measures have been identified and proposed by Nalcor to avoid or reduce potential adverse interactions between Project Construction activities and Marine Fisheries in the Strait of Belle Isle and in Conception Bay (as identified in Table 16.6.3-3). Several of these measures will, in practice, be applicable to more than one of the possible interactions identified, for either KI or both.

Strait of Belle Isle

Continuing Consultations with Fishers

Before the start of construction activities in the Strait of Belle Isle, Nalcor representatives will consult further with local fishers and other interested parties. This will include the provision of information on proposed construction activities, as well as a discussion of any questions, concerns or suggestions from these fishers regarding the construction activities.

Fisheries Liaison Committee

Nalcor will establish a Fisheries Liaison Committee (FLC) for the Construction phase to facilitate its ongoing fisheries consultation and advisory process during construction. The FLC will be the primary mechanism for facilitating information exchange and communications between the Project and fisheries representatives and for identifying and resolving any issues that arise. In addition to Nalcor and fishers based on both shores of the RSA, the FLC will include a representative of the Labrador Fishermen's Shrimp Company Ltd. and of the Fish, Food and Allied Workers (FFAW).

Safety Zones

A 500 m radius (1,000 m wide) Safety Zone will be established around all active construction areas within the marine environment (specifically, vessels at construction locations within the Strait of Belle Isle). Except for any Project support and service vessels, no other marine craft will be permitted within any Project vessel Safety Zone.

The Safety Zone will serve to prevent or reduce direct interactions, particularly contact between construction activities and equipment and fishing activities. This will protect personal safety, reduce the potential for gear and vessel damage in these areas, and allow a more efficient operating environment for both fisheries and Project activities. Nalcor will consult with relevant Transport Canada personnel to determine the most appropriate means for boundary demarcation and communication. The Safety Zone will be in accordance with Rule 43 of the Collision Regulations under the *Canadian Shipping Act.*

All vessels transiting the corridor, or operating in the general vicinity of the cable / rock laying vessels, will be required to exercise caution and to abide by the "rules of the road" (such as those described in the Collision Regulations) as well as by any specific protocols that are established and included in the VTMP (see below).

Vessel Traffic Management Plan

Before the start of marine construction activities in the Strait of Belle Isle, Nalcor will develop a VTMP to promote the safe and efficient operation of Project construction-related marine traffic and fishing vessel operations near all construction activities and in other areas of the Strait of Belle Isle where Project vessels might be operating.

The VTMP will be developed in consultation with applicable agencies and organizations, including advice and guidance from experts with the Ship Safety Branch of Transport Canada and the CCG. The purpose of the VTMP will be to establish a safe and efficient working environment during marine construction activities and to minimize or avoid potential construction-related vessel traffic interference with established commercial fisheries harvesting operations.

The VTMP will describe the "rules of the road" (e.g., those in the Collision Regulations for shared waterways and any special considerations related to the circumstances of the Project), vessel communications and contact information, reporting protocols, traffic / transit routes, and other relevant vessel traffic management procedures. This will include the measures that Project-related vessels (including small service boats) will follow when operating in the area, and that all fishing vessels should follow when they are involved in harvesting operations close to, or transiting, the general vicinity of Project activities.

Working with the CCG's Notices to Shipping and the Canadian Broadcasting Corporation's Fisheries Broadcast, Nalcor will ensure that all fishing vessels operating in the Strait of Belle Isle are given advance notice of planned construction work.

Fishing Gear and Vessel Damage Compensation

Nalcor will make available Fishing Gear Loss or Damage Compensation to cover any damage to commercial fishing gear or other equipment if an incident occurs that involves contact with a Project vessel outside the Safety Zones. This will be in place for the Project Construction phase and will be similar to programs currently in use within the province's offshore area for petroleum exploration and development.

Compensation for Economic Loss

Nalcor will provide economic compensation for any Strait of Belle Isle commercial fishing enterprise that experiences a loss of fishing income as a result of Project marine construction activities. This compensation will be available to licence holders who have been actively involved in harvesting scallop in the relevant area in recent years, and will compensate for any demonstrated actual loss of net commercial fishing income. Further principles and operational components will be developed jointly by Nalcor through discussions with the FLC.

Dowden's Point

Consultations with Fishers

Prior to the start of electrode construction activities in Conception Bay, Nalcor representatives will meet with local fishers and other interested parties, particularly those who use any fishing grounds along the shoreline near the Dowden's Point shoreline electrode site. This will include the provision of information on proposed construction activities, as well as a discussion of any questions, concerns or suggestions from these fishers regarding these activities.

16.6.5.2 Existing Knowledge

Over the past several decades there have been various, often very large-scale, marine construction projects in Newfoundland and Labrador (onshore and offshore) and elsewhere in Atlantic Canada that have involved components and activities which have interacted with marine fisheries. These projects are typically subject to extensive EA and governmental and public reviews under the *Canadian Environmental Assessment Act* (*CEAA*) or other legislation, and / or provincial reviews, and have included the development of comprehensive effects management plans similar to those proposed for this Project.

These past projects include major developments such as the Hibernia Gravity Base Structure construction site in Trinity Bay, Newfoundland; the Newfoundland Transhipment Ltd. facility in Placentia Bay, Newfoundland; the construction and operation of the Confederation Bridge between Prince Edward Island and New Brunswick; and the construction and operation of the Sable Offshore Energy Project submarine gas pipeline from the Scotian Shelf offshore to Country Harbour, Nova Scotia. In addition, there have been numerous shorter-term petroleum exploration projects and long-term petroleum development projects in marine areas in offshore Newfoundland and Labrador and Nova Scotia which have assessed and effectively mitigated effects for potential displacement or interference with fisheries as a result of their associated activities.

Collectively and individually, these past projects have addressed loss of access to fishing grounds, vessel traffic interference, gear and vessel damage and other potential issues similar to those identified for this Project. The experience and success of these real-world precedents demonstrates that marine project construction activities can co-exist with marine fisheries, particularly with appropriate mitigation in place. The knowledge derived from these past experiences has contributed to the selection and design of the mitigation measures proposed for this VEC and the analysis and assessment of any likely adverse effects of the Project.

16.6.5.3 Construction Effects: Commercial Fisheries

Project Construction activities including the installation of submarine cables and associated rock-laying / berming components in the Strait of Belle Isle will affect commercial fishing activities in the LSA, as there will be restrictions of vessel movements and fishing activity at the active marine work areas, as well as restrictions on the use of dragged gear over the submarine cables once these are laid on the seabed.

The overall "zone of influence" of Project-related marine disturbance will consist of a Safety Zone around all marine construction activities. This Safety Zone will be 500 m in radius around all Project-related marine construction activities, and no fishing boats or other vessels will be permitted to operate within the Safety Zone pursuant to the relevant regulations. The Safety Zone's primary purpose will be to minimize the potential for physical contact between construction vessels and activities and fishing, thereby ensuring a safe and efficient operating environment for both. All Project-related vessels will be required to stay within the Safety Zone except when transiting to and from their home port or service base or, in the case of rock laying vessels, to any onshore supply facilities. When transiting to the Safey Zone and through the RSA, these Project vessels will follow the existing CCG Strait of Belle Isle voluntary traffic separation scheme. Beyond the Safety Zone(s), fishing vessels will be able to transit the Strait of Belle Isle RSA as usual.

The potential for Project activities to disrupt commercial fishing in the area will depend on timing as well as location. Available information on the existing commercial fishery in the Strait of Belle Isle (Section 15.6) suggests that the main species harvested near the submarine cable crossing LSA is scallops, using bottom dredges or drags, and cod, fished with gillnets or hooks and lines. When cable installation commences (likely in June of Construction Year 3), scallop dragging activities within the Strait of Belle Isle will be required to avoid areas where the cable has been laid. Although scallop harvesting occurs from May to October, more than half of the catch from Unit Area 4Ra typically occurs in July and August, and the majority (roughly 90%) of the cod harvesting takes place in May and June. The actual extent of any construction-related interference with these fisheries in the LSA will depend on the specific timing of construction events and the fishery for that year. For the purposes of this assessment, however, it is assumed that marine construction activities will occur during the active fishing periods for these species.

The VTMP will lay out the "rules of the road" for marine traffic activities associated with the Project area during Construction, including communications protocols and the routes that all Project vessels will be expected to follow when operating outside the Safety Zone. This will help to minimize the "footprint" of Project marine activities that might interfere with fishing by containing these marine activities within relatively focused and prescribed areas, which will be communicated to fishers. This will also help fishers plan their activities more efficiently and safely during the Construction phase of the Project. The FLC will facilitate information exchange and communication between the Project and the fishing industry and identify any concerns or issues that might arise during Construction. These measures will be implemented to avoid potential interactions and issues between the Project and marine fisheries in the Strait of Belle Isle area, promote the safety of fishers, the public and Project personnel, as well as ongoing communication and good planning to minimize potential interference with fish harvesting. Provisions for fishing gear loss or damage and economic loss compensation will also be in place to address any unanticipated loss caused by Project-related construction activities.

As a result of the relatively small area that will be subject to Project-related marine construction work at any one time, the overall size of the Strait of Belle Isle area (and thus, the range of alternative fishing grounds available), the relatively short-term duration of cable construction activities in the marine environment (likely one season), and the proposed effects management measures outlined above, Project Construction is not

likely to result in adverse effects on commercial fishing activities. Despite some potential for localized and short-term disruptions, fishing activities in the Strait of Belle Isle are not expected to be affected to the extent that would result in any decrease in overall fish landings by local enterprises or in net fishing incomes.

Activities associated with construction work at the L'Anse au Diable and Dowden's Point electrode sites, given their nature (small areas and on-land work), are not expected to disrupt or otherwise adversely affect existing fishing grounds and harvesting activities in these areas.

Summary of Likely Residual Environmental Effects

As a result the likely residual effects of Project Construction on the Commercial Fisheries KI are as follows:

- The direction is adverse as there will be some Project-related interference with fishing activities in the Strait of Belle Isle. As noted, however, this is not expected to result in any decrease in overall landings or fishing income. Commercial fisheries are not expected to be substantially affected during construction activities with the identified effects management measures in place.
- The magnitude of the effect of Project Construction on commercial fisheries will be low. A degree of interference will occur and some adjustments will be required, but given the relatively small areas involved, the short-term nature of any individual disruptions, and the effects management measures planned, any such interference during Construction is not expected to result in a decrease in overall landings or fishing income as compared to pre-Project levels. If unanticipated effects occur during construction, resulting in actual economic loss, including damage to fishing gear, appropriate compensation will be provided.
- Project Construction effects will be local in geographic extent, as they will occur within the Strait of Belle Isle LSA.
- Effects will be of short to medium-term duration, as the marine construction activities will likely be limited to a single construction season.
- Effects will be continuous in frequency as the Safety Zones will be maintained throughout the period of in-water construction.

There is a high degree of confidence that the actual effects of Project Construction on Commercial Fisheries will not be greater than predicted, based on recent and considerable experience with other marine projects, and the standard and proven nature of the effects management plans proposed.

16.6.5.4 Construction Effects: Recreational Fisheries

Marine recreational fishing activities in the Strait of Belle Isle and Conception Bay areas (LSAs and RSAs) are limited, and consist almost entirely of an annual food (cod) fishery for several days each year. Given the nature and location of Project construction activities in the marine environments and these recreational activities (limited in extent and time, usually close to shore), little if any potential interaction or disturbance is anticipated.

Recreational fishing that currently occurs in the proposed construction areas and times can easily be conducted in other locations during that short time period, with no consequent reduction in recreational fishing participation rates or overall enjoyment levels.

Likely Project effects on marine Recreational Fisheries activities are therefore predicted to be neutral. There is a high degree of confidence that the actual effect of Project Construction on Recreational Fisheries will not be greater than predicted based on the standard and proven nature of the effects management plans proposed, and experience with other marine projects.

16.6.6 Operations and Maintenance

16.6.6.1 Overview of Operations and Maintenance and Associated Effects Management

The aspects of Project Operations and Maintenance that are most relevant to the Marine Fisheries VEC include the presence of submarine cables and their associated berms, and any routine inspections that may be required in the Strait of Belle Isle.

In addition, during periodic cable inspections and maintenance activities, and in the unlikely event of any major system repair requirements, Safety Zone restrictions similar to those implemented during Project Construction will be required. Project vessels involved in maintenance and repair work could interfere with commercial and recreational fishing activities, or come into physical contact with and potentially damage fixed gear (e.g., gillnets), depending on timing and locations.

As with the Construction phase of the Project, the presence and general Project Operations and Maintenance of the L'Anse au Diable and Dowden's Point electrodes are not expected to interfere with fishing activity in these areas.

Nalcor will apply the following measures to avoid or reduce any potential adverse effects of the Project on the Marine Fisheries VEC during Project Operations and Maintenance in the Strait of Belle Isle.

Fisheries Liaison Committee / Consultation

Through ongoing consultation, Nalcor will continue to address any concerns and issues on fisheries in the Strait of Belle Isle that arise from Project interactions.

The FLC established for the Project's Construction phase will continue to function during at least the initial years of the Project Operations and Maintenance phase, if all parties consider it to be useful and necessary. Again, the role of the FLC will be to facilitate information exchange and communications between Nalcor and the fishing industry, and to identify and seek to resolve any concerns or issues that arise during Project Operations and Maintenance.

Safety Zones, Marine Notifications, Vessel Traffic Management Plan

A Safety Zone (500 m radius) will be in place around any vessel(s) engaged in routine maintenance or major system repair work for the submarine cables during the Operations and Maintenance phase of the Project. With the exception of Project support and service vessels, no other marine craft will be permitted anywhere within the 500 m Safety Zone surrounding maintenance and repair vessels during such activities.

Working with the FLC, CCG's Notices to Shipping and the Canadian Broadcasting Corporation's Fisheries Broadcast, Nalcor will ensure that all fishing vessels operating in the Strait of Belle Isle are given advance notice of planned maintenance or repair programs for the Project.

The VTMP developed for Project marine construction activities in the Strait of Belle Isle will be adapted and applied to any cable maintenance and / or repair activities.

16.6.6.2 Existing Knowledge

Existing knowledge related to the potential effects of the Operations and Maintenance phase of the Project on Marine Fisheries, including the nature and likely effectiveness of mitigation, is similar to that provided for the Construction phase.

16.6.6.3 Operations and Maintenance Effects: Commercial Fisheries

Fisheries scientists have identified five distinct scallop beds in the Strait of Belle Isle area (Section 10.5), although resource managers and fishers have indicated that most harvesting is concentrated on only a few of

these beds. The approximately 17.5 km^2 seabed area within the marine cable corridor represents less than two percent of the total seabed area within the RSA, and about five percent of the seabed area that was closed to scallop fishing via the Refugium (refer to Section 15.6.4.4). Analysis of geo-referenced fisheries data (Section 15.6) indicates that there are important and alternative scallop fishing grounds adjacent to the submarine cable corridor, and extensive, well-established grounds for this species within both the Strait of Belle Isle RSA and the larger fishing zone – Unit Area 4Ra.

During the past decade, scallop catches have comprised approximately 17% of the total annual value of all-species catch by RSA fishing enterprises. According to DFO (2009), the Strait of Belle Isle scallop fishery has always been cyclical in nature and is often driven by market considerations. Since the mid 1990s, the scallop fishery has been regulated by an annual Total Allowable Catch, and by other management measures including weekly catch limits and spatial regulation of removals. Fishers report that, in recent years, only a small number of vessels have been actively involved because of poor market conditions, regulatory restrictions and other factors (Canning & Pitt Inc. 2010). Indeed, roughly 56 enterprises currently hold scallop licences in the Strait of Belle Isle area, but only 12 vessels have been actively fishing this species in the past 4 to 5 years. The number of active participants may also decline further in the next few years as older enterprise operators exit the fishery, either for financial reasons or retirement. The 2010 Total Allowable Catch was 1,000 tonnes (for all of Division 4R, see Section 15.6). DFO reports that in recent years the annual catch has not been more that 35% of the Total Allowable Catch.

Considering the size of the area involved, current participation rates and catch trends, it is reasonable to conclude that harvesting levels in the RSA will not be significantly affected by the potential loss of scallop habitat within the marine cable corridor. Scallop operators who now take part of their annual scallop catch within the Strait of Belle Isle LSA should be able to re-direct their efforts to alternative, equally productive scallop grounds. Although most scallop fishers have their preferred / favourite fishing location(s), the nature of the scallop fishery is such that fishers have to fish extensively over a relatively large area during the course of the season. There is a limit to the number of times a scallop vessel can drag its gear over a particular seabed area and continue to have a good payload; at some point, the catch level will fall and the operator will find it necessary to move on to a new area, leaving the previous area time to replenish itself.

All existing scallop fishers in the Strait of Belle Isle were involved in the scallop industry during the ten-year period (1999 to 2008) when DFO closed a much larger (approximately 350 km^2) portion of the Strait of Belle Isle to scallop harvesting as a Refugium (which included most of the Strit of Belle Isle LSA and beyond), with the goal to enhance scallop recruitment by removing fishing pressure in that area. Scallop vessel operators stayed outside of this area for a decade, and did not report any significant drop in their annual scallop catch as a result of the exclusion. Some fishers did, however, indicate some increase in operating costs (e.g., more time spent traveling from their home port to their scallop grounds) because of the Refugium.

Fishing vessels will also not be able to set their gear in, or transit through, any 500 m radius Safety Zone established around Project vessels involved in ongoing maintenance operations or major system repairs during the Operations and Maintenance phase. During maintenance or repairs, all Project-related vessels will be required to stay within the 500 m radius Safety Zone when working. When operating outside this zone (e.g., transits), these vessels will stay within the established CCG Strait of Belle Isle (voluntary) traffic separation scheme, or any traffic route to ports within the area recommended by the FLC and / or established in the VTMP. As described above (Construction Effects), the potential for interference with commercial fisheries in the Strait of Belle Isle LSA (scallop dragging and cod fishing in particular) will depend on timing of maintenance activities. The infrequent and localized nature of such activities and associated restrictions will reduce the likelihood of any potential interference. If maintenance activities occur outside the main fishing periods, there will be no or very little likelihood of any adverse effect on commercial fisheries.

Through ongoing consultation (e.g., via the FLC), Nalcor will continue to address any concerns and issues on Marine Fisheries in the Strait of Belle Isle that arise from Project interactions.

Summary of Likely Residual Environmental Effects

Considering the above, and with the application of the identified effects management measures, the likely residual effects of Project Operations and Maintenance on the Commercial Fisheries KI are as follows:

- The direction is adverse because there will be some Project-related interference with fishing activities in the Strait of Belle Isle, due to any vessel movement restrictions during inspection and repair work.
- The magnitude of likely adverse effects will be low, as a degree of interference and required adjustment will occur, but given the relatively small areas involved, this is not expected to translate into a decrease in overall landings or fishing income as compared to pre-Project levels.
- Any likely Project-related adverse effects will be local in geographic extent, as they will occur within the Strait of Belle Isle LSA.
- Effects will extend into the far future, as the cables and berms will be permanent, although it is expected that scallop fishers and others will eventually adjust to these new conditions.
- The effect will be low to continuous in frequency as the interaction with Project vessels is expected to be less than once a year, but the cables and berms will be in place throughout the life of the Project.

There is a high degree of confidence that the actual effects of Project Operations and Maintenance on Commercial Fisheries will not be greater than predicted, based on recent and considerable experience with other marine projects, and the standard and proven nature of the effects management plans proposed.

16.6.6.4 Operations and Maintenance Effects: Recreational Fisheries

Recreational fisheries will not likely be affected by the gear restrictions associated with the presence of the submarine cables, periodic inspection and maintenance activities occurring at some distance from shore, or during the operation of the electrodes. Effects on marine recreational fishing activities are therefore not predicted as a result of Project Operations and Maintenance, based on the standard and proven nature of the effects management plans proposed and experience with other marine projects. There is a high degree of confidence that the actual effects of Project Operations and Maintenance on Recreational Fisheries will not be greater than predicted.

16.6.7 Environmental Effects Summary and Evaluation of Significance

The preceding assessment of potential Project interactions and effects has focused on the individual KIs that comprise the Marine Fisheries VEC, the results of which are summarized and compiled below for the KIs and VEC overall.

16.6.7.1 Summary of Environmental Effects

The summary of the Marine Fisheries environmental effects analysis is presented in Table 16.6.7-1.

Table 16.6.7-1 Environmental Effects Analysis Summary: Marine Fisheries

Project Phase / Key Indicator	Likely Residual Environmental Effects Summary Descriptors				
	Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**
Construction					
Commercial Fisheries	**Adverse / Neutral** – There will be some Project-related interference with fishing activities in the Strait of Belle Isle, but for limited duration and small areas at any one time. – Effects management measures will be implemented (including consultation, liaison, and compensation provisions if required). – The Project is not expected to result in a decrease in overall landings or fishing income.		**Local** – Confined to the Strait of Belle Isle LSA	**Short- to Medium-term** – Marine construction activities planned for one year	**Continuous** – Safety Zones will be maintained throughout construction
Recreational Fisheries	**Neutral** – Although recreational fishing will be prohibited within active construction zones, these areas are most likely to be several kilometres off shore, the immediate area of Dowden's Point and L'Anse au Diable electrode sites are not unique areas for recreational catches, and many alternative grounds are available in the local area. – There will be no measurable loss of overall recreational fishing opportunity or decrease in quality of the experience as a result of the Project.		**Local** – Confined to the Strait of Belle Isle LSA – L'Anse au Diable LSA	**Short- to Medium-term** – Marine construction activities planned for one year	**Low (if at all)** – Limited recreational fishing periods
Summary of Likely Residual Construction Effects on Marine Fisheries: Although there will be some Project-related interference with fishing activities in the Strait of Belle Isle during Project Construction and some adjustments will be required during this period, the relatively small areas involved, short-term nature of any such individual disruptions, and the planned consultation with fishers, will ensure that any likely adverse effects of the Project will not result in a decrease in overall landings or fishing income as compared to pre-Project levels. Any direct damages to fishing gear during construction, should they occur, will be the subject of compensation. There is expected to be no loss of overall recreational fishing opportunity or decrease in quality of the experience.					
Operations and Maintenance					
Commercial Fisheries	**Adverse / Low Magnitude** – Fishing restrictions as a result of Safety Zones; a small area will be restricted (i.e., 500 m radius around the marine construction activities)		**Local** – Confined to the Strait of Belle Isle LSA	**Far Future** – The area of scallop habitat lost will likely extend over the life of the Project	**Low to Continuous** – Project vessels are expected to be present less than once a year – Cables and berms will be in place throughout the life of the Project
Recreational Fisheries	–	–	–	–	–
Summary of Likely Residual Operations and Maintenance Effects on Marine Fisheries: A degree of interference and required adjustment will occur but, given the relatively small areas involved, the Project is not expected to result in a decrease in overall landings or fishing income as compared to pre-Project levels. The effects management measures planned will fully address any adverse effects. Effects on marine recreational fishing activities are not predicted as a result of Operations and Maintenance activities.					

16.6.7.2 Definition and Determination of Significance

Significant effects are considered to be those that cause a change in the VEC that will alter its status, integrity and future viability / sustainability beyond an acceptable level. For commercial marine fisheries, a significant adverse environmental effect is defined as one which would result in a measurable decrease in overall net fishing incomes for one or more fishing enterprises that operate in the RSA, in such a way as to challenge the successful operation and overall economic viability of one or more fishing enterprises in the area. A significant adverse environmental effect on recreational fisheries is one that would result in a measurable decrease in overall participation levels. An environmental effect that does not meet either of these criteria is considered not significant.

Project activities and infrastructure will permanently occupy a portion of the seabed within the RSA. Currently, several commercial fishing enterprises harvest a portion of their annual catch from scallop grounds within this area. After Construction, and excluding temporary maintenance / repair periods, scallop will be the only fishery affected by the Project; established harvesting activities and fishing grounds associated with other existing commercial or recreational activities will not be affected as there will be no areas unavailable for harvesting as a result of the Project.

Considering the extent of the affected scallop fishing area, it is reasonable to conclude that the loss of scallop habitat will not result in a significant change from baseline conditions in the RSA. For example, it is not expected that the Project will result in any noticeable drop in the annual, all-vessel catch, or any change in the average annual catch of a particular scallop enterprise.

With regard to recreational fisheries, most activities take place close to shore and, as such, are well away from the Strait of Belle Isle LSA where construction activities will be concentrated. Recreational fisheries occur for only few weeks during the fishing season, and there are many alternate fishing areas in the Strait of Belle Isle and in Conception Bay. As such, the presence of the Project will not have a noticeable effect on either the number of participants nor on the level of enjoyment recreational fishing provides.

Based on the above, the Project, including its Construction, and Operations and Maintenance phases, is not likely to result in significant adverse environmental effects on the Marine Fisheries VEC.

16.6.8 Evaluation of Project Alternatives

No technically and economically feasible alternatives for the submarine cable crossing or the shoreline electrode sites were identified (see Chapter 2, Section 2.12.3), and therefore marine Project alternatives are not evaluated for Marine Fisheries.

16.6.9 Cumulative Environmental Effects

The only other marine activities within the Strait of Belle Isle and Conception Bay RSAs that are relevant to the Marine Fisheries VEC include general shipping activities. These are common and long established activities in these areas, which are reflected in the existing biophysical and socioeconomic environments. There are no other identified and reasonably foreseeable development projects or activities in these areas that will overlap with the Project, nor are there any known or likely changes to the nature and intensity of non-Project vessel traffic in these areas.

Significant adverse cumulative environmental effects on the Marine Fisheries VEC are not likely to occur as a result of the Project in combination with other projects and activities that have been or will be carried out. Potential cumulative environmental effects for the Marine Fisheries VEC are summarized in Table 16.6.9-1.

Table 16.6.9-1 Cumulative Environmental Effects Summary: Marine Fisheries

Cumulative Effects Analysis	Central and Southeastern Labrador	Strait of Belle Isle[(a)]	Northern Peninsula	Central and Eastern Newfoundland	Avalon Peninsula[(b)]
Current (Baseline) VEC Condition (Reflecting the Effects of Past and Ongoing Projects and Activities)	n/a	– The current condition of the Marine Fisheries VEC in the Strait of Belle Isle RSA can be described as stable but somewhat marginal from an economic perspective. – Past and ongoing anthropogenic projects and activities that may affect the Marine Fisheries in the Strait of Belle Isle RSA include commercial fishing, and vessel traffic (e.g., shipping, ferries and fishing boat traffic).	n/a	n/a	– The current condition of the Marine Fisheries VEC in the Dowden's Point RSA can be described as stable. – Past and ongoing anthropogenic projects and activities that affect Marine Fisheries in the Dowden's Point RSA include commercial fishing, vessel traffic (e.g., shipping, fishing boats and recreational craft), and relatively dense human habitation in non-marine areas adjacent to the coast. There are no other known activities or projects in this RSA.
Likely Residual Environmental Effects of Labrador-Island Transmission Link (Reflecting Current VEC Condition, as above)	n/a	– The Project is not likely to result in a significant adverse environmental effect on the Marine Fisheries VEC in the Strait of Belle Isle RSA.	n/a	n/a	– The Project is not likely to result in any significant adverse environmental effects on the Marine Fisheries VEC in the Dowden's Point RSA.
Likely Cumulative Environmental Effects (within RSA) of Other Future Projects and Activities	n/a	– General shipping activity is a common and long established activity in the area. There are no known or likely changes to the nature and intensity of such vessel traffic, or any other proposed development projects in the area.	n/a	n/a	– General shipping activity is a common and long established activity in the area. There are no known or likely changes to the nature and intensity of such vessel traffic, or any other proposed development projects in the area.
Cumulative Environmental Effects Summary[(c)]	n/a	**Not Significant** – Project effects on Marine Fisheries are evaluated as not significant, and there are few if any other projects and activities in the area to contribute to cumulative effects.	n/a	n/a	**Not Significant** – Project effects on Marine Fisheries are evaluated as not significant, and there are few if any other projects and activities in the area to contribute to cumulative effects.

n/a Not applicable.
(a) Marine environment. Applicable to the Marine Fisheries VEC only.
(b) For the Marine VECs, this area comprises the Island of Newfoundland shoreline electrode site only.
(c) Total (cumulative) change from the existing environment. Significance of cumulative effects is evaluated using the same definitions as for the Project Environmental Effects Analysis.

16.6.10 Monitoring and Follow-up

Commercial and recreational marine fisheries in Newfoundland and Labrador are the subject of ongoing management, regulatory enforcement and monitoring (through, for example, the collection of statistical data on catch quantities, locations, and values) by the appropriate federal government agencies. Nalcor has neither the mandate nor the expertise to monitor the fishing industry in the Project areas, but has provided and will continue to provide Project information to such agencies as required and requested.

The effects management measures proposed by Nalcor include consultation and communications with area fishers and other provisions, which will serve as a means to identify and address any Project-related issues and effects as they arise throughout Construction and into Operations and Maintenance.

16.7 Tourism

16.7.1 Introduction

This section of the EIS assesses and describes the potential effects of the Project on the Newfoundland and Labrador tourism industry. This Tourism VEC includes attractions, activities and events, and regional infrastructure and services that support the tourism industry within each of the study area regions in which Project components and activities will take place. Tourism has been identified and considered as a separate VEC in this EIS as it plays a key role in the provincial economy, and because it may be affected both directly and indirectly by the proposed Project.

The tourism industry is an important consideration because attractions (e.g., parks, historic sites), events or activities (e.g., plays, festivals, boat tours) and related services (e.g., accommodations and restaurants) are important economic generators in Newfoundland and Labrador, particularly in rural areas. The tourism sector has experienced a compound annual growth rate of approximately 3% since 2003, resulting in a record number of visitors in 2010 (i.e., 519,000). Total non-resident expenditures have also grown steadily at a compound annual growth rate of 4.6% over the same period, also reaching an all-time high of almost $411 million in 2010. The sector is also important because non-resident visitation brings new money into the province and residents who choose not to travel elsewhere help to retain existing money within the province. The province is attracting growing numbers of non-resident visitors with increased expenditures, and at a time when other regions of Canada are not experiencing similar growth.

Tourism in Newfoundland and Labrador is based on particular well-recognized icons (e.g., natural and cultural attractions including L'Anse aux Meadows National Historic Site, Gros Morne National Park, icebergs, bird colonies and whales). The challenges for Newfoundland and Labrador tourism are, in many ways, also its strengths. The province is off the beaten track, and transportation and weather create challenges for potential visitors. These attributes make the province a special and genuine place of interest because it lacks mass tourism characteristics (e.g., over-crowded venues, impersonal service and inauthentic commercial attractions). To continue to attract non-residents and to retain vacationing residents, the province must maintain its distinctive heritage, strong cultural identity, clean air, quiet and friendly communities, unspoiled natural environments, and uninterrupted viewscapes. In general, areas that have favourable transportation networks and access (e.g., airports, looped roads, rental cars), clusters of cultural or natural tourism products (e.g., attractions, events, activities, destinations) and a range of facilities and services (e.g., food and accommodations) are likely to be more viable than those regions with limited access and fewer cultural or natural opportunities and services.

Tourism-related questions and concerns were identified through Project consultations with stakeholders and government officials as well as with the general public. For some tourists, construction work and the operations (presence) and maintenance of the proposed Project will not make any real difference to their enjoyment of the province. For many, the Project represents clean renewable energy and a sign of economic progress. For other users, who anticipate seeing a pristine environment devoid of development, it may affect their enjoyment of a site or activity. This is especially true of individuals who spend a substantial amount of money and time to travel to the province and expect a pristine environment.

As with other components of the economy, tourism visitation levels and revenues often fluctuate widely, and may be affected by non Project-related occurrences (e.g., quality of the tourism product, new or reduced travel options, currency exchange rates, fuel prices, alternative destinations and marketing campaigns). This effects assessment, therefore, focuses on Project-related changes to the existing environment with consideration of the likely natural variability in the tourism industry over time. The overall effect on tourism due to the Project and other likely projects and activities is addressed in the cumulative effects assessment (Section 16.7.9).

As a result of its very nature, the Tourism VEC overlaps and interacts strongly with other components of the natural and socioeconomic environments, including several of the other VECs and KIs considered elsewhere in this assessment. Effects on tourism, and particularly the enjoyment and quality of the tourist experience, may be due to changes in viewscapes and the remoteness and wilderness character of an area (Visual Aesthetics VEC, Section 16.8). In addition, effects on the tourism industry may stem from changes in the availability of transportation services, local accommodations or other infrastructure and services as a result of Project-related demands (Communities VEC, Section 16.3). Certain recreational activities that are or may be undertaken as part of the tourism experience (e.g., outfitting, hunting and angling, camping, boating, bicycling and hiking) and areas where they take place (e.g., parks and protected areas, and hunting and fishing management areas) were considered in the Land and Resource Use VEC (Section 16.5).

16.7.2 Environmental Assessment Study Areas

16.7.2.1 Spatial Boundaries

The various components and activities that will be associated with the Construction, and Operations and Maintenance of the Project are located within and adjacent to a number of regions and communities throughout Newfoundland and Labrador.

The LSA for the Tourism VEC is defined as the area within which Project-related elements and activities that may affect the tourism industry will occur. This includes the 2 km wide transmission corridor while also considering the nature and location of other Project activities and elements (e.g., access, electrode sites, electrode lines, camps, storage areas). Also included is the proposed 500 m wide submarine cable crossing corridor across the Strait of Belle Isle, from Labrador to the Island of Newfoundland. It also considers any communities or other locations where tourism attractions, activities and / or supporting infrastructure and services may be directly affected by the Project.

The RSA encompasses the overall tourism industry in Newfoundland and Labrador.

16.7.2.2 Temporal Boundaries

The temporal boundaries of the assessment for the Tourism VEC encompass the Project's Construction phase, as well as the Operations and Maintenance phase that will extend through the life of the Project.

16.7.3 Potential Environmental Issues, Indicators and Interactions

16.7.3.1 Potential Environmental Issues

Potential issues and questions associated with the Tourism VEC were identified in the *EIS Guidelines and Scoping Document* issued for the Project (Government of Newfoundland and Labrador and the Government of Canada 2011), and through regulatory, Aboriginal and stakeholder consultation by Nalcor, and by the EIS study team. These issues are associated primarily with how construction-related activities and disturbances and the use of local infrastructure and services, as well as the physical presence of the transmission system, may affect the tourism industry. These items are summarized in Table 16.7.3-1.

Table 16.7.3-1 Identified Issues and Questions: Tourism

Issue / Question	Nature and Rationale	Specific Considerations
Potential decrease in quality of tourism experience and thus, eventually, in visitation levels / industry revenues - due to Project-related disturbances during construction (e.g., noise, dust, presence of workers and use of equipment)	– Through good messaging and marketing, the province has become known for its outdoor tourism activities and unspoiled natural environment. – Interaction with or sight of Project construction work may be perceived as disruptive and negative.	– Labrador, particularly the populated areas at the western and eastern ends of the Project (central Labrador, Labrador Straits). – Throughout the Island of Newfoundland, particularly in areas where the Project is near existing communities, attractions and infrastructure. – Summer tourist season, particularly for the Construction phase and, to a lesser degree, spring and fall shoulder seasons.
Potential decrease in quality of tourism experience and thus, eventually, in visitation levels / industry revenues - due to Project-related uses of, for example, roads, other transportation services, accommodations, as this may be disruptive to tourists seeking to travel to and within the province	– Project vehicles on primary and secondary roads may cause inconvenience and delays for resident and non-resident tourists who may be constrained by time and cost considerations (e.g., vacation days, plane, ferry and rental car reservations). – Use of local accommodations by Project personnel may result in tourists not being able to secure accommodations, which may affect visitation (and thus revenues) in that and future years.	
Potential decrease in quality of tourism experience and thus, eventually, in visitation levels / industry revenues - due to the presence of the transmission system (especially, towers and cleared ROW) during Project operations	– Through good messaging and marketing, the province has become known for its outdoor tourism activities and unspoiled natural environment. – Interaction with or sight of Project infrastructure may be perceived as disruptive and negative.	

16.7.3.2 Key Indicators and Measurable Parameters

The KIs and associated MPs that are relevant to and reflect the potential effects of the Project on the Tourism VEC are identified and described in Table 16.7.3-2.

Table 16.7.3-2 Key Indicators and Associated Measurable Parameters: Tourism

Key Indicator	Rationale for Key Indicator	Measurable Parameter	Rationale for Measurable Parameter
Quality of Tourism Experience	– A key aspect of the tourism product, linked strongly to why people choose to visit an area, and / or whether to return – This may, in turn, affect visitation and revenue levels	– Expectations regarding the nature and quality of the tourism experience vs. actual outcomes – Interference / nuisance levels and tolerance	– Degree of difference between expected and actual tourism experiences, overlain by tolerance or aversion to Project-related disturbances (e.g., transportation, noise, visual) will influence perceptions of tourism experience quality
Tourism Visitation and Expenditures	– Important aspect of the tourism industry that reflects the overall activity levels and value	– Annual visitation levels – Accommodation occupancy rates – Tourism industry revenue levels (may be provincial, regional and / or by attraction / event)	– Project Construction activities could cause a decrease in visitation levels and expenditures by non-resident and resident tourists – Perceived or real Project Construction transportation delays could cause a decrease in tourism activity

16.7.3.3 Potential Project-Tourism Interactions

Potential interactions between Tourism and Project components and activities have been identified for the Quality of Tourism Experience KI and Tourism Visitation and Expenditures KI, and are listed in Table 16.7.3-3. These interactions are associated primarily with how construction-related activities and disturbances, the use of local infrastructure and services, and the eventual presence of the transmission system, may affect the tourism industry. While each Project component and activity listed in Table 16.7.3-3 has some potential to interact with individual tourists or their activities, the focus is on highlighting those which are most relevant to the industry as a whole. The key focus of this assessment is on whether, and the degree to which, any such interactions and resulting effects may translate into overall changes in the nature and status of one or both KIs, materially affecting the tourism industry in Newfoundland and Labrador.

Many potential interactions that may occur between large development projects and tourism can be avoided due to the nature and characteristics of the project itself, and / or can be avoided or reduced through appropriate project planning and design considerations. Project design can be used for effects management purposes where interactions leading to potential adverse effects are recognized at the outset, thereby eliminating many possible causes for concern. These and other effects management approaches are discussed in the sections that follow. The proactive identification and management of potential adverse effects through Project design has been an important aspect of Nalcor's planning to date.

Tourists to the province have been profiled as part of the "touring / explorer" market (NLDTCR 2010) based on their interests, income, education and age. Since these tourists prefer to travel "off the beaten track", it is difficult to identify and measure their complete travel routes and destinations. However, most seek to participate in specific activities (e.g., viewing icebergs, birds or whales) or to visit specific iconic destinations (e.g., L'Anse aux Meadows, Gros Morne National Park) or other destinations that may be related to natural or cultural features (e.g., Twillingate, Cape St. Mary's, Southern Shore), many of which maintain visitation records. This, combined with accommodation occupancy data and tourism expenditures, helps to identify the major travel destinations that residents and non-residents visit. This, in turn, helps to determine whether the proposed transmission corridor or system would intersect with important tourist travel routes to major destinations or would be visible from tourism destinations, and whether these statistics would change if an adverse interaction were to occur. Tourism expenditures, which are reported for the province as a whole, indicate the overall economic health of the tourism industry.

Table 16.7.3-3 Potential Project Interactions: Tourism

Project Phase / Activity	Key Indicator	
	Quality of Tourism Experience	**Tourism Visitation and Expenditures**
Construction		
Construction access trails and roads	–	–
Movement and presence of personnel, equipment and materials	– Potential decrease in quality of tourism experience due to interference with the movement of visitors to and from tourism destinations as a result of increased traffic caused by transport of Project personnel, equipment and materials – Use of local accommodations by Project personnel may result in tourists not being able to secure accommodations, which may affect visitation (and thus revenues) in that and future years	– Decrease in quality of tourism experience may, in turn, affect visitation and revenue levels
Construction camps	– Noise, dust and visibility of Project construction activities may affect tourist enjoyment	—
Marshalling yards and staging areas		
ROW clearing and preparation		
Quarrying and borrowing		
Transmission tower assembly and installation		
Conductor installation		
Converter station site preparation and construction		
Preparation and construction of submarine cable landing sites (on-land works)		
Construction and installation of submarine cables (Marine works)		
Electrode site preparation and installation		
Island system upgrades		
Employment / presence of workers		
Contracting / expenditures	—	
System commissioning		

Table 16.7.3-3 Potential Project Interactions: Tourism (continued)

Project Phase / Activity	Key Indicator	
	Quality of Tourism Experience	**Tourism Visitation and Expenditures**
Operations and Maintenance		
Operations and Maintenance access trails and roads	—	—
Presence and operation of the transmission system	– Potential decrease in quality of tourism experience and thus, eventually, in visitation levels / industry revenues - due to the presence of the transmission system (especially, towers and cleared ROW) during Project operations	– Potential decrease in quality of tourism experience and thus, eventually, in visitation levels / industry revenues - due to the presence of the transmission system (especially, towers and cleared ROW) during Project operations
Routine line inspections and repairs	—	—
Vegetation management		
Potential major system repairs	– Decrease in quality of tourism experience due to Project-related congestion on travel routes and / or in accommodations and other services	– Any decrease in quality of tourism experience may, in turn, affect visitation and revenue levels
Operation of the electrodes	—	—
Employment / presence of workers		
Contracting / expenditures		

— No likely or detectable interaction identified.

16.7.4 Approach to the Environmental Effects Analysis

16.7.4.1 Analytical Methods

The information sources and methods used to describe and understand the existing tourism industry in Newfoundland and Labrador were provided in Section 15.7. The assessment of potential Project effects on Tourism was based on a general approach of "overlaying" what is known about existing tourism attractions, activities and events, and the use of existing infrastructure and services by tourists in the LSA and RSA, with the nature of planned Project components and activities, to identify likely interactions and resulting effects on the VEC and its KIs. The primary focus of this assessment is on whether, and the degree to which, any such interactions may translate into measurable effects (e.g., increase / decrease in visitation or expenditures) on the Newfoundland and Labrador tourism industry.

16.7.4.2 Environmental Effects Descriptors

The potential effects of Project activities on the Tourism VEC are generally described in terms of a set of descriptors which are summarized in Table 16.7.4-1.

Table 16.7.4-1 Effects Descriptors: Tourism

Effects Descriptor	Definition
Direction	
Adverse	Effect is negative and undesirable
Neutral	Effect is neither adverse nor beneficial
Beneficial	Effect is positive and desirable
Magnitude	
No effect	Project results in no change in the existing condition / baseline value
Low	Project results in a small change in the existing condition / baseline value, but this is well within the capacity of the element in question, or is in keeping with the natural condition / variability or accepted threshold of the parameter
Moderate	Project results in a clear change in the existing condition / baseline value, but this is within the capacity of the element in question, or is in keeping with the natural condition / variability or accepted threshold of the parameter
High	Project results in a major change in the existing condition / baseline value, that exceeds the capacity of the element in question or is outside the natural condition / variability or accepted threshold for the parameter
Geographic Extent	
Local	Effect will be evident within the LSA
Regional	Effect will be evident within the RSA
Beyond regional	Effect will be evident beyond the RSA
Duration	
Short-term	Effect will be evident for less than one year
Medium-term	Effect will be evident for between one and four years
Long-term	Effect will be evident for from four to ten years
Far future	Effect will be evident throughout the life of the Project
Frequency	
Low	Effect will occur once or occasionally
Moderate	Effect will occur frequently but it could be sporadically
High	Effect will occur continuously

16.7.5 Construction

16.7.5.1 Overview of Project Construction and Associated Effects Management

Of particular relevance to the Tourism VEC and its associated KIs are the proposed construction methods and arrangements for the Project. Project Construction will take place over an approximately four year period at locations throughout Newfoundland and Labrador, with different types of activities taking place at different sites and at varying intensities over time.

Construction activities such as land clearing and transmission tower erection as well as development of construction infrastructure such as access trails, camps, quarries and lay down areas, will result in noise, dust,

general human presence and other activities and disturbances that may interact with tourism activities at these locations, through visual and other perceptual issues and / or disturbances.

As described in Chapter 3, Project Description, and elsewhere in this EIS, the Project involves substantial requirements for the transportation and movement of construction materials, equipment and workers to and across Project areas throughout the Construction phase. Ports, highways and other transportation infrastructure will be used throughout the province as required. At strategic points along the ROW and at other key sites, marshalling yards will be established to receive and temporarily store materials and equipment for use in Project Construction. The movement of materials and personnel throughout the province over the Construction phase, using existing regional and local transportation infrastructure, represents the key potential interaction between Project works and the tourism industry during that phase of the Project.

Project Construction will also require a significant workforce, that will move across the province as construction tasks progress in sequence, and for which accommodations will be required. Lodging for the construction workforce will be provided through small, temporary, self-contained construction camps established at strategic points along or near the ROW (Chapter 3, Project Description), which will typically be occupied by a sequence of sets of workers. Crews will work on a roster system (yet to be finalized), with a given number of days on the job followed by a number of days off work.

In its Project planning and design, Nalcor has sought to proactively anticipate and avoid the potential for interactions between the Project and the tourism industry, including any associated adverse socioeconomic effects that may result from such interactions. Key environmental effects management measures that relate to the Tourism VEC include:

- the avoidance of known and key tourism attractions and sites during Project planning, including in the selection of the proposed transmission corridor for the transmission line, and in the identification of locations for other key Project components (e.g., electrodes, submarine cable landing sites, converter stations);
- a decision by Nalcor that construction workers will be housed in temporary construction camps rather than in local hotels, B&Bs and other accommodations, so as to avoid placing demands on these services, especially during peak tourism seasons; and
- the coordination and scheduling of Project-related transportation of significant equipment and materials to avoid heavy seasonal tourism traffic to the extent practical, as well as regular communication and consultation with relevant agencies and tourism industry organizations and representatives as part of Project planning.

Other effects management measures that have been identified and proposed in relation to the natural and / or socioeconomic environments, as discussed throughout this EIS, are also relevant to avoiding or reducing potential effects on the Tourism VEC (e.g., the general landscape, visual issues, infrastructure and services).

16.7.5.2 Existing Knowledge

The potential effects of transmission line construction on tourism are, in many respects, similar to those which may be experienced with any large construction project, and particularly comparable with those of other large linear projects such as pipeline, road and railway construction. Unfortunately, there is little available published "existing knowledge" that evaluates and measures the actual and known effects of similar projects and activities on the tourism industry.

Key findings from a selection of recently published literature specific to transmission line construction, and which relates primarily to known and perceived effects on tourism that are often associated with such projects, and / or to the management of their effects on tourism are summarized in Table 16.7.5-1.

Table 16.7.5-1 Existing Knowledge (Construction): Effects of Similar Projects on Tourism

Reference	Study / Project Context	Summary of Findings
PSC Wisconsin (2010, internet site)	This overview reviews the environmental issues and concerns raised by the construction of electric transmission facilities. The first part of the overview provides a general summary of the methods to measure and identify environmental impacts. The second part of the overview is an A to Z directory of specific environmental issues and techniques to minimize or mitigate the impacts.	Tourism was not considered as being specifically affected, but recreation and aesthetics were.

The following sections describe potential effects of Project Construction, and Operations and Maintenance on tourism in Newfoundland and Labrador, and Nalcor's effects management strategies. These strategies are an integral element of the Project design and implementation. The resulting effects assessment is based on residual effects following implementation of the effects management strategies.

16.7.5.3 Construction Effects: Quality of Tourism Experience

Construction activity will occur throughout the province at various stages / times, causing noise, dust, visual intrusion, traffic, or the occasional small leak or spill. However, in most cases work at any particular location will be short-term. As part of Nalcor's effects management strategy, the Project will avoid key tourism attractions and Project activities will occur for the most part in remote interior areas of the province that are away from communities and major roads. Therefore, limited potential exists for direct interaction (visual, respiratory, audible) between the Project and the enjoyment of a tourism experience.

The following describes key issues and effects management strategies relevant to the Quality of Tourism Experience KI:

- Use of transportation infrastructure by the Project during construction will be spread out over four years, and throughout the province. As described in the Communities VEC (Section 16.3), Project use will still be within the overall capacity of existing services and roadways. Some potential for minor and short-term disruptions exists, but these will be similar to normal road construction and other increased construction uses in the province, which routinely occur during the peak tourism season (summer). The main potential for an increased use of public roadways will occur during the transportation of large scale Project components, but these will be infrequent. For any such traffic disruptions, Nalcor will follow standard safety and notification procedures as do other owner / operators of large scale construction projects in Newfoundland and Labrador (e.g., Vale, ExxonMobil).
- Nalcor and its contractors will coordinate and schedule Project-related transportation of large equipment and materials to avoid heavy seasonal tourism traffic to the extent practical. Nalcor will also regularly communicate and consult with relevant agencies and tourism industry organizations and representatives as part of its coordination and scheduling efforts.
- As part of its effects management strategy, Nalcor will house construction workers in camps rather than hotels to avoid occupying Newfoundland and Labrador accommodations during the summer tourism season.
- In addition to these effects management measures, capacity to meet tourist needs can also be increased when demand is apparent. Airlines and car rental companies increase capacity in July and August and capacity has been increased where warranted (e.g., St. John's airport). NLDTCR, Hospitality Newfoundland and Labrador (HNL) and industry are also working together to address air and rental car capacity issues. Where ferry demand has increased (i.e., Labrador Straits), the Department of Transportation and Works added additional crossings in the 2010 high season.

The only areas where Project Construction may affect the tourism quality of experience are along the Labrador Straits near Forteau, on the Northern Peninsula and in central Newfoundland near Deer Lake.

In Central and Southeastern Labrador between Forteau and L'Anse au Diable, some Project Construction activities could affect the overall quality of tourism experience. Construction activities would be most visible (e.g., accommodation camps, submarine cable landing sites, electrode site preparation and marshalling yard) to tourists travelling along the Labrador Straits on Route 510 or some of its side roads between Forteau and L'Anse aux Diable. Occasionally, issues related to movement and presence of personnel, equipment and materials could delay tourists wishing to visit Red Bay National Historic Site and Battle Harbour, the top tourism destinations in Central and Southeastern Labrador. Construction activity and increased demand for travel services on either side of the Strait of Belle Isle may create irritants for tourists and cause delays in meeting ferry and plane schedules and / or finding available or suitable rental vehicles and accommodations, especially during peak travel months (July and August). However, with suitable communications in place in advance to notify tourists and given that most of these delays are within the normal range of construction activities, the effects will not be sufficient to spoil an overall quality of tourism experience.

On the Northern Peninsula, movement and presence of personnel, equipment and materials from Shoal Cove East to Deer Lake may result in occasional traffic delays along Route 430, which is the only access route through the Northern Peninsula and to and from the Strait of Belle Isle ferry, Gros Morne National Park and L'Anse Aux Meadows National Historic Site. The latter two sites are important tourist destinations in the province. However, these effects, which might be a part of a travel experience in any year with or without this Project, are not anticipated to be measurable.

In Central and Eastern Newfoundland, the Deer Lake marshalling yards will support construction-related activities to the north and east of that town. The movement of large-scale Project components could cause short-term traffic delays on the TCH during high tourism season (July and August) for residents and non-residents heading north on Route 430 to Gros Morne National Park, L'Anse aux Meadows National Historic Site and across the Labrador Straits ferry to the two historic sites in southern Labrador, Red Bay National Historic Site and Battle Harbour. It could also temporarily delay tourists accessing the eastern tourism destinations of Twillingate, Fogo and Change Islands, and Terra Nova National Park from the TCH. However, temporary delays are within the range of normal summer construction season traffic, can be managed through scheduling and good communication, and will be avoided during peak travel periods, where possible.

Accidents and malfunctions could occur during Construction, as discussed in Chapter 5. The effect of the low-risk incidents (e.g., small brush fire, release of drilling mud, multiple tower failure, localized slope failure, waste spill) on Quality of Tourism Experience may result in temporary delays or visual distraction along tourist travel routes and destinations. Considering that these events would occur primarily away from major tourist areas and would be limited, the proposed mitigation will likely limit the effect. The accident most likely to occur is a small spill or leak of fuel or lubricants.

Accidental release of hydrocarbons or other contaminants from spills or leaks may result in vegetation alteration and loss, and result in temporary delays and visual distraction during Project Construction if along a tourist travel route. The remediation of a spill would likely require the excavation and disposal of contaminated soils, resulting in additional direct loss of vegetation. The proposed spill prevention mitigation measures will limit the likelihood of a release of hydrocarbon or other contaminant into the natural environment, and the effects management strategies identified above will limit the extent of disruptuion to the tourism experience.

In summary, the nature and quality of the tourism experience both in terms of expectations and potential satisfaction is subjective and personal. Nonetheless, the Project is likely to cause only short-term disturbance effects, and the Project is not expected to have a material adverse effect on the Quality of Tourism Experience in the province.

Summary of Likely Residual Environmental Effects

The likely residual effects of the Project Construction on the Quality of Tourism Experience KI are as follows:

- Adverse, because Project-related Construction work will result in interferences with some tourism activities, thereby potentially diminishing the quality of tourism experience.
- Of low magnitude, because most tourists anticipate a certain amount of road construction and, with the proliferation of websites and smart phones, tourists can schedule their travel to avoid delays, find suitable accommodations or make alternate travel arrangements. Nalcor will schedule certain Project-related movement and presence of personnel, equipment and materials to avoid heavy seasonal tourism traffic and will communicate with its contractors about alternate travel and living arrangements during high tourism season.
- Primarily local and occasionally in the RSA, because Project-related disturbances may occasionally extend beyond Project work areas.
- Of medium-term duration, as Project Construction will occur for one to four years, but not all activities will occur continuously in any one location.
- Of moderate frequency, as any such disturbances may occur intermittently throughout Project Construction.

There is a high degree of confidence that the actual effects of the Project Construction on Quality of Tourism Experience will not be greater than predicted given recent and long-term experience in the province with routine and major construction activities throughout the tourism seasons.

16.7.5.4 Construction Effects: Tourism Visitation and Expenditures

This section examines effects of Construction activities on tourism visitation and expenditures within the four on-land regions crossed by the proposed Project. Movement and presence of Project personnel, equipment and materials will occur in all four regions during the four-year Construction phase and will cause some minor and short-term disruptions during peak tourism travel months (i.e., summer); but, these disruptions will be similar to those from other linear-type construction projects (e.g., roads). Most construction activity will occur away from communities and will avoid major tourism areas. Detours or delays in movement of visitors to and from tourist destinations will likely occur during the transportation of large scale Project components, but these delays will be infrequent and, therefore, unlikely to result in non-visitation or cause direct loss of revenue to tourism operators.

As is the case for maintaining a quality of tourism experience, coordinating and scheduling Project-related transportation of significant equipment and materials and ongoing communications with relevant agencies and tourism industry organizations to avoid heavy seasonal tourism traffic will help avoid loss of revenue to tourism operators.

Construction workers will be housed and fed in temporary camps and will use company transportation when and where available. This will allow the Project to avoid competing with tourists for limited accommodations, which would otherwise affect tourism visitation, but not revenues.

The two areas where Project Construction has the potential to result in measurable effects on tourism are along the Labrador Straits and on the Northern Peninsula, where limited access routes exist. In Labrador, many tourists are constrained by tight schedules; travel to and from the Straits is time sensitive (i.e., ferry, airplane), weather- and seasonally-dependent, and alternative highway and plane routes are unavailable. Therefore, traffic delays along a travel route could negatively affect Labrador travel to some tourist destinations (e.g., Red Bay National Historic Site or Battle Harbour). However, activities associated with this Project are within the normal range of summer construction activity. Sufficient knowledge of previous similar construction projects, as well as proper planning, scheduling and communicating with appropriate agencies in relation to the Project should result in avoidance of most problems and prevent loss of revenue to tourism operators.

On the Northern Peninsula, movement and presence of Project personnel, equipment and materials could result in traffic delays to two important provincial tourism destinations, Gros Morne National Park and L'Anse aux Meadows National Historic Site. Traffic on Route 430 can be slower on the Northern Peninsula (e.g., as compared to the TCH) since the highway has only two lanes, limited passing ability and a lower speed limit; in summer, slow moving traffic such as camper trailers and construction vehicles exacerbate this problem. On the Northern Peninsula, traffic issues resulting from Project-related activities may interfere with tourists' schedules. However, this should not prevent them from reaching their destinations, although perhaps later than anticipated. Therefore, the effect is not expected to be measurable in terms of loss of revenue to tourism operators.

Project-related personnel may use a variety of transportation modes to reach remote or distant Project sites (e.g., Labrador or the Northern Peninsula). Throughout the year, this should not pose a capacity problem; however, during the high tourism season when airplane seats and rental cars are in shorter supply, especially on the Northern Peninsula and along the Labrador Straits, some competition for these transportation modes may occur. Both rental car companies and flight providers have improved their capacity in recent years, and this trend is expected to continue in an effort to meet growing demands. Thus, visitation, expenditures and occupancy rates should not be diminished nor should the overall revenue to tourism operators.

Accidents and malfunctions could occur during Construction, as discussed in Chapter 5. The effect of the low-risk incidents (e.g., small brush fire, release of drilling mud, multiple tower failure, localized slope failure, waste spill) on Tourism Visitation and Expenditures may result in temporary, local disruption or delays. As indicated in the Quality of Tourism Experience KI, considering that these events would occur primarily away from major tourist areas and would be limited, the proposed mitigation will likely limit the effect.

Because these disruptions are temporary, localized and for the most part, away from major tourism areas, they are unlikely to diminish the overall tourism experience and are unlikely to affect current or future visitation and tourism revenues. Therefore, the Project is unlikely to measurably affect tourism visitation levels or expenditures.

Summary of Likely Residual Environmental Effects

The likely residual effects of Project Construction on the Tourism Visitation and Expenditures KI are as follows:

- Adverse, because Project-related Construction will result in interferences with tourism activities, thereby potentially decreasing visitation and revenue to tourist operators.
- Of low magnitude, because construction traffic delays are a normal part of summer highway travel. Nalcor will schedule certain Project-related movements and presence of personnel, equipment and materials to avoid high volume seasonal tourism traffic; communicate to appropriate agencies about non-routine Project-related movement; and, communicate with contractors about alternative travel and living arrangements during high tourism season to avoid loss of income to tourism operators.
- Primarily local and occasionally regional, because Project-related disturbances may occasionally extend beyond Project work areas.
- Of medium-term duration, as Construction traffic will occur for one to four years.
- Of moderate frequency, as any such disturbances may occur intermittently throughout Project Construction.

There is a high degree of confidence that the actual effects of Project Construction on Tourism Visitation and Expenditures will not be greater than predicted given recent and long-term experience in the province with routine and major construction activities throughout the tourism season.

16.7.6 Operations and Maintenance

16.7.6.1 Overview of Project Operations and Maintenance and Associated Effects Management

This Project phase will involve operating and maintaining the transmission system. Most Operations and Maintenance Project components and activities will have effects similar to those of other existing transmission systems and will not likely result in effects on tourism, although this may vary by region (e.g., if major system repairs are required in the Straits area of Central and Southeastern Labrador during the peak tourism months of July and August, suitable accommodations and rental cars might be difficult to find).

From a tourism perspective, the primary focus of this assessment is on the presence and operation of the transmission system in the landscape and how this may affect the quality of the tourism experience and, eventually, tourism visitation and revenues in the province. Potential major system repairs and presence of workers (e.g., prolonged repairs could result in traffic delays) are also considered. Effects management strategies and approaches related to Operations and Maintenance will be similar to these developed for Construction, as applicable.

16.7.6.2 Existing Knowledge

As stated in the existing knowledge section for construction effects on tourism, effects on land use, visual landscape, and property values are the primary socioeconomic focus (Table 16.7.6-1). With the exception of effects on visual amenity, land use and recreation, limited available literature focuses on the actual effects of the operations and maintenance phase of transmission projects on tourism, but rather the focus is on the overall effect of the transmission corridor.

Table 16.7.6-1 Existing Knowledge (Operations and Maintenance): Effects of Similar Projects on Tourism

Reference	Study / Project Context	Summary of Findings
PSC Wisconsin (2010, internet site)	This overview reviews the environmental issues and concerns raised by the construction of electric transmission facilities. The first part of the overview provides a general summary of the methods to measure and identify environmental impacts. The second part of the overview is an A to Z directory of specific environmental issues and techniques to minimize or mitigate the impacts.	– Tourism was not considered as being specifically affected, but recreation and aesthetics were.
Marshall and Baxter (2002)	High-voltage, high-capacity overhead lines are the economic and reliable choice for the bulk transmission of electricity throughout the world. The routing of transmission lines is a complex process, and in the UK requires that a balance is struck between statutory obligations, engineering requirements, economic viability, land use and the environment. Transmission line routing can rightly generate considerable public interest and debate, but issues often focus on local effects such as visual amenity rather than the wider benefits of the project to society as a whole.	– In general, the main potential effects of an overhead transmission line are the effects on visual amenity (e.g., people living and working in the area) and on the landscape resource. The degree of visual intrusion can be reduced through careful routing. Towers and conductors may be visible from tourist attractions and may alter the character of the landscape in which they are sited. – Interactions between effects may exist for specific topics (e.g., effects on visual amenity and cultural heritage) and may interact to highlight an indirect effect on tourism and thus on the tourism economy of the area. – Authors suggest to follow the Holford Rules and avoid major areas of highest amenity value even if total mileage is somewhat increased in consequence.

16.7.6.3 Operations and Maintenance Effects

This section examines the effect of Project Operations and Maintenance activities on the Quality of the Tourism Experience as well as on Tourism Visitation and Expenditures. Tourism is a growing industry. The province appeals to tourists who seek outdoor adventures on the ocean, in wide open landscapes and in the small friendly communities of Newfoundland and Labrador.

During this phase of the Project, construction infrastructure not required during Project operations will be removed, and construction activity will not occur; routine maintenance will be similar to current routine maintenance of other transmission lines within the province, and is unlikely to affect most tourists' quality of experience. For occurrences during routine maintenance and repairs where tourist experience is affected and, in particular, for major planned and unplanned (e.g., hurricanes) system repairs, similar procedures will be followed as during Project Construction (e.g., coordinating and scheduling with appropriate agencies, avoidance of high tourism periods and emergency planning), but unlike Construction, these repairs would occur only at specific locations. Further, the transmission line avoids all tourism infrastructure, is similar to the many transmission lines currently crossing the province and, because of its location away from major highways (except on the Avalon Peninsula where it parallels existing transmission lines) and communities, it will not be visible to most travelers and tourists.

Presence and operation of the transmission system, potential major system repairs, and presence of workers could affect the quality of the tourism experience in several ways. Depending on the nature and seasonal occurrence of major system repairs and presence of workers, Project Operations and Maintenance may result in traffic delays and detours that affect the quality of tourism experience. Traffic delays can prevent tourists from reaching destinations as planned (particularly when using airplanes or ferries) and possibly not being able to visit some areas when schedules are inflexible. Changing reservations or missing bookings could result in change fees or lost deposits.

The months of July and August are high tourism season throughout the province and at that time of year it can be difficult for tourists to find airplane seats and vehicle rentals. Excess accommodations capacity existed in all regions in 2010 but this remaining capacity might not be suitable to meet the needs of Newfoundland and Labrador's typically high income non-resident tourists.

Viewing of permanent towers is one of the main ways in which the quality of tourism might be affected by the Project. In total, approximately 910 to 1,305 towers will be constructed between the Muskrat Falls converter station and the Forteau Point transition compound. However, only one tower, at Forteau Point, will likely be visible to the average tourist. Between Shoal Cove East and Soldiers Pond approximately 2,148 towers will be constructed, almost all of which will not be visible from the TCH or smaller feeder roads, except on the Avalon Peninsula and near Clarenville where they will be built along existing transmission ROWs.

The main consideration for the Tourism VEC is the viewing of towers by nature-based tourists in wilderness areas, particularly near the Labrador Straits, on the Northern Peninsula and in Central Newfoundland. In Labrador, tourists expect to experience an unspoiled wilderness. If they arrive by ferry there is a potential they will see the transmission towers at Forteau Point. On the Northern Peninsula, a popular hiking, kayaking / canoeing and outfitting area, tourist enjoyment of the areas near Shoal Cove East, Portland Creek, Rack Lake, Four Ponds and IATNL may be affected by the visibility of the transmission towers. In Central Newfoundland, the ROW is unlikely to affect the quality of tourism experience near the Riverfront Chalet (Stantec 2011). However, in many situations, the actual visibility of the transmission line is confined to a small area of a large panorama and away from the main highway. The visibility of the Project by tourists is highly dependent on environmental conditions such as weather, terrain, and vantage point. Further, transmission towers are common occurrences and represent modern conveniences (e.g., heat and light), even in rural areas. For many tourists, transmission ROWs and towers do not affect enjoyment of a region as long as they are isolated occurrences. Therefore, the quality of the overall tourism experience is unlikely to be compromised as a result of the Project and is highly unlikely to affect future tourism revenues.

Accidents and malfunctions could occur during Operations and Maintenance, as discussed in Chapter 5. The effect of the low-risk incidents (e.g., small brush fire, multiple tower failure, small leaks and spills) on Quality of Tourism Experience and Tourism Visitation and Expenditures may result in temporary, localized delays to travel or distractions to the visual experience. The accident most likely to occur is a small spill or leak of fuel or lubricants. Minor spills will be cleaned-up efficiently and effectively and unacceptable environmental effects are not anticipated. Considering that these events would occur primarily away from tourist attractions and would be limited, the proposed mitigation will limit the effect.

The only areas where Project operations and maintenance may affect the tourism quality of experience are along the Labrador Straits near Forteau, on certain sections of Route 430 on the Northern Peninsula and on certain sections of the TCH in Central and Eastern Newfoundland and on the Avalon Peninsula. These are more fully described below Tourism interest in Labrador is increasing, but despite improved ferry service and a continuous road connection from the Labrador Straits to Québec and beyond, challenges still face tourists travelling to and from Labrador. Travel from Central to Southeastern Labrador requires driving on rough roads with limited services. Availability of rental vehicles or suitable accommodations during the peak travel months is also limited. Tourists may become disappointed if these challenges are further exacerbated by traffic delays, either in Labrador or on the Northern Peninsula, that cause difficulty meeting ferry and plane schedules. The quality of the experience might also be affected by the visibility of transmission towers around Forteau and L'Anse Amour in what is perceived to be an unspoiled landscape. However, this effect will not likely be measurable.

Tourism in the Northern Peninsula has been increasing, especially to Gros Morne National Park. Traffic delays on Route 430 (the major vehicle route to the region) which has limited capacity for passing, and the need to change plans as a result of delays, could affect the quality of the tourism experience. Competition for limited airplane seats, rental vehicles and suitable accommodations could also affect the quality of experience. Tourist's enjoyment of the area might also be minimally affected by the visibility of transmission towers near Shoal Cove East.

Tourism has also been increasing in Central and Eastern Newfoundland, particularly in the eastern portion of the region around Terra Nova, Trinity and Bonavista. Project-related traffic delays on the TCH could affect tourists' ability to access some sites in a timely manner, and this could minimally affect the quality of the tourism experience.

If major system repairs or presence of workers cause traffic delays on the TCH, access to six of the province's top 19 tourism destinations, as well as time sensitive transportation modes, might be adversely affected.

Summary of Likely Residual Environmental Effects

The likely residual effects of Project Operations and Maintenance on the Quality of Tourism Experience and Tourism Visitation and Expenditures KIs are as follows:

- Adverse, because the transmission line is a permanent presence on the landscape. Also, Project Operations and Maintenance will result in occasional, temporary traffic disturbance.
- Of low magnitude, because the transmission line is primarily located away from tourism areas. In more heavily populated and traffic areas (Avalon Peninsula), the transmission line runs parallel to existing transmission lines.
- Regional, because the effect will extend into the RSA.
- Of short-term to far future duration, as Operations and Maintenance will occur throughout the life of the Project, but Maintenance activities will be short-term events.
- Of low to moderate frequency, as maintenance activities and associated effects are expected to occur occasionally and sporadically; and, while the Project presence on the landscape will last throughout the life

of the Project, the effects of viewing the Project will depend on a variety of environmental conditions such as weather, terrain, and vantage point, and may therefore also be occasional and sporadic.

There is a high degree of confidence that the actual effect of Project Operations and Maintenance on Tourism will not be greater than predicted because transmission lines are common occurrences in many parts of the world, do not present high risk and are predictable in their effects, and the predictions are based on past experiences with major construction projects in the province.

16.7.7 Environmental Effects Summary and Evaluation of Significance

16.7.7.1 Summary of Environmental Effects

A summary of the potential Project-related environmental effects on the KIs for the Tourism VEC are presented in Table 16.7.7-1. The information is brought together to develop an overall conclusion about the effects of the Project on the Tourism VEC.

Table 16.7.7-1 Environmental Effects Analysis Summary: Tourism

Project Phase / Key Indicator	Likely Residual Environmental Effects Summary Descriptors				
	Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**
Construction					
Quality of Tourism Experience	**Adverse** – Project-related construction will result in occasional short-term interference (visual, noise, dust, traffic disruptions, accommodation shortages) with enjoyment of tourism activities, but these disruptions are within the normal variability of the effects of construction activities within the province	**Low** – Effects management measures will result in minimal traffic delays and minimal shortages of accommodation and means of transportation	**Local to Regional** – Local and sometimes regional (e.g., traffic delays in one zone of the province can affect tourism in another zone)	**Medium-term** – Project construction will occur from one to four years, but not necessarily that length of time in any one location, nor will Project activities occur near major tourism destinations	**Moderate** – Disturbances may occur intermittently throughout the Construction phase
Tourism Visitation and Expenditures	**Adverse** – In some locations construction activities may cause traffic delays or some irritants in travel bookings	**Low** – Construction interruptions will be minor, short-term and within the range of normal effects related to construction activities within a tourism season	**Local to Regional** – Local and sometimes regional (e.g., traffic delays in one zone of the province can affect tourism in another zone)	**Medium-term** – Project construction will occur over a four year period, but not necessarily that length of time in any one location, nor will Project activities occur near major tourism destinations	**Moderate** – Disturbances may occur intermittently throughout the Construction phase, primarily in the transport of large scale Project components

Table 16.7.7-1 Environmental Effects Analysis Summary: Tourism (continued)

Project Phase / Key Indicator	Likely Residual Environmental Effects Summary Descriptors				
	Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**
Summary of Likely Residual Construction Effects on Tourism: The Quality of Tourism Experience KI could be intermittently affected (e.g., noise, dust, small leaks or spills, visual disturbance, traffic delays) but these are within the range of normal effects related to construction activities. Occasionally, large scale construction components could cause traffic delays during the summer (July and August) when equipment and materials are moved along travel routes frequented by tourists, but these are also within the range of normal effects related to construction activities. Conflicts between Project-related personnel and tourists for travel and accommodation resources will be limited, if they occur at all, because construction personnel will mainly be housed in temporary construction camps. Project-related personnel may use a variety of transportation modes to reach Project sites. Throughout the year, this should not pose a capacity problem for tourists, but during high tourism season when there is greater demand for airplane seats and rental cars, resident and non-residents may occasionally experience difficulty booking certain travel modes. These disturbances are within the normal travel experience of tourists, especially during the peak tourism seasons, and can be managed by avoiding Project Construction near tourism sites, by effective scheduling, and through ongoing communications with appropriate agencies. These effects management measures should prevent loss of revenue to tourism operators.					
Operations and Maintenance					
Quality of Tourism Experience and Tourism Visitation and Expenditures	**Adverse** – Visual effect of structures may create a negative quality experience at particular locations, but most structures are located in remote areas away from major roads, which should not affect tourism visitation or expenditures	**Low** – Effects management measures will result in minimal traffic delays or accommodation and transportation mode shortages, except for major system repairs which are infrequent events and for which emergency planning is in place	**Regional** – The effects of the Project will extend into the RSA	**Short-term to Far Future** – Maintenance activities will be short-term and temporary events – The transmission system will be placed permanently on the landscape	**Low to Moderate** – Activities are expected to occur occasionally – The effect of viewing the Projec will be sporadic depending on environmental conditions

Table 16.7.7-1 Environmental Effects Analysis Summary: Tourism (continued)

Project Phase / Key Indicator	Likely Residual Environmental Effects Summary Descriptors				
	Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**
Summary of Likely Residual Operations and Maintenance Effects on Tourism: Traffic delays caused by major system repairs are unlikely, but should they occur, Nalcor's existing effects management measures, emergency planning and communications with appropriate tourism and transportation departments and agencies are expected to address these repairs including extreme events (e.g., hurricanes, ice storms) to minimize associated effects. Large permanent structures on the landscape could negatively affect some tourists' quality of experience, but the transmission system will avoid special tourism places (e.g., Gros Morne and Terra Nova National Parks), is visible in relatively few remote wilderness areas, and will not be visible in most regions except the Avalon Peninsula where it parallels already existing structures. Considering this, the Operations and Maintenance of the Project is expected to have a minor to negligible effect on the Quality of the Tourism Experience and on Tourism Visitation and Expenditures.					

16.7.7.2 Definition and Determination of Significance

Significant adverse effects are considered to be those that cause a change in the VEC that will alter its status, integrity and future viability / sustainability beyond an acceptable level.

For the Tourism VEC, a significant adverse environmental effect is defined as one where the Project causes a decrease in the overall quality and enjoyment of Newfoundland and Labrador's tourism product, in such a way that it results in a detectable decrease in tourism visitation and expenditure levels in one or more regions of the province and / or where it threatens the successful operation and overall economic viability of one or more tourism enterprises. An environmental effect that does not meet these criteria is considered not significant.

Construction, and operations and maintenance of major transmission lines have occurred within the province without any significant negative effect on tourism. Construction activities associated with the proposed Project are short-term, avoid key tourism attractions, are located away from most communities and major roads, and are within the normal pattern of summer construction activity within the province. Project Construction activity will use existing roadways and access routes where possible, thus, not adding unnecessary land disturbance. Construction workers will be housed in temporary accommodations along the ROW, which will remove workers from unnecessary interaction with local communities and will avoid competition with tourism establishments in the region. Planning, coordinating and scheduling Project activities to avoid seasonal tourism traffic and ongoing communication and consultation with relevant agencies and tourism industry organizations will minimize disruption to tourist travellers.

Through Nalcor's effects management measures, the NLDTW's long-term knowledge and expertise in traffic management, the province's focus on creating and maintaining a high quality tourism product, and the strength of Hospitality Newfoundland and Labrador's partner relationships among government and tourism operators, sufficient policies and practices are in place to manage likely adverse effects of the Project on tourism. Therefore, current tourism opportunities are expected to remain available and viable, and future tourism opportunities are not expected to be compromised as a result of the Project.

Based on the above, the Project, including its Construction and Operations and Maintenance phases, is likely to result in no significant adverse environmental effects on the Tourism VEC.

16.7.8 Evaluation of Project Alternatives

This section compares alternative transmission corridor segments with the corresponding portions of the proposed Project corridor discussed throughout this assessment on Tourism. The alternative segments cross approximately the same geographic areas as the preferred corridor. For the proposed Project and alternative corridor segments, construction activity and visual aesthetics of the towers on the landscape will be the primary effects on the quality of the tourism experience; however, the towers are anticipated to have little to no effect on tourism visitation and expenditures, with the possible exception of the tourism experience at the Point Amour Lighthouse Provincial Historic Site for the Point Amour Alternative Segment (A3). In all cases, primary tourism sites are avoided, construction will be scheduled to avoid areas of high tourism concentration during the summer months, and towers are planned to avoid interruption of major view planes (Visual Aesthetics VEC, Section 16.8).

The comparison of the Project and alternative corridors is included in Table 16.7.8-1.

Table 16.7.8-1 Summary Evaluation of Project Alternative Means: Tourism

Project Alternative Means	Environmental Implications (Compared to the Proposed Transmission Corridor)	
	Quality of Tourism Experience	**Tourism Visitation and Expenditures**
A2: North-west of Strait of Belle Isle Alternative Segment	No difference, as few tourists visit the area.	No difference, as no tourism facilities are located in the immediate area.
A3: Point Amour Alternative Segment	Tower will likely be visible on the road to Point Amour Lighthouse Provincial Historic Site as opposed to along Route 530 at Forteau Point. Point Amour is a designated tourism site whereas Route 530 at Forteau Point is a route that tourists travel. The transmission tower and its construction could affect the overall quality of tourism experience at Point Amour because tourists would be more likely to expect construction or a tower along a public roadway.	If tourists feel the tower and its construction on the road to the lighthouse impedes their view of the region, a slight decrease in visitation and expenditures might occur at the site. However, tourists can no longer climb the lighthouse staircase to view the Straits.
A4: Strait of Belle Isle Newfoundland Side Alternative Segment	It is unlikely that construction would impede traffic or that towers would be visible on the alternative route.	No difference.
A5: GNP North-east Alternative Segment	The proposed area through which both routes would go is rarely used by tourists (no outfitters, limited trails).	There are no tourism establishments or means to spend money on either route.
A6: GNP West-central Alternative Segment	Small collections of RV parks are located on both routes. The alternative routing has a few more RVs / mobile trailers. The construction and permanent placement of towers could diminish the quality of tourism experience.	It is unlikely that the construction and viewing of a tower will result in decreased visitation and expenditures because few tourists travel in this area and limited opportunities exist for expenditures.
A7: GNP Eastern LRM Crossing Alternative Segment	Little difference. The proposed routing crosses an accessible waterbody on which an outfitter is located. The alternative route is less accessible, but an outfitter is also located on it.	It is unlikely that the construction and viewing of several towers will result in decreased visitation and expenditures as alternative areas are available for hiking and limited opportunities exist for expenditures in the immediate area.
A8: GNP IATNL Alternative Segment	Back country trails are located in this area. Towers are less visible from an outfitting lodge in the alterative routing.	It is unlikely that the construction and viewing of a tower will result in decreased visitation and expenditures in the region.
A9: Birchy Lake Alternative	The alternative passes through a popular RV and summer tourist area as well as one outfitter cabin. The proposed routing avoids these areas.	Some diminished expenditures could occur with the alternative routing if RVs or day users in the area are concerned about construction activities and their associated disturbances (e.g., noise, dust, traffic, small leaks or spills, general human presence or viewing a tower).
A10: NLOA Alternative Segment	The alternative partly follows an existing transmission line. The alternative may overlap with four outfitters.	The alternative will increase access which may increase visitation and expenditures for some outfitters. It is unlikely to affect other outdoor tourists as it is a remote region of the province.
A11: Avalon Alternative Segment	Both routes cross popular boating and summer tourism areas. The alternative routing crosses more waterbodies than the proposed routing. The construction and permanent placement of towers might affect tourists' quality of experience.	It is unlikely that the construction and viewing of a tower will result in decreased visitation and expenditures as construction is common on the Avalon Peninsula near the TCH, and other transmission lines are located in the region.

In summary, the alternative segments could cause some minor irritations to the overall quality of experience, but many of these effects would be momentary as they would occur primarily when traveling by car and less frequently when hiking or boating. Neither the alternatives nor the preferred corridor will likely cause measurable effects to tourism visitation or expenditures.

No technically and economically feasible alternatives for the submarine cable crossing or the shoreline electrode sites were identified (see Chapter 2, Section 2.12.3), and therefore marine Project alternatives are not evaluated for Tourism.

16.7.9 Cumulative Environmental Effects

Cumulative effects are the overall effect on the Tourism VEC as a result of the Project's residual effects in combination with effects of past, present and reasonably foreseeable future projects and activities.

Projects that could overlap temporarily with the Project include:

- Lower Churchill Hydroelectric Generation Project (assuming construction begins in 2011, peak employment would occur in 2016);
- TLH3 (Happy Valley-Goose Bay to Cartwright Junction – operational since late 2009);
- General Economic and Infrastructure Development (Labrador); and
- General Economic and Infrastructure Development (Island).

From the perspective of the Project, cumulative effects on Tourism (Quality of Tourism Experience and Tourism Visitation and Expenditures) will be greatest during Project Construction because noise, dust, visuals, traffic delays, transportation shortages and demand for accommodation will be greatest, particularly along major traffic routes.

Cumulative effects associated with the Project are summarized in Table 16.7.9-1. This table outlines trends, existing developments and proposed initiatives that could affect the Tourism VEC in the RSA (i.e., projects that could simultaneously occur with this Project in the Construction, and Operations and Maintenance phases that could cause increased traffic delays, shortages of suitable accommodation and means of transportation along major traffic routes (e.g., TLH, TCH), or could cause a diminished quality of tourism experience).

A significant effect would cause a decrease in the overall quality and enjoyment of Newfoundland and Labrador's tourism products in such a way that it (1) results in a detectable decrease in tourism visitation and expenditure levels in one or more regions of the province, and / or (2) threatens the successful operation and overall economic viability of one or more tourism enterprises. The effects of the Project in combination with other projects and activities that have been or will be carried out are not expected to result in an effect on the Tourism KIs that would be considered significant, based on the definition. Therefore, significant cumulative effects on the Tourism VEC are not likely to occur.

Table 16.7.9-1 Cumulative Environmental Effects Summary: Tourism

Cumulative Effects Analysis	Central and Southeastern Labrador	Strait of Belle Isle[(a)]	Northern Peninsula	Central and Eastern Newfoundland	Avalon Peninsula
Current (Baseline) Tourism Condition	– Tourism is increasing as a result of business travellers and the completion of the TLH.	n/a	– Tourism is increasing as a result of continual increased visitation at Gros Morne National Park and interest in outdoor and cultural tourism product.	– Tourism is increasing, particularly on the Bonavista Peninsula and Twillingate Islands.	– Tourism is increasing, particularly business travellers on the north-east Avalon as a result of a buoyant growing economy.
Likely Residual Environmental Effects of Labrador-Island Transmission Link	– Some possible short-term traffic inconvenience due to movement of large scale Project components in the Labrador Straits area near Forteau. – Visual presence of tower near Forteau.	n/a	– Some possible short-term inconvenience due to movement of large scale Project components on Route 430. – Visual presence of towers near Shoal Cove East, Portland Creek Pond and Rack Lake.	– Some possible short-term inconvenience due to movement of large scale Project components entering / exiting Deer Lake marshalling yards and travelling north and east. – Visual presence of towers at Birchy Lake and Riverfront Chalet.	– No anticipated measurable residual effects.

Table 16.7.9-1 Cumulative Environmental Effects Summary: Tourism (continued)

Cumulative Effects Analysis	Central and Southeastern Labrador	Strait of Belle Isle[(a)]	Northern Peninsula	Central and Eastern Newfoundland	Avalon Peninsula
Likely Cumulative Environmental Effects (within RSA) of Other Future Projects and Activities	– Increased demand and insufficient supply of short-term accommodations in Happy Valley-Goose Bay area due to construction at Muskrat Falls of both the Project and the Lower Churchill Hydroelectric Generation Project, and increased traffic as result of TLH3. – Increased traffic on Route 510 plus increased workers as a result of general economic development could affect the ability of tourists to find suitable accommodations in the Labrador Straits, or diminish the overall quality of tourism experience during the peak tourism season.	n/a	– Increased numbers of travellers related to other projects and activities could result in more frequent traffic delays on Route 430 during the peak tourism season (July and August), causing tourists to miss travel connections to Labrador and time sensitive United Nations Educational, Scientific and Cultural Organization (UNESCO) sites. – Increased traffic related to other projects and activities could cause a decrease in quality of tourism experience. – Increased demand by workers on other projects and activities for limited accommodations, restaurants and retail services could discourage visitors to the region.	– No anticipated projects that will overlap with the Project.	– No anticipated projects that will overlap with the Project.
Cumulative Environmental Effects Summary	– **Not significant** considering that construction will occur over four years, a traffic management plan and accommodations camps will be in place, and Nalcor will adjust its schedule to accommodate high tourism season. Thus, the contribution of the Project to cumulative effects is considered low.	n/a	– **Not significant** considering construction will occur over four years and a traffic management plan will be in place. Thus, the contribution of the Project to cumulative effects is considered low.	– No anticipated cumulative effects.	– No anticipated cumulative effects.

n/a Not applicable.
(a) Strait of Belle Isle does not apply to tourism. Information related to either side of the Strait of Belle Isle is contained within the appropriate geographic land region (i.e., the Central and Southern Labrador or the Northern Peninsula).

16.7.10 Monitoring and Follow-up

The tourism industry in Newfoundland and Labrador is subject to ongoing management, regulatory enforcement and monitoring (through, for example, the collection of statistical data on visitation and accommodation occupancy rates, expenditures, quality and satisfaction rates) by the appropriate government departments and agencies, industry organizations and others. Nalcor has neither the mandate nor the expertise to monitor the tourism industry in the Project areas, but has provided, and will continue to provide, Project information to such agencies as required and requested. As described above, a number of the effects management measures proposed by Nalcor include initiatives related to ongoing communication and cooperation with authorities and other participants in the tourism industry, which will serve as a means to identify and help to address any Project-related issues and effects as they arise throughout Project Construction and into the Operations and Maintenance phase of the Project.

16.8 Visual Aesthetics

16.8.1 Introduction

The aesthetic value of the landscape can vary according to its scenic elements and the perception of the landscape by viewers. All landscapes have scenic value, which may be altered by changes brought on by the Project and other future developments. The goal of the visual aesthetics section of this assessment is to determine the amount and significance of the changes to the visual landscape potentially resulting from the Project.

This section provides an assessment of the level of Project-related alterations to the visual landscape, the degree to which the alterations contrast with the existing landscape, and the expected significance of these changes. The existing environment and the visual classes used in this assessment were characterized in Section 15.8. The scenic quality of the landscape and the sensitivity of the views at 12 Key Observation Points (KOPs) were described and ranked, and are used in assessing the Project's visual effects. This process included consideration of landscapes, landscape integrity, aesthetics and wilderness values (see Section 15.8.3) as outlined in Section 4.4.4.4 of the EIS Guidelines and Scoping Document (Government of Newfoundland and Labrador and the Government of Canada 2011). The visual Aesthetics Component Study (Stantec 2011b) was also used to inform the assessment, as it indicated the potential number of towers visible from a given location and the visual exposure (i.e., likely visibility of the proposed transmission line).

The landscape of Newfoundland and Labrador outside of urban centres is typically forested, as much of the province is undeveloped. Construction of the Project will therefore visually contrast with much of the present visual landscape. The ROW may be especially visible where the required clearing of trees for the Project components (e.g., access, ROW) creates a linear contrast against the natural surroundings. Transmission towers are likely to contrast with the existing environment where they are visible from a short distance or when they are visible against the sky.

16.8.2 Environmental Assessment Study Areas

16.8.2.1 Spatial Boundaries

The LSA focuses on the 2 km wide transmission corridor within which Project-related components and activities will occur, while also considering the general nature and location of other Project components. Primarily, this consists of the cleared ROW and transmission towers, but also includes the converter stations, access trails and roads, temporary camps and storage areas. From within the LSA, any of these visible components will likely be in the foreground of potential viewers, depending on the view angle, topography and vegetation cover.

The RSA includes locations up to 4.8 km from the ROW. This distance encompasses views that could potentially have a foreground or middle-ground view of the Project. Beyond this distance, the Project will be in the

background and details of the landscape generally become blurred and blend in with their surroundings, and are unlikely to have a visual effect.

16.8.2.2 Temporal Boundaries

The temporal boundaries for the EA of the Visual Aesthetics VEC encompass the Construction phase and the Operations and Maintenance phase of the Project. Although this assessment considers the Construction phase, there is a focus on the Operations and Maintenance phase, as this is when all Project components (e.g., transmission towers, conductors, converter stations) will be completed and expected to be the most visible.

16.8.3 Potential Environmental Issues, Indicators and Interactions

16.8.3.1 Potential Environmental Issues

This section outlines potential issues associated with the Project altering the visual aesthetics of the landscape. Issues and questions related to visual aesthetics, as identified in the EIS Guidelines and Scoping Document (Government of Newfoundland and Labrador and the Government of Canada 2011), through regulatory, Aboriginal and stakeholder consultation, and by the EIS study team are outlined in Table 16.8.3-1.

Table 16.8.3-1 Identified Issues and Questions: Visual Aesthetics

Issue / Question	Nature and Rationale	Specific Considerations
How visually distracting will a cleared ROW and towers be in the landscape?	The cleared ROW and towers will be visible in the landscape	The cleared ROW and towers may be visually discernible and may have an adverse effect on the scenery
How dominant will multiple 43 m high transmission towers be in the landscape?	The towers will be visible depending on the viewers' proximity to the structures, the topography and the vegetative buffer present	Above the horizon, towers visible against a sky background may become predominant silhouettes
The Project may have adverse visual effects at waterbody crossings	The Project may be visible from waterbodies	User groups may find the views of the Project adverse and detract from their experience
The Project may have adverse visual effects in remote areas	The Project may be visible from remote cottages, outfitting lodges and recreation areas	User groups may find views of the Project adverse and detract from their experience
The Project may have adverse visual effects where it crosses in close proximity to communities	The Project may be visible from communities	User groups may find views of the Project adverse and detract from their experience
The Project may have adverse visual effects depending on the proximity to the Main River Waterway Provincial Park and Gros Morne National Park[(a)]	The Project may be visible if the corridor is in close proximity to park boundaries	User groups may find views of the Project adverse and detract from their experience
How will the Project affect sightseeing for tourists?	The Project will likely be visible to tourists at certain locations	User groups may find views of the Project adverse and detract from their experience

[(a)] Due, in part, to public concern related to visual aesthetic effects, Nalcor decided to avoid Gros Morne National Park (recognized as a UNESCO World Heritage Site), so as not to disturb the natural beauty of the area.

16.8.3.2 Key Indicators and Measurable Parameters

The KIs focus and frame the visual aesthetics effects analysis on the specific interaction of the Project with the landscape. The three KIs for visual aesthetics are the view of the cleared ROW, the view of the transmission towers and conductors, and the view of other Project components (i.e., the converter station at Soldiers Pond).

The chosen KIs will focus on visibility of the Project components in the landscape. The MPs are based on the analysis of visibility of the Project and the degree of contrast the Project component has with the surrounding landscape. The MPs reflect the potential for disturbance to visual aesthetics. The KIs and their associated MPs and the rationale for their selection are shown in Table 16.8.3-2.

Table 16.8.3-2 Key Indicators and Associated Measurable Parameters: Visual Aesthetics

Key Indicator	Rationale for Key Indicator	Measurable Parameter	Rationale for Measurable Parameter
View of the ROW	Concern about how the cleared ROW will appear in the landscape	Amount of the cleared ROW visible, and contrast with the landscape	To highlight positive or negative visual effects of the cleared ROW
View of the transmission towers and conductors	Concern about the size and number of transmission towers that will be visible	Amount and size of transmission towers and conductor visible, and contrast with the landscape	To highlight positive or negative visual effects of the transmission towers
View of the other Project components	Concern about other Project components that will be visible	Amount of other Project components (e.g., converter station) that will be visible and contrast with the landscape	To highlight positive or negative visual effects of other Project components

16.8.3.3 Potential Project-Visual Aesthetics Interactions

From Construction to Operations and Maintenance, potential Project-Visual Aesthetics interactions will vary depending on the Project component or activity and individual perceptions. Project components and activities (e.g., access roads, temporary bridges, quarrying and borrowing, construction access trails, and camps) will vary during Construction, and Operations and Maintenance. For example, some construction access infrastructure will be reclaimed prior to commencement of Operations and Maintenance. Potential Project-Visual Aesthetics interactions in relation to the selected KIs are outlined in Table 16.8.3-3.

Table 16.8.3-3 Potential Project Interactions: Visual Aesthetics

Project Phase / Activity	Key Indicator		
	View of the Cleared ROW	**View of the Transmission Towers and Conductor**	**View of the Other Project Components**
Construction			
Construction access trails and roads	– New or expanded linear clearings[(a)] to the ROW	– New or expanded linear clearings[(a)] to the towers	– New or expanded linear clearings[(a)] to the other Project components
Movement and presence of personnel, equipment and materials	– Personnel and equipment may be visible on portions of the ROW	—	– Personnel and equipment may be visible on other Project components
Construction camps	—		– May be visible from existing access
Marshalling yards and staging areas (depends on location)			– New or expanded clearings
Right of way clearing and preparation	– Visible in forested areas – Not visible in open barrens		—
Quarrying and borrowing	—		– New or expansion of existing excavation
Transmission tower assembly and installation	– Personnel and equipment may be visible on portions of the ROW	– Portions of towers under construction or complete towers may be visible	—
Conductor installation		– Portions of conductors under construction or complete conductors may be visible	
Converter station site preparation and construction	—	—	– New clearings and facilities
Preparation and construction of submarine cable landing sites (on-land works)			
Construction and installation of submarine cables (Marine works)			—
Electrode site preparation and installation			

Table 16.8.3-3 Potential Project Interactions: Visual Aesthetics (continued)

Project Phase / Activity	Key Indicator		
	View of the Cleared ROW	**View of the Transmission Towers and Conductor**	**View of the Other Project Components**
Island system upgrades	—	– New towers may be more visible than those that are replaced	– Additional or modified structures and facilities
Presence of workers	– Personnel and equipment may be visible	– Personnel and equipment may be visible	– Personnel and equipment may be visible
Contracting / expenditures	—	—	—
System commissioning	– Personnel and equipment may be visible		– Personnel and equipment may be visible
– **Operations and Maintenance**			
Access trails and roads	– Linear clearings[(a)] or natural revegetation of reclaimed linear clearing	– Linear clearings[(a)] or natural revegetation of reclaimed linear clearing	– Linear clearings[(a)] or natural revegetation of reclaimed areas will be visible
Presence and operation of the transmission system	– ROW visible in cleared areas; in barrens the ROW may or may not be visible	– Towers visible; conductors less visible	– Facilities will be visible, as will revegetation of reclaimed areas
Routine line inspections and repairs	– Personnel and equipment in the ROW or above (i.e., in a helicopter)	– Personnel and equipment in the ROW or above (i.e., in a helicopter)	—
Vegetation management	– Personnel and equipment may be visible; change in vegetation cover due to cutting and herbicide application may be visible	– Personnel and equipment may be visible	
Potential major system repairs	– Personnel and equipment may be visible; if required, cleared areas of regenerating vegetation may be visible	– Personnel and equipment may be visible; if required, cleared areas of regenerating vegetation may be visible	– Modified structures or facilities
Operation of the electrodes	—	—	– Personnel and equipment may be visible
Employment / presence of workers	– Personnel and equipment may be visible	– Personnel and equipment may be visible	
Contracting / expenditures	—	—	—

— No Interaction.

(a) Linear clearing: contrasting linear form with two roughly parallel edges dividing the area in two.

16.8.4 Approach to the Environmental Effects Analysis

Visual aesthetics analysis examines the contrast between the Project and the existing landscape. This analysis focuses on the Project components that will be constructed and operated on land and not on the marine components, as the infrastructure across the Strait of Belle Isle is underwater and not visible to the public. The following section describes the methods used for the visual aesthetic effects assessment for the Project.

16.8.4.1 Analytical Methods

The effects assessment of visual aesthetics uses the information from the existing environment chapter. In Section 15.8, the existing landscape was classified at 12 KOPs that considered the viewscapes along the transmission corridor. As described in Section 15.8, Nalcor used the United States Department of Interior, Bureau of Land Management (BLM) method to determine visual landscape ratings (USDI 1984). This process described and ranked the existing visual character at each KOP. The existing environment at each KOP was classified using a scenic quality evaluation and a sensitivity level analysis intended to reflect the visual aesthetics.

The effects assessment focuses on using landscape modelling to superimpose the Project components (e.g., cleared ROW, towers, converter station) onto the images from the 12 KOPs selected as indicators for the Project to provide a qualitative assessment. The modelled images allow the amount of alteration to the image as a result of the Project to be calculated and the level of contrast with the surrounding landscape to be determined. The effects assessment considers the amount of alteration and the level of contrast to determine the overall visual effect of the Project. The effect is determined by comparing the overall visual effect with the landscape class derived in Section 15.8. The effects are assessed for the Construction, and Operations and Management phases of the Project and for each KI.

The assessment also considers the findings of the viewscape modelling completed by Nalcor in the Viewscapes Component Study (Stantec 2011b) to provide context for the potential visibility of Project components (i.e., potential effects on Visual Aesthetics) along the entire length of the transmission corridor in a qualitative manner, recognizing that the final ROW has not been selected. Computer modelling (details provided in Stantec 2011b) was used to generate maps showing the potential number of transmission towers visible from a given location, and the visual exposure (i.e., figures that present the likely visibility of the proposed transmission towers). This considers that the effect of a change in a view, and the resulting effect on Visual Aesthetics, depends on an individual's perception.

Key Observation Point Determination

The study team selected KOPs that offer: the least obstructed view of the Project; are most representative of the views in that area; are likely to be viewed by the most people; and / or represent the worst case scenario view of the Project. The KOPs are publicly accessible locations, albeit some of which are more remote to access and were identified as having visual sensitivities through Nalcor's public consultation process as outlined in the Viewscapes Component Study (Stantec 2011b).

The overall perception of visual alteration depends largely on the number of viewers and the sensitivity of the viewers to visual changes to the landscape. Where the transmission corridor intersects travel routes, or lies near frequented areas, the Project will have the greatest number of viewers, which increases its potential for effects on visual aesthetics. The eight locations where the transmission corridor will be near roadways are at the Kenamu River, TLH3, Forteau Point, Birchy Lake, Buchans Highway, Chapel Arm, Witless Bay Line and Soldiers Pond. The Project will cross 1,100 km of the province, approximately 88% of which is uninhabited Crown land and is therefore rarely seen by the public; thereby, reducing overall visual sensitivity. A small number of people who travel to these remote parts of the province to participate in outdoor recreation may encounter the ROW and infrastructure. The remote locations selected include Portland Creek Pond, Rack Lake, Four Ponds Lake, and the Exploits River. The KOPs are described in Table 16.8.4-1, along with the rationale for their selection.

Table 16.8.4-1 Key Observation Point Determination

KOP[(a)]	Location / Region	Rationale
01	Kenamu River / Central and Southeastern Labrador	– Kenamu River crossed by the TLH3 – Recreational use – Area of interest based on consultation with stakeholders
02	TLH3 / Central and Southeastern Labrador	– TLH3 – Area of interest based on consultation with stakeholders
03	Forteau Point / Central and Southeastern Labrador	– Crossing area near existing highways and communities
04	Portland Creek Pond / Northern Peninsula Newfoundland	– Outfitters, boating, International Appalachian Trail
05	Rack Lake / Northern Peninsula Newfoundland	– Outfitters, high land, minimal tree cover
06	Four Ponds / Northern Peninsula Newfoundland	– Outfitters, International Appalachian Trail
07	Birchy Lake / Central and Eastern Newfoundland	– Main highway route, recreation area
08	Buchans Highway / Central and Eastern Newfoundland	– Tall tree cover, community road, Exploits River
09	Exploits River / Central and Eastern Newfoundland	– Recreational rafting, River Front Chalet, Exploits River
10	Chapel Arm / Avalon Peninsula Newfoundland	– Community entry road off TCH
11	Witless Bay Line / Avalon Peninsula Newfoundland	– Existing transmission line, silhouettes on flat expanse of land
12	Soldiers Pond / Avalon Peninsula Newfoundland	– Converter station near TCH

Source: Stantec (2011b).
(a) KOP = Key Observation Point.

Landscape Modelling

Stantec Consulting Ltd. (Stantec 2011b) created computer-generated images of the Project components superimposed on the existing environment for each of the 12 KOPs. These images included the ROW and tower infrastructure in the accurate, photo-realistic images.

Landscape View Effects Analysis

For each KOP, the percentage alteration in the view resulting from the Project components was calculated by delineating the outline of visible Project components and comparing the area altered to the total size of the field-of-view (total size of the photograph). The effects assessment then compares the percentage of alteration with the existing environment classification determined in Section 15.8.3 and shown in Table 16.8.4-2.

Table 16.8.4-2 Acceptable Percent Alteration of Classified Landscapes

Classification[(a)]	Acceptable Level of Disruption	Percent Alteration
Class I	Natural evolutions	0.0%
Class II	Minor changes	Up to 1.5%
Class III	Moderate changes	Up to 7.0%
Class IV	Major changes	Up to 30.0% (not above)

(a) Classification based on USDI (1984).
Percent Alteration: Percent of alteration that is acceptable (as adapted from BCMF 2001).

The contrast of the Project with its surroundings is also considered to determine how much the alterations attract the viewer's attention in the context of their surroundings. The contrast of the alterations can either increase or decrease depending on the following factors: clutter; skylining; scale; viewshed; backgrounding; and, screening (PSC Wisconsin 2010, internet site). These factors are described below:

- Clutter refers to numerous poles and wires, particularly when various types at different heights are mixed with other highly visible unnatural elements or human interventions. Existing clutter can decrease contrast; however, introducing clutter to a previously undisturbed landscape can increase contrast.
- Skylining occurs when transmission towers and wires create highly visible silhouettes that exceed the height of the horizon of existing landscape elements, which increases contrast.
- Scale differentiation occurs in the foreground when large structures make human-scaled elements (e.g., cars) appear smaller, which increases contrast.
- Viewshed effect occurs when the towers and ROW interfere with distant panoramic views, which increases contrast.
- Backgrounding occurs when the towers do not exceed the height of vegetation and are visually absorbed by the landscape and the cleared ROW is below the viewing angle and unseen, which decreases contrast.
- Screening or buffering occurs when vegetation or other foreground objects block or partially block the view of towers and / or the ROW, which decreases contrast.

The factors listed above are considered when rating the contrast of the Project with the landscape. Contrast is defined under the following categories (USDI 1986):

- None: The Project is not visible or perceptible;
- Low: The Project can be seen but does not attract attention;
- Moderate: The Project begins to attract attention and begins to dominate the characteristic landscape; and
- High: The Project demands attention, will not be overlooked, and is dominant in the landscape.

Environmental Effects Descriptors

Descriptors used to assess the Project effects on each KI (cleared ROW, transmission towers, and other Project components) are explained in Table 16.8.4-3. The effects descriptors include direction, magnitude, geographic extent, duration and frequency. These effects descriptors were applied to the effects of the Project on the KIs during the Construction, and the Operations and Maintenance phases of the Project. The effects descriptors qualify or quantify potential interactions between the Project and the views of the KOPs and the effects on the visual aesthetics. This assessment focuses on the ROW and towers in the images at the KOPs modelled except for KOP 12, where the converter station is also modelled.

Table 16.8.4-3 Effects Descriptors: Visual Aesthetics

Effects Descriptor	Definition
Direction	
Adverse	Effect is undesirable and negatively affects the overall visual character of the landscape
Neutral	Effect is not apparent and does not affect the overall visual character of the landscape
Beneficial	Effect is desirable and improves the overall visual character of the landscape
Magnitude	
No effect	Effect is not perceptible (no alteration to the view)
Low	Effect is visible, but does not attract attention
Moderate	Effect attracts attention and begins to dominate the landscape
High	Effect is dominant in the landscape
Geographic Extent	
Local	Effect is clearly visible to a distance of 1.9 km
Regional	Effect is visible to a distance of 4.8 km
Beyond Regional	Effect is visible beyond a distance of 4.8 km
Duration	
Short-term	Effect will be evident for less than one year
Medium-term	Effect will be evident for one to four years
Long-term	Effect will be evident for longer than four years, but does not extend more than 30 years
Far Future	Effect will be evident throughout Project operations

In addition to the effects descriptors applied to each likely effect on the KI (i.e., direction, magnitude, geographic extent and duration), the assessment also addresses how often an effect occurs, or frequency, and certainty, which is the level of confidence attributed to the effects prediction.

16.8.5 Construction

16.8.5.1 Overview of Project Construction and Associated Effects Management

Construction will take place over a four year period. Following construction of the access roads, crews will move along the transmission line ROW completing each component / activity sequentially, except for the converter stations, electrode sites and horizontal directional drilling at the landing sites. Construction activities include: preparing access; clearing the ROW (i.e., removal of vegetation that exceeds 2 m in height at maturity); transporting construction materials; installing tower foundations; assembling and installing towers; stringing conductors; directionally drilling boreholes and installing the initial portions of the submarine cables; installing electrodes; and, constructing converter stations. Construction components also include temporary camps, marshalling yards and staging areas for delivery and storage of materials and infrastructure assembly. These activities are expected to result in disturbance to the existing visual landscape either by their presence or the resulting Project infrastructure that is constructed.

Nalcor has selected a transmission corridor, within which the ROW will be constructed, in consideration of visually sensitive areas (e.g., avoidance of Gros Morne National Park). Mitigation measures to limit the effects of the Project on the visual landscape include:

- avoidance of visually sensitive areas;
- following existing disturbance corridors where practical;
- constructing in remote, uninhabited areas; and
- retaining a vegetative buffer zone at watercourses and major highway crossings to the extent practical.

The transmission line and associated components and activities will be routed / designed to avoid direct, physical interaction with existing protected areas in the province. Nalcor will work directly with the GNL Natural Heritage Branch, Parks and Natural Areas Division (and other organizations as applicable) in detailed design and planning for sections of the proposed transmission line that will occur within 1 km of the boundaries of an existing protected area, including in ROW alignment, tower design and placement, and scheduling with the goal to avoid or reduce any potential visual or other interactions.

Nalcor will work directly with any commercial outfitter with an existing, active hunting and / or fishing camp located within the proposed transmission corridor, or within 5 km of the corridor or the planned locations of any other permanent Project component. This will include consultation during detailed design and planning (e.g., ROW selection, tower design and placement, scheduling) for sections of the proposed transmission line within these areas, with the goal to avoid or reduce any potential issues or interactions during Construction, or Operations and Maintenance, including possible routing approaches to minimize the eventual use of the ROW by ATVs. Nalcor will also meet and consult generally with the NLOA and other industry representatives to discuss issues and potential effects management measures.

16.8.5.2 Existing Knowledge

Transmission towers and related infrastructure have been shown to affect the visual aesthetics of landscapes, as indicated in Table 16.8.5-1. No specific references for visual effects of construction of similar or related projects could be found.

Visual aesthetic effects on landscapes are perceived differently depending on the observer. The PSC Wisconsin (PSC Wisconsin 2010, internet site) reports that public response to installed transmission corridors and towers varies, as aesthetics are based on human perceptions. PSC Wisconsin describes the effects of a transmission corridor as being adverse, neutral or beneficial and that the aesthetics of transmission corridors are likely to be adverse for most people, particularly where lines cross a natural landscape. Some people tend not to notice transmission corridors (neutral response) and see them as part of the infrastructure necessary to sustain everyday lives and activities. Others see transmission corridors as beneficial, as they represent economic development and symbolize economic strength (PSC Wisconsin 2010, internet site).

Soini et al. (2009) state that there is a difference in perception of the public depending on certain demographics. Urban people, outdoor enthusiasts, and people with higher education and income levels had negative opinions related to their desire to use transmission corridor areas for recreation. Land owners in rural and agricultural areas viewed transmission lines as financially beneficial because they could gain income through land leases to utility companies or by using the corridor to grow Christmas tree crops (Soini et al. 2009).

Table 16.8.5-1 Existing Knowledge (Construction): Effects of Similar Projects on Visual Aesthetics

Reference	Study / Project Context	Summary of Findings
PSC Wisconsin (2010, internet site)	Human perception of visual aesthetic effects of transmission corridors in Wisconsin	Peoples' perception of the visual effects of transmission corridors and towers are mainly negative but may also be neutral or positive
Soini et al. (2009)	Case study on perceptions of transmission lines among residents of Finland	Visual perceptions of transmission lines are not homogenous and depend on land ownership, knowledge concerning power lines in general, and environmental attitudes

16.8.5.3 Construction Effects: Visual Aesthetics

Project components will become more visible as Construction progresses from clearing for the access and ROW, to tower and building erection, and to conductor installation. The effects of the Project on Visual Aesthetics recognizes that there will be increasing levels of alteration to viewscapes during Project Construction, but focuses on the final alteration (i.e., during Operations and Maintenance) when all Project components are constructed and operational (see Section 16.8.7).

In general, the presence of short-term and intermittent construction activities during this phase of the Project is unlikely to affect Visual Aesthetics, except where the ROW or workspace is visible. The towers will be visible, once they are erected, from locations outside the ROW.

16.8.6 Operations and Maintenance

16.8.6.1 Overview of Project Operations and Maintenance and Associated Effects Management

Operations and maintenance activities include maintaining access roads, routine inspections and repairs, vegetation management, operation of electrodes, and potential major repairs. These activities will not be readily evident at any particular time as they are intermittent and not intensive. In terms of visual aesthetic effects, the presence of the transmission system will be continuously evident and is the focus of this assessment.

Mitigation of Project effects on Visual Aesthetics includes allowing the majority of the ROW (except for the access trail) to revegetate and the natural reclamation of the Project components (e.g., camps, marshalling yards, temporary access) not required during Operations and Maintenance. Some components (e.g., ROW, towers, access roads and facilities) will remain visible through the life of the Project and mitigation is not practical.

The ROW will revegetate, with the type and amount of regrowth depending on the habitat type crossed. Recovery of disturbed areas is expected to go through many phases over several seasons. Operations and Maintenance activities include vegetation management through manual and chemical control methods. This is expected to begin during year eight of operations and be repeated every seven years thereafter, or as required for safety.

16.8.6.2 Existing Knowledge

Existing knowledge related to effects of the existing, operating transmission systems on visual aesthetics is summarized in Table 16.8.5-1.

16.8.7 Project Effects (Construction, and Operations and Maintenance): Visual Aesthetics

This section contains the assessment of the effects of the Project on the KOPs which are indicators of the Visual Aesthetics along the entire length of the Project. The assessment indicates the percent alteration and contrast rating at each KOP with all Project components constructed. This section also applies the effects descriptors at each KOP during Construction, and Operations and Maintenance phases of the Project. As discussed earlier, the findings of the Viewscapes Component Study (Stantec 2011b) were considered during the assessment of Project effects on Visual Aesthetics, as appropriate.

KOP 01, Kenamu River, Central and Southeastern Labrador

There is one tower visible in this image at a distance of 252 m from the camera. The conductors are also visible as they span the river. The ROW is not visible in the image because of the vegetated buffer to be maintained along the river. The percentage of alteration as a result of the Project is 0.52%. The contrast of the Project is moderate, as it begins to attract attention, but it does not yet dominate the view. KOP 01 is a Class III landscape. This landscape should partially retain the existing landscape character and the level of change may be moderate, as the Project components may attract attention, but should not dominate the view. The percentage of alteration and level of contrast for KOP 01 are within the expectations for this landscape class.

Photograph 16.8.7-1 KOP 01 Kenamu River with Project Modelling

Note: Photograph taken June 2011, Central and Southeastern Labrador, 52.84615° N, 60.15177° W.

Table 16.8.7-1 Effects Descriptors for the Key Indicators at KOP 01 Kenamu River

KI	Effects Descriptors			
	Direction	**Magnitude**	**Geographical Extent**	**Duration**
View of ROW	No effect	n/a	n/a	n/a
View of Transmission Towers and Conductors	Adverse	Moderate	Local	Far Future
View of Other Project Components	n/a	n/a	n/a	n/a

n/a Not applicable.

Overall, there is no effect on the view of the ROW because it is screened by the buffer of vegetation along the Kenamu River. The effect of the transmission tower is adverse in direction and moderate in magnitude as it is

skylining above the existing vegetation, becoming dominant against the sky. The scale of the tower is disproportionate to the existing landscape as the tower dwarfs the trees. The effect is local in geographical extent and far future in duration, as the Project components are within 1.9 km, and will be visible throughout the life of the Project.

During Construction the visual effect will be of low frequency, as construction activities will be visible over the four years, but sporadic as the different components are built along the ROW. During Operations and Maintenance activities, the frequency of the visual effects will be high, as the visual effect of the tower and conductors will be continuous.

There is a high degree of confidence that the actual effect of the Project on KOP 01 will not be greater than predicted in the effects analysis because visibility of the transmission system was assessed by comparing photographs of current, existing views at the KOPs with computer generated representations with accurate and realistic computer modelled simulations superimposed on the same photos to facilitate comparison. The visual quality classifications of the KOPs in the current state (2010 to 2011) were formed based on accepted BLM methods (USDI 1984) for visual contrast and sensitivity.

KOP 02 Trans - Labrador Highway, Phase 3, Central and Southeastern Labrador

There are three towers visible in this image at a distance from 1,090 m to 1,704 m from the camera. The ROW is not visible in the image. The percentage of alteration as a result of the Project is 0.15%. The contrast of the Project is moderate, as the skylining of the towers attracts the viewer's attention, but the Project does not dominate the view. KOP 02 is a Class IV landscape. This landscape can accommodate major modifications (no more than 30%) to the landscape character and the level of change may dominate the view. The percentage of alteration and level of contrast for KOP 02 are within the expectations for this landscape class.

Photograph 16.8.7-2 KOP 02 TLH3 with Project Modelling

Note: Photograph taken June 2011, Central and Southeastern Labrador, 52.77637° N, 59.94086° W.

Table 16.8.7-2 Effects Descriptors for the Key Indicators at KOP 02 TLH3

KI	Effects Descriptors			
	Direction	**Magnitude**	**Geographical Extent**	**Duration**
View of ROW	No effect	n/a	n/a	n/a
View of Transmission Towers and Conductors	Adverse	Moderate	Local	Far Future
View of Other Project Components	n/a	n/a	n/a	n/a

n/a Not applicable.

Overall, there is no effect on the view of the ROW because it is screened by the existing vegetation and below the viewing angle. The effect of the transmission towers is adverse in direction and moderate in magnitude as they are skylining and exceed the height of the existing vegetation, emphasizing their presence in the landscape. The effect is local in geographical extent and far future in duration as the Project components are within 1.9 km, and will be visible throughout the life of the Project.

During Construction the visual effect will be of low frequency, as construction activities will be visible over the four years, but sporadic as the different components are built along the ROW. During Operations and Maintenance activities, the frequency of visual effect will be high, as the visual effects of the towers and conductors will be continuous.

There is a high degree of confidence that the actual effects of the Project on KOP 02 will not be greater than predicted in the effects analysis because visibility of the transmission system was assessed by comparing photographs of current, existing views at the KOPs with computer generated representations with accurate and realistic computer modelled simulations superimposed on the same photos to facilitate comparison. The visual quality classifications of the KOPs in the current state (2010 to 2011) were formed based on accepted BLM methods (USDI 1984) for visual contrast and sensitivity.

KOP 03 Forteau Point, Central and Southeastern Labrador

There is one tower visible in this image at a distance of 335 m from the camera. The conductors are also visible. The ROW is not visible in the image. The percentage of alteration as a result of the Project is 0.75%. The level of contrast is high, as the tower is large in scale compared to its surroundings, and is made more prominent because of the skylining. KOP 03 is a Class IV landscape. This landscape can accommodate major modifications to the landscape character and the level of change may dominate the view. The percentage of alteration and level of contrast for KOP 03 are within the expectations for this landscape class.

Photograph 16.8.7-3 KOP 03 Forteau Point with Project Modelling

Note: Photograph taken September 2010, Central and Southeastern Labrador, 51.46387° N, 56.97446° W.

Table 16.8.7-3 Effects Descriptors for the Key Indicators at KOP 03 Forteau Point

KI	Effects Descriptors			
	Direction	**Magnitude**	**Geographical Extent**	**Duration**
View of ROW	No effect	n/a	n/a	n/a
View of Transmission Towers and Conductors	Adverse	Moderate	Local	Far Future
View of Other Project Components	n/a	n/a	n/a	n/a

n/a Not applicable.

There is no effect on the view of the ROW as the ROW is not visible due to the screening and buffering provided by the existing vegetation, and it is below the horizon line. The effect of the transmission tower is adverse in direction and moderate in magnitude due to the contrast with the landscape. The tower and conductors are skylined, as they are highly visible against the sky and exceed the height of their surroundings. The tower also adds to visual clutter with the seven existing poles that are of a different type and at a different

height. The effect is moderate, however, because the contrast fits within the landscape classification. The effect is local in geographical extent and far future in duration, as the Project components are within 1.9 km, and will be visible throughout the life of the Project.

During Construction the visual effect will be of low frequency, as construction activities will be visible over the four years, but sporadic as the different components are built along the ROW. During Operations and Maintenance activities, the frequency of visual effects will be high, as the visual effect of the towers and conductors will be continuous.

There is a high degree of confidence that the actual effects of the Project on KOP 03 will not be greater than predicted in the effects analysis because visibility of the transmission system was assessed by comparing photographs of current, existing views at the KOPs with computer generated representations with accurate and realistic computer modelled simulations superimposed on the same photos to facilitate comparison. The visual quality classifications of the KOPs in the current state (2010 to 2011) were formed based on accepted BLM methods (USDI 1984) for visual contrast and sensitivity.

KOP 04 Portland Creek Pond and Inner Pond, Northern Peninsula

There are 14 towers visible in this image at a distance ranging from 857 m to 4,698 m from the camera. The ROW is visible in the image. The percentage of alteration as a result of the Project is 0.99%. The contrast of the Project is moderate, as the ROW attracts attention, but it does not dominate the view. KOP 04 is a Class II landscape. This landscape should retain the existing landscape character and the level of change should not attract attention. The percentage of alteration and level of contrast for KOP 04 are within the expectations for this landscape class.

Photograph 16.8.7-4 KOP 04 Portland Creek Pond and Inner Pond with Project Modelling

Note: Photograph taken June 2010, Northern Peninsula, 50.16545° N, 57.48345° W.

Table 16.8.7-4 Effects Descriptors for the Key Indicators at KOP 04 Portland Creek Pond and Inner Pond

KI	Effects Descriptors			
	Direction	**Magnitude**	**Geographical Extent**	**Duration**
View of ROW	Adverse	Moderate	Local / Regional	Far Future
View of Transmission Towers and Conductors	Adverse	Low	Local / Regional	Far Future
View of Other Project Components	n/a	n/a	n/a	n/a

n/a Not applicable.

The view of the ROW is adverse in direction and moderate in magnitude due to the contrast with the panoramic views. The amount of alteration visible is small, however, the linear nature of the ROW results in a somewhat higher contrast than would otherwise be expected with the small alteration. With a resulting moderate contrast, the magnitude is also rated moderate. The viewing angle is from above, making the ROW visible as a band wrapping around the waterbody in the image. Although the ROW is visible, the dominant view is still of the waterbody and mountains. The effect of the transmission towers is adverse in direction and low in magnitude, as they blend into the existing vegetation and background and do not exceed the height of existing vegetation from this perspective. The effect is local and regional in geographical extent and far future in duration as the Project components are visible within 4.8 km, and will be visible throughout the life of the Project.

During Construction the visual effect will be of low frequency, as construction activities will be visible over the four years, but sporadic as the different components are built along the ROW. During Operations and Maintenance activities, the frequency of visual effects will be high, as the visual effect of the towers and conductors will be continuous.

There is a high degree of confidence that the actual effects of the Project on KOP 04 will not be greater than predicted in the effects analysis because visibility of the transmission system was assessed by comparing photographs of current, existing views at the KOPs with computer generated representations with accurate and realistic computer modelled simulations superimposed on the same photos to facilitate comparison. The visual quality classifications of the KOPs in the current state (2010 to 2011) were formed based on accepted BLM methods (USDI 1984) for visual contrast and sensitivity.

KOP 05 Rack Lake, Northern Peninsula of Newfoundland

There are nine towers visible in the image at a distance ranging from 526 m to 3,001 m from the camera. The ROW is visible in the image, although from this angle it appears as a small sliver of cleared vegetation that disappears into the horizon. The percentage of alteration as a result of the Project is 1.13%. The contrast of the Project is moderate, as it begins to attract attention, but does not yet dominate the view. KOP 05 is a Class III landscape. This landscape should partially retain the existing landscape character and the level of change may be moderate, and may attract attention, but should not dominate the view. The percentage of alteration and level of contrast for KOP 05 are within the expectations for this landscape class.

Photograph 16.8.7-5 KOP 05 Rack Lake with Project Modelling

Note: Photograph taken June 2010, Northern Peninsula, 50.178060° N, 57.28128° W.

Table 16.8.7-5 Effects Descriptors for the Key Indicators at KOP 05 Rack Lake

KI	Effects Descriptors			
	Direction	**Magnitude**	**Geographical Extent**	**Duration**
View of ROW	Adverse	Low	Local / Regional	Far Future
View of Transmission Towers and Conductors	Adverse	Moderate	Local / Regional	Far Future
View of Other Project Components	n/a	n/a	n/a	n/a

n/a Not applicable

The view of the ROW is adverse in direction and low in magnitude as it is only slightly visible and blends into the background and disappears into the rolling hills. The effect of the towers is adverse in direction and moderate in magnitude. Although they do not exceed the height of the vegetation and are somewhat visually absorbed by the landscape, the towers do contrast as silhouettes against the consistent evergreen backdrop and disrupt the panoramic view of the landscape, creating a viewshed effect. The effect is local and regional in

geographical extent and far future in duration as the Project components are visible within 4.8 km, and will be visible throughout the life of the Project.

During Construction the visual effects will be of low frequency, as construction activities will be visible over the four years, but sporadic as the different components are built along the ROW. During Operations and Maintenance activities, the frequency of visual effects will be high, as the visual effect of the towers and conductors will be continuous.

There is a high degree of confidence that the actual effects of the Project on KOP 05 will not be greater than predicted in the effects analysis because visibility of the transmission system was assessed by comparing photographs of current, existing views at the KOPs with computer generated representations with accurate and realistic computer modelled simulations superimposed on the same photos to facilitate comparison. The visual quality classifications of the KOPs in the current state (2010 to 2011) were formed based on accepted BLM methods (USDI 1984) for visual contrast and sensitivity.

KOP 06 Four Ponds, Northern Peninsula

There are 11 towers visible in this image at a distance ranging from 917 m to 2,010 m from the camera. The ROW is visible in the image where it passes over a hill. The percentage of alteration as a result of the Project is 0.38%. The contrast of the Project is moderate, as it begins to attract attention where the ROW is visible on the hill and the towers skyline on the right side of the image. KOP 06 is a Class III landscape. This landscape should partially retain the existing landscape character and the level of change may be moderate, and may attract attention, but should not dominate the view. The percentage of alteration and level of contrast for KOP 06 are within the expectations for this landscape class.

Photograph 16.8.7-6 KOP 06 Four Ponds with Project Modelling

Note: Photograph taken June 2010, Northern Peninsula, 49.90654° N, 57.41250° W.

Table 16.8.7-6 Effects Descriptors for the Key Indicators at KOP 06 Four Ponds

KI	Effects Descriptors			
	Direction	**Magnitude**	**Geographical Extent**	**Duration**
View of ROW	Adverse	Low	Local / Regional	Far Future
View of Transmission Towers and Conductors	Adverse	Moderate	Local / Regional	Far Future
View of Other Project Components	n/a	n/a	n/a	n/a

n/a Not applicable.

The view of the ROW is adverse in direction and low in magnitude, as some of the ROW is below the viewing angle and not visible. The portion of the ROW that is visible rolls over the top of a ridge and does not dominate the view. The effect of the transmission towers is adverse in direction and moderate in magnitude, as some blend into the background vegetation and some are skylining off into the distance. In the middle of the image, the transmission towers are within the panoramic views to the channel through the Long Range Mountains, creating a viewshed effect. The effect is local and regional in geographical extent and far future in duration as the Project components are visible within 4.8 km, and will be visible throughout the life of the Project.

During Construction the visual effects will be of low frequency, as construction activities will be visible over the four years, but sporadic as the different components are built along the ROW. During Operations and Maintenance activities, the frequency of visual effects will be high, as the visual effect of the towers and conductors will be continuous.

There is a high degree of confidence that the actual effects of the Project on KOP 06 will not be greater than predicted in the effects analysis because visibility of the transmission system was assessed by comparing photographs of current, existing views at the KOPs with computer generated representations with accurate and realistic computer modelled simulations superimposed on the same photos to facilitate comparison. The visual quality classifications of the KOPs in the current state (2010 to 2011) were formed based on accepted BLM methods (USDI 1984) for visual contrast and sensitivity.

KOP 07 Birchy Lake, Central and Eastern Newfoundland

There are six towers visible in this image at a distance ranging from 877 m to 1,794 m from the camera. The ROW is not visible in the image. The percentage of alteration as a result of the Project is 0.12%. The contrast of the Project is low, as it can be seen, but it does not attract attention. KOP 07 is a Class II landscape. This landscape should retain the existing landscape character and the level of change should not attract attention. The percentage of alteration and level of contrast for KOP 07 are within the expectations for this landscape class.

Photograph 16.8.7-7 KOP 07 Birchy Lake with Project Modelling

Note: Photograph taken June 2010, Central and Eastern Newfoundland, 49.29126° N, 56.78918° W.

Table 16.8.7-7 Effects Descriptors for the Key Indicators at KOP 07 Birchy Lake

KI	Effects Descriptors			
	Direction	**Magnitude**	**Geographical Extent**	**Duration**
View of ROW	No effect	n/a	n/a	n/a
View of Transmission Towers and Conductors	Adverse	Low	Local	Far Future
View of Other Project Components	n/a	n/a	n/a	n/a

n/a Not applicable.

There is no effect on the view of the ROW as the ROW is below the viewing angle. The effect of the transmission towers is adverse in direction and low in magnitude, as they are skylining at the horizon, but are so far off into the distance that they are hazy and difficult to distinguish. The effect is local in geographical extent and of far future duration as the Project components are visible within 1.9 km, and will be visible throughout the life of the Project.

During Construction the visual effects will be of low frequency, as construction activities will be visible over the four years, but sporadic as the different components are built along the ROW. During Operations and Maintenance activities, the frequency of visual effects will be high, as the visual effect of the towers and conductors will be continuous.

There is a high degree of confidence that the actual effects of the Project on KOP 07 will not be greater than predicted in the effects analysis because visibility of the transmission system was assessed by comparing photographs of current, existing views at the KOPs with computer generated representations with accurate and realistic computer modelled simulations superimposed on the same photos to facilitate comparison. The visual quality classifications of the KOPs in the current state (2010 to 2011) were formed based on accepted BLM methods (USDI 1984) for visual contrast and sensitivity.

KOP 08 Buchans Highway, Central and Eastern Newfoundland

There is one tower visible in this image at a distance of 76 m from the camera. The conductors are visible as they pass over the highway. The ROW is not visible in the image. The percentage of alteration as a result of the Project is 0.62%. The contrast of the Project is moderate, as the tower and conductors attract attention, but do not dominate the view. KOP 08 is a Class IV landscape. This landscape can accommodate major modifications to the landscape character and the level of change may dominate the view. The percentage of alteration and level of contrast for KOP 08 are within the expectations for this landscape class.

Photograph 16.8.7-8 KOP 08 Buchans Highway with Project Modelling

Note: Photograph taken June 2010, Central and Eastern Newfoundland, 48.95657° N, 56.07592° W.

Table 16.8.7-8 Effects Descriptors for the Key Indicators at KOP 08 Buchans Highway

KI	Effects Descriptors			
	Direction	Magnitude	Geographical Extent	Duration
View of ROW	No effect	n/a	n/a	n/a
View of Transmission Towers and Conductors	Adverse	Moderate	Local	Far Future
View of Other Project Components	n/a	n/a	n/a	n/a

n/a Not applicable.

There is no effect on the view of the ROW as the ROW is screened and buffered by the existing vegetation along the roadway. The effect of the tower and conductors is adverse in direction and moderate in magnitude because they are skylining and are visible against the sky, emphasizing their presence in the landscape. The large scale of the tower dwarfs vegetation and the other elements in the image. The effect is local in geographical extent and of far future duration as the Project components are within 1.9 km, and will be visible throughout the life of the Project.

During Construction the visual effects will be of low frequency, as construction activities will be visible over the four years, but sporadic as the different components are built along the ROW. During Operations and Maintenance activities, the frequency of visual effects will be high, as the visual effect of the tower and conductors will be continuous.

There is a high degree of confidence that the actual effects of the Project on KOP 08 will not be greater than predicted in the effects analysis because visibility of the transmission system was assessed by comparing photographs of current, existing views at the KOPs with computer generated representations with accurate and realistic computer modelled simulations superimposed on the same photos to facilitate comparison. The visual quality classifications of the KOPs in the current state (2010 to 2011) were formed based on accepted BLM methods (USDI 1984) for visual contrast and sensitivity.

KOP 09 Exploits River, Central and Eastern Newfoundland

There are nine towers visible in this image at a distance ranging from 4,820 m to 5,020 m from the camera. The ROW is not visible in the image. The percentage of alteration as a result of the Project is 0.01%. The contrast of the Project is low, as it can be seen, but it does not attract attention. KOP 09 is a Class III landscape. This landscape should partially retain the existing landscape character and the level of change may be moderate, and may attract attention, but should not dominate the view. The percentage of alteration and level of contrast for KOP 09 are within the expectations for this landscape class.

Photograph 16.8.7-9 KOP 09 Exploits River with Project Modelling

Note: Photograph taken June 2010, Central and Eastern Newfoundland, 48.95° N, 55.91° W (approximate).
This photograph was taken from a helicopter and therefore presents an enhanced view of the horizon.

Table 16.8.7-9 Effects Descriptors for the Key Indicators at KOP 09 Exploits River

KI	Effects Descriptors			
	Direction	**Magnitude**	**Geographical Extent**	**Duration**
View of ROW	No effect	n/a	n/a	n/a
View of Transmission Towers and Conductors	Adverse	Low	Beyond Regional	Far Future
View of Other Project Components	n/a	n/a	n/a	n/a

n/a Not applicable.

There is no effect on the view of the ROW as the ROW is blocked by existing vegetation and is below the viewing angle. The effect of the towers is adverse in direction and low in magnitude. Although the towers exceed the height of the existing vegetation and are skylining at the horizon, they are so far in the distance that they begin to blend into the sky and are almost unnoticeable. The effect is beyond regional in geographical extent and far future duration as the Project components are beyond 4.8 km, and will be visible throughout the life of the Project.

During Construction the visual effects will be of low frequency, as construction activities will be visible over the four years, but sporadic as the different components are built along the ROW. During Operations and Maintenance activities, the frequency of visual effects will be high, as the visual effect of the towers and conductors will be continuous.

There is a high degree of confidence that the actual effects of the Project on KOP 09 will not be greater than predicted in the effects analysis because visibility of the transmission system was assessed by comparing photographs of current, existing views at the KOPs with computer generated representations with accurate and realistic computer modelled simulations superimposed on the same photos to facilitate comparison. The visual quality classifications of the KOPs in the current state (2010 to 2011) were formed based on accepted BLM methods (USDI 1984) for visual contrast and sensitivity.

KOP 10 Chapel Arm, Avalon Peninsula Newfoundland

There is one tower visible in this image at a distance of 209 m from the camera. The conductors are visible as they pass over the roadway. The ROW is not visible in the image. The percentage of alteration as a result of the Project is 0.26%. The contrast of the Project is low, as it can be seen, but does not attract attention. KOP 10 is a Class IV landscape. This landscape can accommodate major modifications to the landscape character and the level of change may dominate the view. The percentage of alteration and level of contrast for KOP 10 are within the expectations for this landscape class.

Photograph 16.8.7-10 KOP 10 Chapel Arm with Project Modelling

Note: Photograph taken July 2010, Avalon Peninsula, 47.51298° N, 53.68761° W.

Table 16.8.7-10 Effects Descriptors for the Key Indicators at KOP 10 Chapel Arm

KI	Effects Descriptors			
	Direction	**Magnitude**	**Geographical Extent**	**Duration**
View of ROW	No effect	n/a	n/a	n/a
View of Transmission Towers and Conductors	Adverse	Low	Local	Far Future
View of Other Project Components	n/a	n/a	n/a	n/a

n/a Not applicable.

There is no effect on the view of the ROW as it is screened and buffered by the existing vegetation. The effect of the transmission tower is adverse in direction and low in magnitude. Despite the fact that the towers are skylined, they are de-emphasized by the mimicking tips of the trees at a similar height. The visual clutter of the existing towers and conductors serves to reduce the contrast of the Project. The effect is local in geographical

extent and of far future duration as the Project components are within 1.9 km, and will be visible throughout the life of the Project.

During Construction the visual effects will be of low frequency, as construction activities will be visible over the four years, but sporadic as the different components are built along the ROW. During Operations and Maintenance activities, the frequency of visual effects will be high, as the visual effect of the tower and conductors will be continuous.

There is a high degree of confidence that the actual effects of the Project on KOP 10 will not be greater than predicted in the effects analysis because visibility of the transmission system was assessed by comparing photographs of current, existing views at the KOPs with computer generated representations with accurate and realistic computer modelled simulations superimposed on the same photos to facilitate comparison. The visual quality classifications of the KOPs in the current state (2010 to 2011) were formed based on accepted BLM methods (USDI 1984) for visual contrast and sensitivity.

KOP 11 Witless Bay Line, Avalon Peninsula

There are four towers from the Project visible in this image at a distance ranging from 393 m to 825 m from the camera. The ROW is not visible in the image. The percentage of alteration as a result of the Project is 0.14%. The contrast of the Project is low, as it can be seen, but does not attract attention. KOP 11 is a Class IV landscape. This landscape can accommodate major modifications to the landscape character and the level of change may dominate the view. The percentage of alteration and level of contrast for KOP 11 are within the expectations for this landscape class.

Photograph 16.8.7-11 KOP 11 Witless Bay Line with Project Modelling

Note: Photograph taken July 2010, Avalon Peninsula, 47.33768° N, 53.06134° W.

Table 16.8.7-11 Effects Descriptors for the Key Indicators at KOP 11 Witless Bay Line

KI	Effects Descriptors			
	Direction	**Magnitude**	**Geographical Extent**	**Duration**
View of ROW	No effect	n/a	n/a	n/a
View of Transmission Towers and Conductors	Adverse	Low	Local	Far Future
View of Other Project Components	n/a	n/a	n/a	n/a

n/a Not applicable.

There is no effect on the view of the ROW as the ROW is below the viewing angle and is not visible. The effect of the transmission towers is adverse in direction and low in magnitude. Although the towers are skylining and the short vegetation does not obstruct the view of the towers, they blend in with the existing transmission towers. The effect is local in geographical extent and of far future duration as the effects are within 1.9 km, and Project components will be visible throughout the life of the Project.

During Construction the visual effects will be of low frequency, as construction activities will be visible over the four years, but sporadic as the different components are built along the ROW. During Operations and Maintenance activities, the frequency of visual effects will be high, as the visual effect of the towers and conductors will be continuous.

There is a high degree of confidence that the actual effects of the Project on KOP11 will not be greater than predicted in the effects analysis because visibility of the transmission system was assessed by comparing photographs of current, existing views at the KOPs with computer generated representations with accurate and realistic computer modelled simulations superimposed on the same photos to facilitate comparison. The visual quality classifications of the KOPs in the current state (2010 to 2011) were formed based on accepted BLM methods (USDI 1984) for visual contrast and sensitivity.

KOP 12 Soldiers Pond, Avalon Peninsula

There are 26 Project towers visible in this image at distances ranging from 573 m to 2,385 m from the camera. The ROW, towers and the converter station are visible in the image. The percentage of alteration as a result of the Project is 1.05%. The contrast of the Project is low, as it can be seen, but it does not attract attention. KOP 12 is a Class IV landscape. This landscape can accommodate major modifications to the landscape character and the level of change may dominate the view. The percentage of alteration and level of contrast for KOP 12 are within the expectations for this landscape class.

Photograph 16.8.7-12 KOP 12 Soldiers Pond with Project Modelling

Note: Photograph taken July 2010, Avalon Peninsula, 47.41588° N, 53.00123° W.

Table 16.8.7-12 Effects Descriptors for the Key Indicators at KOP 12 Soldiers Pond

KI	Effects Descriptors			
	Direction	**Magnitude**	**Geographical Extent**	**Duration**
View of ROW	Adverse	Low	Local / Regional	Far Future
View of Transmission Towers and Conductors	Adverse	Low	Local / Regional	Far Future
View of Other Project Components	Adverse	Low	Local / Regional	Far Future

The view of the ROW is adverse in direction and low in magnitude, as the ROW blends into an existing ROW and does not dominate. The effect of the transmission towers is adverse in direction and low in magnitude, as the Project towers blend into the existing towers making it difficult to distinguish one transmission line from the other. The effect of the other Project component, i.e., the converter station, is adverse in direction and low in magnitude, as the converter station is visible in the landscape where no such structure was visible before; but it is backed by rolling hills, it does not exceed the height of the existing vegetation, and it is not a noticeable feature in the landscape. The effect is local and regional in geographical extent and of far future duration, as the effects extend past 1.9 km but less than 4.8 km, and the Project components will be visible throughout the life of the Project.

During Construction the visual effects will be of low frequency, as construction activities will be visible over the four years, but sporadic as the different components are built along the ROW. During Operations and Maintenance activities, the frequency of visual effects will be high, as the visual effect of the converter station, towers and conductors will be persistent.

There is a high degree of confidence that the actual effects of the Project on KOP 12 will not be greater than predicted in the effects analysis because visibility of the transmission system was assessed by comparing photographs of current, existing views at the KOPs with computer generated representations with accurate

and realistic computer modelled simulations superimposed on the same photos to facilitate comparison. The visual quality classifications of the KOPs in the current state (2010 to 2011) were formed based on accepted BLM methods (USDI 1984) for visual contrast and sensitivity.

Transmission Line Viewscape

In relation to the entire transmission corridor length, the viewshed modelling (Stantec 2011b) found that for the hypothetical centre line, 43% of the towers are potentially visible from within a 15 km wide study area centred on the centre line of the transmission corridor, 27% of the towers are potentially not visible, and 30% are likely not visible from within that Study Area. The KOPs were selected as indicators of the potential effects of the Project on Visual Aesthetics, but the visual exposure analysis presented in the Viewscapes Component Study (Stantec 2011b) provides a comprehensive presentation that considers multiple criteria. This allows the reader to choose a location on the map to determine the likelihood of seeing transmission towers from that vantage point. However, the visual exposure analysis is for a hypothetical centre line ROW and tower locations, and the Project views will depend on the final ROW alignment and tower placement. The assessment of the effects of the Project on the Visual Aesthetics VEC considers this visual exposure analysis, but also recognizes that the effect of a change in a view, and the resulting effect on Visual Aesthetics, depends on an individual's perception.

Considering the mitigation employed during initial routing to avoid visually sensitive areas (e.g., avoidance of Gros Morne National Park) and Nalcor's commitment to work with stakeholders during final ROW alignment selection, the effects on the Visual Aesthetics are predicted to be acceptable and predicted to have minimal effects on the viewscapes for activities such as sightseeing by tourists.

Accidents and malfunctions could occur during Construction, and Operations and Maintenance, as discussed in Chapter 5, Accidents and Malfunctions. The effects of low-risk incidents (e.g., small brush fire) on Visual Aesthetics may result in an alteration to, or obscurity of, existing views due to the presence of smoke. Considering that these events would occur within disturbed areas (e.g., the ROW) and would be of short duration due to the emergency response measures proposed, these effects are is expected to be limited.

16.8.8 Environmental Effects Summary and Evaluation of Significance

16.8.8.1 Summary of Environmental Effects

Likely effects of the Project on the Visual Aesthetics VEC, based on the nature and findings of the above analysis of effects on the KIs for the selected KOPs, and the consideration of the visual exposure modelling completed by Stantec (2011b) for the entire length of the transmission corridor are summarized in Table 16.8.8-1.

Table 16.8.8-1 Environmental Effects Analysis Summary: Visual Aesthetics

Project Phase / Key Indicator	Likely Residual Environmental Effects Summary Descriptors				
	Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**
Construction					
View of Cleared ROW	No effect at 8 KOPs; Adverse at 4 KOP	Low at 3 KOPs; Moderate at 1 KOP	Local / Regional	Far Future at 4 KOPs	Low at 4 KOPs
View of Transmission Towers and Conductors	Adverse at 12 KOPs	Low at 6 KOPs; Moderate at 6 KOPs	Local / Regional / Beyond Regional	Far Future at all KOPs	Low at all KOPs
View of Other Project Components[(a)]	Adverse at 1 KOP	Low at 1 KOP	Local / Regional at 1 KOP	Far Future at 1 KOP	Low at 1 KOPs
Summary of Likely Residual Construction Effects on Visual Aesthetics: Clearing of the ROW and installation of the transmission towers and other Project components will result in changes to the existing views to varying degrees, depending on location and the stage of Construction, with the towers expected to be visible from greater distances due to their height. The effect of the Project on Visual Aesthetics will likely be acceptable, given the low percentage of alteration of the landscape and low level of contrast with the existing environment.					
Operations and Maintenance					
View of Cleared ROW	No effect at 8 KOPs; Adverse at 4 KOP	Low at 3 KOPs; Moderate at 1 KOP	Local / Regional	Far Future at 4KOPs	High at all KOPs
View of Transmission Towers	Adverse at 12 KOPs	Low at 6 KOPs / Moderate at 6 KOPs	Local / Regional / Beyond Regional	Far Future at all KOPs	High at all KOPs
View of Other Project Components[(a)]	Adverse at 1 KOP	Low at 1 KOP	Local / Regional at 1 KOP	Far Future at 1 KOP	High at all KOPs
Summary of Likely Residual Operations and Maintenance Effects on Visual Aesthetics: The Project components (e.g., the ROW, transmission towers, converter stations and shoreline electrode sites) will be visible throughout the life of the Project. The effect of the Project on Visual Aesthetics from a regional perspective will likely be acceptable, given the low percentage of alteration of the landscape and low level of contrast with the existing environment.					

(a) Only assessed at KOP 12 Soldiers Pond as this was the only KOP with "Other Project Components" (i.e., Soldiers Pond Converter Station) modelled.

16.8.8.2 Definition and Determination of Significance

A significant effect of the Project on the Visual Aesthetics VEC is one where the presence of Project infrastructure and / or activities dominates the visual landscape of an area in such a way that causes an unacceptable change in the overall aesthetic character, quality, value and use of that location for the overall population. An environmental effect that does not meet these criteria is not significant.

As shown in Table 16.8.8-1, the Project's effects on the KIs have directions that are either neutral or adverse, magnitudes that range from no effect to moderate, and geographic extents that range from local to beyond regional. The cleared ROW, the transmission towers, and the other Project components (e.g., electrode lines, electrode sites, converter stations, access) will result in added visual disturbances within the natural landscape of the province. However, these Project components will not be visible from all locations along the corridor, or from all locations within the regions crossed. As discussed earlier, the Project will cross approximately 1,100 km of the province, approximately 88% of which is uninhabited Crown land and is therefore rarely seen by the public, thereby reducing overall visual effects. The percentage of alteration and level of contrast for the views at the KOPs with the Project components included are acceptable for their respective landscape class. In addition, the visual exposure modelling (Stantec 2011b) showed that 57% of the towers in the hypothetical centre line ROW are either potentially not visible or likely not visible from within 7.5 km on either side of the transmission corridor centre line; while the remaining 43% are potentially visible.

Perceptions related to any given effect of the Project on a particular landscape view is largely subjective and dependant on the opinions of individuals. Nalcor has considered visually sensitive areas during the initial planning phases of the Project (e.g., avoidance of Gros Morne National Park) and the use of existing disturbance corridors (e.g., the TLH3) to limit the effects on the visual aesthetics of the regions crossed.

It is predicted, based on the findings of the visual effects assessment (Table 16.8.8-1) and the visual exposure modelling (Stantec 2011b), that the presence of Project infrastructure and / or activities will not dominate the visual landscape of any area in such a way that causes an unacceptable change in the overall aesthetic character, quality, value and use of that location for the overall population. Therefore, the Project is not likely to result in significant adverse effects on the Visual Aesthetics VEC.

16.8.9 Evaluation of Project Alternatives

Nalcor has identified alternative segments for portions of the transmission corridor. The Construction, and Operations and Maintenance of these alternative transmission corridor segments would result in the same types of effects to the visual landscape in the same general areas of the province. These alternative segments are compared to the proposed Project corridor, with respect to predicted effects on the Visual Aesthetics KIs, in Table 16.8.9-1.

Table 16.8.9-1 Summary Evaluation of Project Alternative Means: Visual Aesthetics

Project Alternative Means[(a)]	Environmental Implications (Compared to the Proposed Transmission Corridor)[(b)]		
	View of Cleared ROW	View of Transmission Towers and Conductors	View of Other Project Components
A2: North-west of Strait of Belle Isle	No difference	No difference	No difference
A3: Point Amour	Passes through the coastal community; adverse effect	Passes through the coastal community, adverse effect	No difference
A4: of Strait of Belle Isle NF Side	No difference	Towers would only be on one side of the roadway; reduced adverse effect	No difference
A5: GNP North-east	No difference	No difference	No difference
A6: GNP West - Central	Through scenic area; adverse effect	Through scenic area; adverse effect	No difference
A7: GNP Eastern LRM Crossing	Avoids scenic area; reduced adverse effect	Avoids scenic area; reduced adverse effect	No difference
A8: GNP IATNL	Avoids scenic area; reduced adverse effect	Avoids scenic area; reduced adverse effect	No difference
A9: Birchy Lake	No difference	No difference	No difference
A10: NLOA	Uses existing ROW; beneficial effect	Passes through communities; adverse effect	No difference
A11: Avalon	No difference	Avoids two road crossings; reduced adverse effect	No difference

(a) As identified and described in Chapter 2, Project Rationale and Planning.

(b) Namely, the proposed Project described in Chapter 3, Project Description, and assessed in the preceding Environmental Effects Analysis.

Incremental adverse effects on the Visual Aesthetics KIs are predicted for three segment alternatives, A3: Point Amour, A6: GNP West Central and A10: NLOA, as discussed below:

- The A3: Point Amour alternative segment would locate the Project in close proximity to L'Anse Amour and its historic tourism icon, the Point Amour Lighthouse. This could result in an adverse visual aesthetic effect with skylining transmission towers that would likely have a disproportionate scale and dwarf the human-scaled scenic lighthouse.
- The A6: GNP West Central alternative segment would locate the Project closer to Hawkes Bay and around the shoreline of West Lake, potentially resulting in an adverse effect on visual aesthetics. The cleared ROW and transmission towers have the potential to dominate the views in this recreational area as the ROW wraps around West Lake and potentially creates a viewshed effect.
- The A10: NLOA alternative segment would locate the transmission corridor closer to three towns (i.e., Millertown, Buchans Junction, and Buchans), potentially resulting in an adverse effect on visual aesthetics at those locations. Although the A10 alternative segment would likely use and expand the existing transmission line ROW, creating a beneficial effect, the transmission towers would be visible and could result in additional visual clutter when combined with existing towers.

Neutral effects on the Visual Aesthetics KIs are predicted for three segment alternatives, A2: North-west of Strait of Belle Isle, A5: GNP NE and A9: Birchy Lake, as discussed below:

- The A2: North-west of Strait of Belle Isle alternative segment is a short segment near the southern end of the Labrador portion of the transmission corridor, east of the Québec border and north of the Strait of Belle Isle, and is predicted to result in no difference in effects on visual aesthetics of the landscape, as both the proposed corridor and the alternative corridor cross similar landscapes.
- The A5: GNP NE alternative segment east of the Project on the north-east side of the Northern Peninsula is predicted to result in no difference in effects on visual aesthetics. The A5 alternative and the proposed corridor are both far (> 5 km) from the Viking Trail Route 430, and are not expected to be visible.
- The A9: Birchy Lake alternative segment, a short alternative in the Birchy / Sandy Lakes area of west-central Newfoundland, is predicted to result in no difference in effects on visual aesthetics. Both the proposed corridor and the A9 alternative segment cross similar landscapes.

Reduced adverse effects on the Visual Aesthetics KIs are predicted for four segment alternatives, A4: Strait of Belle Isle NF side, A7: GNP Eastern LRM Crossing, A8: GNP IATNL and A11: Avalon.

- The A4: Strait of Belle Isle alternative segment is located near the north-west portion of the Project on the Northern Peninsula and is predicted to result in a reduced adverse effect on visual aesthetics as compared with the proposed Project corridor. The Project includes a submarine cable crossing of the Strait of Belle Isle. After making landfall, the cables connect to the transmission towers which span Route 430, the Viking Trail. In the A4 alternate segment, Route 430 is closer to the shoreline and the conductor would be trenched under the highway before connecting to the towers. The A4 alternative is predicted to result in a reduced adverse effect on the visual aesthetics by not having transmission towers flanking the Viking Trail. This would likely reduce the amount of visual clutter to the landscape.
- The A7: GNP Eastern LRM Crossing alternative segment, which lies to the east of the proposed Project where the corridor crosses the Long Range Mountains, is predicted to result in a reduced adverse effect on visual aesthetics as compared with the proposed Project corridor. The A7 alternative segment would avoid the scenic area of Portland Creek Pond and Inner Pond. KOP 05 represents the A7 alternative segment and when compared to KOP 04 which represents the proposed corridor, A7 was predicted to result in a reduced adverse effect on the visual aesthetics.
- The A8: GNP IATNL alternative segment is a short segment in the area of the Long Range Mountains that extends off A7 and deviates further east, which is predicted to result in a reduced adverse effect on visual aesthetics, as compared to the proposed Project corridor. Nalcor added this segment for consideration as suggested by the International Appalachian Trail Newfoundland and Labrador Association. The A8 alternative segment avoids the visually sensitive scenic trail area.
- The A11: Avalon alternative segment is a short segment near the eastern terminus of the Project on the Avalon Peninsula. It is predicted that this alternative segment would result in a reduced negative effect on visual aesthetics by avoiding two road crossings, thereby reducing visual clutter and visual distraction of the transmission towers. The towers that cross the roadways create a skylining effect and the scale dwarfs the human-scaled objects in the area.

No technically and economically feasible alternatives for the submarine cable crossing or the shoreline electrode sites were identified (see Chapter 2, Section 2.12.3), and would not be visible; therefore, marine Project alternatives are not evaluated for Visual Aesthetics.

16.8.10 Cumulative Environmental Effects

The cumulative environmental effects assessment examines the visual aesthetics of a particular region with the Project in place and in operation, in combination with the effects on the visual aesthetics resulting from existing activities and reasonably foreseeable future developments. The likely effects on visual aesthetics as a

result of the Project in combination with past, present, and future projects and activities may result in cumulative visual aesthetic effects.

The majority of the landscape of Newfoundland and Labrador is currently of a naturalistic character. The visual landscape may change with the amount and type of projects and / or activities that occur and overlap with each other in the RSA. The projects and activities considered for the cumulative effects assessment for Visual Aesthetics VEC are described below:

- The Lower Churchill Hydroelectric Generation Project is expected to result in changes to the visual aesthetics of the Churchill River Valley changing the flows and water levels in the Churchill River and portions of the associated valley into a reservoir. This effect on visual aesthetics is expected to overlap with the Project at the northern terminus of the transmission corridor.
- The TLH3 Construction: The TLH3 and the Project will overlap for approximately 150 km. The clearing of forested land for the Project is expected to result in an adverse cumulative visual effect where the two projects are visible from the same location.
- General Economic Infrastructure: This includes general and likely works and development activities throughout the regions (e.g., transportation improvements, municipal works, proposed quarries, cottage development areas, and small agricultural developments) (GNL 2011, internet site).
- Commercial Forestry Activity: The activities outlined in the forestry industry's 5 year plans for new access roads and harvesting in Forest Management District 19A and District 21 in Labrador, and primarily in Forest Management Districts 6, 9, 16 and 17 in Newfoundland may adversely affect visual aesthetics (GNL 2011, internet site) and may overlap with the visual effects of the Project in some locations.

The effects of the Project in combination with other projects and activities that have been or will be carried out are not expected to result in an effect on the Visual Aesthetics KIs that would cause an unacceptable change in the overall aesthetic character, quality, value and use of that location for overall population. Therefore, significant adverse cumulative environmental effects on Visual Aesthetics are not likely to occur. The planning (e.g., route selection), consultative and other effects management measures identified will serve to avoid or reduce potential interactions and adverse effects of this Project.

The analysis of cumulative effects on Visual Aethetics by region crossed by the Project is summarized in Table 16.8.10-1.

16.8.11 Monitoring and Follow-up

Monitoring or follow-up programs related to visual aesthetics are not considered to be warranted due to the findings of the assessment and the individual, subjective nature of the perception related to the effects of the Project on the Visual Aesthetics.

Table 16.8.10-1 Summary Cumulative Environmental Effects: Visual Aesthetics

Cumulative Effects Analysis	Central and Southeastern Labrador	Strait of Belle Isle[(a)]	Northern Peninsula	Central and Eastern Newfoundland	Avalon Peninsula
Current (Baseline) VEC Condition	Landscape is primarily naturalistic in character in a remote setting, except for the portion that follows the TLH3 and the southern portion near the coastal communities	n/a	Landscape is primarily naturalistic in character in a remote setting, with communities and roads at the coast and some forestry activity (i.e., access and clearcuts) in the southern portions	Landscape is primarily naturalistic in character but with existing disturbance corridors related to highways, transmission lines and communities	Characteristic landscape; existing disturbance corridors followed, including highways and transmission lines; higher population densities reflect more human influence on the viewscape
Likely Residual Environmental Effects of Labrador-Island Transmission Link	Views of the ROW, transmission towers, converter station and shoreline electrode site	n/a	Views of the ROW and transmission towers	Views of the ROW and transmission towers	Views of the ROW, transmission towers, converter station and shoreline electrode site
Likely Cumulative Environmental Effects of Other Future Projects and Activities	Alterations to the existing viewscapes due to clearing of vegetation to accommodate activities, or infrastructure construction related to these projects (e.g., Lower Churchill Hydroelectric Generation Project, highway maintenance, forestry access roads and harvesting areas)	n/a	Alterations to the existing viewscapes due to clearing of vegetation to accommodate activities, or infrastructure construction related to these projects (e.g., forestry access roads and ROWs, and harvesting, cottages)	Alterations to the existing viewscapes due to clearing of vegetation to accommodate activities, or infrastructure construction related to these projects (e.g., infrastructure developments, forestry access roads and ROWs, and harvesting, agriculture, cottages, quarries)	Alterations to the existing viewscapes due to clearing of vegetation to accommodate activities, or infrastructure construction related to these projects (e.g., infrastructure development)
Cumulative Environmental Effects Summary	**Not Significant** The level of contribution of the Project to cumulative effects or visual aesthetics is limited, considering the remoteness of much of the corridor and the use of existing disturbance corridors where practical	n/a	**Not Significant** The level of contribution of the Project to cumulative effects or visual aesthetics is limited, considering the remoteness of much of the corridor and the use of existing disturbance corridors where practical	**Not Significant** The level of contribution of the Project to cumulative effects or visual aesthetics is limited, considering the remoteness of much of the corridor and the use of existing disturbance corridors where practical	**Not Significant** The level of contribution of the Project to cumulative effects or visual aesthetics is limited, considering the remoteness of much of the corridor and the use of existing disturbance corridors where practical

Note: Naturalistic Character: A landscape setting where the basic elements are displayed in a composition that appears unaltered by man (USDI 1984).

Characteristic Landscape: The established landscape within an area being viewed. This does not necessarily mean a naturalistic character. It could refer to a silvaculture setting, an inhabited landscape, a primarily natural environment, or a combination of these types (USDI 1984).

5 n/a Not applicable.

16.9 Environmental Assessment Summary

This section presents a summary of the EA for the Socioeconomic Environment. Subsections address the following:

- effects management measures planned for the Project to address identified issues;
- potential effects of moderate to high risk accidents and malfunctions and planned mitigation and response measures;
- likely residual Project effects and their significance;
- cumulative environmental effects associated with the Project; and
- environmental monitoring and follow-up programs planned in relation to the Project.

16.9.1 Effects Management Measures

Table 16.9.1-1 and Table 16.9.1-2 provide a summary of the effects management measures that Nalcor has incorporated into the Project for Construction, and Operations and Maintenance, respectively. Nalcor has designed the Project components specifically to address identified issues, and is proposing to use best management practices and effects management options designed to avoid or limit the effects of the Project on the Socioeconomic Environment. Further, through the adaptive management process, Nalcor will assess issues that arise during the Construction, and Operations and Maintenance phases to allow appropriate changes to be made to effects management strategies or methods, and will adopt these changes in a timely manner.

Table 16.9.1-1 Construction Mitigation Strategies and Methods – Socioeconomic Environment

VEC	Proposed Mitigation
Historic and Heritage Resources	– Information on known Historic and Heritage Resources will be mapped and used during the planning and design phase of the Project, including the transmission line ROW selection. Nalcor will consult with the PAO during detailed Project design, as needed. – Nalcor will conduct an historic resources field survey of those sections of the selected ROW that cross through identified high potential areas. The specific nature and locations of such surveys will be planned in consultation with the PAO. – Nalcor and its contractors will apply for all required provincial and federal permits required for Project construction in relation to Historic and Heritage Resources, including for both the transmission system itself as well as all associated and ancillary infrastructure and activities (access trails, camps, quarries, marshalling yards), and will adhere to permit conditions. – Nalcor or its contractors will identify any known Historic and Heritage Resources within 100 m of planned Project activities, and these sites will be made known to supervisory personnel. A 50 m "no work" buffer will be maintained around all known Historic and Heritage Resources sites to avoid interactions between Project activities and these known resources. – The orientation and training programs provided to construction personnel will include briefings related to Historic and Heritage Resources, including the avoidance of known sites, site and artefact recognition, the importance and value of such resources and their preservation, and the protection and contingency measures to be implemented in the event of an accidental resource discovery. – In the event that unregistered Historic and Heritage Resources are discovered, work will be halted immediately at that location, the PAO will be notified and, if requested, a Stage 1 Historic Resources Overview Assessment will be initiated by Nalcor in accordance with provincial guidelines. – If Historic and Heritage Resources are encountered and cannot be avoided through Project design, mitigation in the form of Systematic Data Recovery will be undertaken in full consultation with the PAO and in accordance with provincial guidelines (GNL 1992) (i.e., appropriate excavation,

Table 16.9.1-1 Construction Mitigation Strategies and Methods – Socioeconomic Environment (continued)

VEC	Proposed Mitigation
	documentation, salvage and retrieval and conservation of materials, followed by analysis and report preparation). – Where Project components are constructed in an area known to have high potential to contain palaeontological resources, periodic inspections of disturbed areas by qualified palaeontologists will be undertaken to limit the potential for disturbance of fossils and the loss of any information they may provide. – Nalcor will continue to consult with relevant Aboriginal communities and organizations, to further understand any sites of cultural-historical importance or other Historic and Heritage Resources that may be located within or near planned Project activities. Information made available to Nalcor through such consultation will be considered during ongoing Project design and eventual implementation, and Aboriginal groups will be kept informed as Project work progresses. – Mitigation measures identified above will be included in the EPP for all Project activities. – Historic and Heritage Resources contingency and response measures for the Project will be included in the EPP.
Communities - Transportation Infrastructure and Services	– Nalcor will comply with all laws and regulations regarding transportation, waste disposal, noise, and safety. – Access to and within the Project area for the transportation and distribution of personnel, equipment and materials to the work areas will be through existing ports and other provincial transportation infrastructure. – Small local ports will be evaluated on an as needed basis and will only be used following consultation with owners and stakeholders and if it is determined that the adjacent infrastructure (e.g., area roads) have the capacity to meet Project requirements. – Nalcor will continue to liaise with the relevant planning authorities regarding the Port of Goose Bay dock, and will be involved to the extent appropriate and necessary to upgrade the Port of Goose Bay dock. – Existing access to select points along the transmission corridor ROW and other Project will be used wherever possible. – The Project will not make substantial use of the Gulf or Strait of Belle Isle ferry services as both have identified capacity issues. – Existing operational quarries will be used where appropriate and practical. – Existing clearings and pits will be used for laydown areas, camps or other construction infrastructure such as marshalling yards and staging areas wherever possible. – All construction workers will be housed in small, temporary, self-contained construction camps established at strategic points along or near the ROW. – Extended work-days and the rotational work schedule will allow workers to return to their homes between work cycles; therefore, there will be no demands placed on local housing or other accommodations. – The use of construction camps will minimize pressure on local municipal infrastructure and the secured nature of the camps will help to minimize worker-community interactions. Nalcor will liaise with the provincial Department of Transportation and Works and local stakeholders and communities regarding the condition of the road surface of Route 510 in Labrador and the potential for Project-related traffic to result in further road surface deterioration. – Nalcor will liaise with Department of Transportation and Works and local authorities to address expected Project traffic volume and potential traffic delays.

Table 16.9.1-1 Construction Mitigation Strategies and Methods – Socioeconomic Environment (continued)

VEC	Proposed Mitigation
	– Nalcor will advertise to notify motorists of the details of anticipated traffic delays and, where possible, these activities will avoid periods of peak traffic. – All traffic operations will be conducted in accordance with provincial legislation, including the *Uniform Highway Transport Vehicle Regulations*, which regulate both the weight and dimensions of highway vehicles operating in Atlantic Canada.
Communities - Waste Disposal Infrastructure and Services	– Waste disposal procedures will be identified in the Project EPP. – Waste disposal for the Project will be permit-based, and will only be undertaken with the approval of waste management authorities or municipalities across the province. – Nalcor will consult with local communities and stakeholders regarding Project waste disposal requirements. – Whenever possible, waste materials will be reused and/or recycled. – Domestic waste and other potential waste attractants will be temporarily stored in bear-proof containers before being transported to an approved disposal site. – Where local waste management facilities do not have the capacity or authority to accept Project waste, Nalcor and its contractors will remove the waste from the area and make arrangements to appropriately dispose of it elsewhere.
Communities - Safety and Security Services	– Nalcor will develop SHERP, which will include plans to address potential unplanned incidents and emergency situations, handling and storage of materials, driving safety, animal encounters, emergency response communications, spill response, personnel injury response and vehicle accidents. – All Project personnel will be made aware of the SHERP and designated staff will receive SHERP training. – In the event of an unplanned incident (e.g., forest and other fire, spill or leak of hazardous materials), the appropriate provincial and local authorities will be advised and called upon to help resolve the situation, as indicated in the SHERP. – Nalcor will coordinate communications with local emergency management officials as necessary.
Communities - Health Conditions / Community Well-being	– Construction activities will be conducted in accordance with municipal by-laws regarding noise. – In the event that an issue (e.g., sleep disruption due to noise) is raised by local residents, it will be discussed and mitigation measures will be implemented as appropriate. – Nalcor will offer an easement payment to address a situation where there is a direct land issue with the ROW placement. – Nalcor will consult with property owners on any issues related to use of their property, and, as appropriate, potential effects will be managed through Project design or, if necessary, a negotiated damage claim settlement.

Table 16.9.1-1 Construction Mitigation Strategies and Methods – Socioeconomic Environment (continued)

VEC	Proposed Mitigation
Economy, Employment and Business	– Nalcor and its contractors and sub-contractors will apply the principles and procedures regarding employment, business activities and benefits as set out in the Benefits Strategy (prepared for both the Labrador-Island Transmission Link and the Lower Churchill Hydroelectric Generation Project). – Nalcor will develop a Contracting and Purchasing policy for the Project to support business opportunities for Newfoundland and Labrador enterprises. – Nalcor will continue to participate in an informal working group with relevant government departments to identify issues and planning to meet the Project's labour force requirements. – Nalcor will consult with relevant stakeholder organizations and provincial departments and agencies to develop and implement a Gender Equity Program and a Diversity Program for the Project. – A hiring protocol will be established for Project Construction, consistent with the Canadian Charter of Human Rights and Freedoms, as well as any associated terms and conditions of governmental approvals for the Project. – Nalcor will work with contractors to encourage pre-construction training initiatives including health and safety, cultural awareness, gender sensitivity, environmental awareness, respectful workplace protocols, and specialized skills training, to enable people in the province to participate fully in the Project. – Nalcor will work with training institutions and government agencies throughout the province to offer technical advice and expertise where appropriate and to assist in coordinating training for Project-related work with relevant stakeholders. – Nalcor will adhere to the Lower Churchill Innu IBA which defines how the Labrador Innu will participate in and benefit from this development, including processes for continued consultation and cooperation throughout Project planning. – Nalcor and Innu Nation have agreed to co-operate in the development of a specific Innu Training Plan to help encourage and assist Innu to participate in and become qualified for employment on the Project. – Nalcor will engage employees and potential employees through a variety of programs and practices focusing on a positive work environment; opportunities for training and professional development; participation in career fairs, career counselling and mentorship; and, student achievement awards and temporary employment opportunities. – Nalcor will support employees through an Employee Assistance Program (EAP), which will provide counselling for employees and their families who are experiencing problems in their work or personal lives, and will establish a workplace committee to serve as a discussion forum to address workplace issues and make recommendations to Nalcor and its contractors on any requirements and measures for improvement.
Land and Resource Use	– Nalcor and its contractors will identify, obtain and comply with all authorizations, approvals and permits from relevant provincial and federal agencies that are required in relation to Project construction. – Nalcor will provide information and updates to organizations and the general public as appropriate regarding ongoing and planned construction activities to proactively avoid potential adverse interactions and any safety issues. – Known land and resource use components and activities have been avoided where possible during Project design and planning, including during selection of the proposed transmission corridor and identification of locations for other key Project components (e.g., electrodes, submarine cable

Table 16.9.1-1 Construction Mitigation Strategies and Methods – Socioeconomic Environment (continued)

VEC	Proposed Mitigation
	landing sites, converter stations). – Known land and resource use components and activities will be avoided where possible during the detailed route selection process for the transmission line ROW within the corridor. – During the detailed route and site planning, Nalcor will consult with government departments, Aboriginal and stakeholder groups, and the public as necessary. – Existing access roads and trails will be used wherever possible, and existing transmission lines will be followed where possible, while respecting technical design requirements. – Existing industrial sites and other developed areas will be used for key Project components, and borrow material will be extracted from existing operational quarries and from within the ROW wherever practical. – Project-related elements and activities will be scheduled in specific areas to avoid interactions with land and resources users to the extent practical, and Nalcor will be in regular communication and consultation with relevant agencies, organizations and representatives during Project planning and implementation. – Nalcor will adhere to the Lower Churchill Innu IBA which defines how the Labrador Innu will participate in and benefit from this development, including processes for continued consultation and cooperation throughout Project planning. – Nalcor will continue to consult with other relevant Aboriginal communities and organizations in Labrador and Quebec, particularly those with demonstrated contemporary land use in the vicinity of the Project, to provide Project information and discuss any issues that arise. – During detailed design and planning (e.g., ROW selection, tower design and placement, scheduling) Nalcor will engage in the following to seek to avoid or reduce any potential issues or interactions during construction and / or operations: o work with any commercial outfitter with an existing, active hunting and / or fishing camp located within the proposed transmission corridor, or within 5 km of it or of the planned location of any other permanent Project component; o explore possible routing to minimize the eventual use of the ROW by ATVs and snowmobiles in areas that are currently remote and inaccessible; and o meet and consult with the Newfoundland and Labrador Outfitters Association (NLOA) and / or other industry representatives to discuss general issues and potential effects management measures. – The transmission line and associated components and activities will be routed and designed to avoid direct, physical interaction with existing protected areas. Nalcor will work with the GNL Natural Heritage Branch, Parks and Natural Areas Division (and other organizations as applicable) during detailed engineering design and planning (e.g., ROW selection, tower design and placement, scheduling) for those sections of the proposed transmission line that will occur within 1 km of the boundaries of an existing protected area, to seek to avoid or reduce any potential visual or other interactions. – Nalcor will consult with the DND during detailed design and planning (e.g., ROW selection, tower design and placement, scheduling, communications protocols, infrastructure mapping) for sections of the proposed transmission line that will occur within the designated low level flight training area in Labrador. – Nalcor will use other standard effects management measures used effectively during past and ongoing transmission line construction and maintenance activities, such as: o discussion with private property owners regarding issues related to any intrusion on property,

Table 16.9.1-1 Construction Mitigation Strategies and Methods – Socioeconomic Environment (continued)

VEC	Proposed Mitigation
	both prior to and after such events; o use only essential vehicles along the transmission line to limit noise; and o limit access to only approved routes and specific vehicles. – When it is necessary to acquire property rights, Nalcor will implement its *Property Acquisition Policy*, with the goal to treat all property owners with respect and in a fair, transparent, and consistent manner. – Wood (timber) cleared from the ROW, will be limbed and stacked within the ROW, and will be available for removal by local residents.
Marine Fisheries	– Prior to the start of construction activities in the Strait of Belle Isle, Nalcor representatives will consult with local fishers and other interested parties, to provide information on proposed construction activities, answer questions and discuss concerns or suggestions regarding construction activities. – Prior to the start of electrode construction activities in Conception Bay, Nalcor representatives will meet with local fishers and other interested parties, particularly those who use any fishing grounds along the shoreline near the Dowden's Point shoreline electrode site, to provide information on proposed construction activities, answer questions, and discuss concerns or suggestions regarding construction activities. – Nalcor will establish a Fisheries Liaison Committee (FLC), including a representative of the Labrador Fishermen's Shrimp Company Ltd. and of the Fish, Food and Allied Workers (FFAW), for the construction period to facilitate its ongoing fisheries consultation and advisory process during construction. – A 500 m radius (1,000 m wide) Safety Zone, within which only Project support and service vessels will be allowed, will be established around all active construction areas within the marine environment; in accordance with Rule 43 of the *Collision Regulations* under the *Canadian Shipping Act*, Nalcor will consult with relevant Transport Canada personnel to determine the most appropriate means for boundary demarcation and communication. – The Safety Zone will serve to prevent or reduce direct interactions, particularly contact, between construction activities and equipment and fishing activities. This will protect personal safety, reduce the potential for gear and vessel damage in these areas, and allow a more efficient operating environment for both fisheries and Project activities. – Prior to the start of construction activities in the Strait of Belle Isle, Nalcor will develop a Vessel Traffic Management Plan (VTMP) to promote the safe and efficient operation of Project construction-related marine traffic and fishing vessel operations in the vicinity of all construction activities and in other areas of the Strait of Belle Isle where Project vessels might operate. – The VTMP will be developed in consultation with applicable agencies and organizations, including advice and guidance from experts with the Ship Safety Branch of Transport Canada and the Canadian Coast Guard (CCG). – The VTMP will include measures that Project-related vessels (including small service boats) will follow when operating in the area, and that all fishing vessels should follow when they are involved in harvesting operations close to, or transiting, the general vicinity of Project activities. – Working with the CCG's Notices to Shipping and the Canadian Broadcasting Corporation's Fisheries Broadcast, Nalcor will ensure that all fishing vessels operating in the Strait of Belle Isle are given advance notice of planned construction work. – Nalcor will make available Fishing Gear Loss or Damage Compensation (similar to programs currently in use within the province's offshore area for petroleum exploration and development) to

Table 16.9.1-1 Construction Mitigation Strategies and Methods – Socioeconomic Environment (continued)

VEC	Proposed Mitigation
	cover any damage to commercial fishing gear or other equipment if an incident occurs that involves contact with a Project vessel outside the Safety Zone during construction. – Nalcor will provide economic compensation for any Strait of Belle Isle commercial fishing enterprise (i.e., licence holders who have been actively involved in harvesting scallop in the relevant area in recent years) that experiences a loss of fishing income as a result of Project marine construction activities, based on the principles developed jointly by Nalcor and the FLC.
Tourism	– Nalcor has sought to avoid known and key tourism attractions and sites during Project planning, including in the selection of the proposed transmission corridor for the transmission line, and in the identification of locations for other key project components (e.g., electrodes, submarine cable landing sites, converter stations). – Project construction workers will be housed in temporary construction camps rather than in local hotels, B&Bs and other accommodations, to avoid placing demands on tourist accommodation, especially during peak tourism seasons. – Nalcor will follow standard safety and notification procedures when using provincial transportation infrastructure. – Nalcor and its contractors will coordinate and schedule Project-related transportation of large equipment and materials to avoid heavy seasonal tourism traffic to the extent practical. – Nalcor will regularly communicate and consult with relevant agencies and tourism industry organizations and representatives as part of its coordination and scheduling efforts.
Visual Aesthetics	– Nalcor has selected a corridor, within which the ROW will be constructed, to avoid visually sensitive areas such as Gros Morne National Park. – During Project planning and design, Nalcor has routed and designed the transmission line and associated components and activities to avoid direct, physical interaction with existing protected areas in the province, and to follow existing ROWs to the extent practical. – Nalcor will continue to work with the GNL Natural Heritage Branch, Parks and Natural Areas Division (and other organizations as applicable) during detailed design and planning (including during ROW alignment, tower design and placement, scheduling) for sections of the proposed transmission line that will be within 1 km of the boundaries of an existing protected area to try to avoid or reduce any potential visual interactions. – Nalcor will work directly with any commercial outfitter with an existing, active hunting and / or fishing camp located within the proposed transmission corridor, or within 5 km of the corridor or the planned location of any other permanent Project component, including during detailed design and planning (e.g., ROW selection, tower design and placement, scheduling) for sections of the proposed transmission line within these areas. – Nalcor will meet and consult with NLOA and industry representatives to consider possible routing approaches to minimize the eventual use of the ROW by ATVs. – During detailed planning and design, Nalcor will use the following measures to limit the effects of the Project on the visual landscape: o avoidance of visually sensitive areas; o following existing disturbance corridors where practical; o constructing in remote, uninhabited areas; and o retaining a vegetative buffer zone at watercourses and major highway crossings to the extent practical.

Table 16.9.1-2 Operations and Maintenance Mitigation Strategies and Methods – Socioeconomic Environment

VEC	Proposed Mitigation
Historic and Heritage Resources	– In the event that unregistered Historic and Heritage Resources are encountered, the Historic and Heritage Resources contingency and response measures included in the EPP will be implemented. – Specific precautionary and reporting measures identified as contingency and response measures in the EPP will be followed, including: o implementation of a Stage 1 Historic Resources Assessment in accordance with provincial guidelines; and o cessation of any Project activities at this location until an appropriate approach is developed and approved by the PAO.
Communities	– Project Operations and Maintenance activities will be carried out in accordance with standard procedures and in accordance with required and relevant environmental protection measures. – Nalcor will incorporate Operations and Maintenance activities for the Project into its established transmission system inspection and maintenance, and integrated vegetation management programs. – Nalcor will develop SHERP; SHERP, will include plans to address potential unplanned incidents and emergency situations, including handling and storage of materials, driving safety, animal encounters, emergency response communications, spill response, personnel injury response and vehicle accidents. – All Project personnel will be made aware of the SHERP and designated staff will receive SHERP training. – In the event of an incident (e.g., forest and other fire, spill or leak of hazardous materials), the appropriate provincial and local authorities will be advised and called upon as indicated in the SHERP to help resolve the situation. – Nalcor will coordinate communications with local emergency management officials as necessary. – All herbicide application will be conducted in accordance with the *Pesticides Control Regulations* 1996 (plus amendments) under the *Environmental Protection Act* SNL 2002, and will be performed by applicators certified with an Industrial Vegetation license issued by the Department of Environment. – Herbicide applications will not be undertaken in Protected Public Water Supply Areas, private or provincial parks, ecological reserves, or on private lands without permission of the owner. – Vegetation buffer zones, established at environmentally sensitive areas during transmission line construction, will be maintained during vegetation management activities, with only danger trees being removed from these areas.
Economy, Employment and Business	– Nalcor will incorporate Operations and Maintenance activities for the Project into its established transmission system inspection and maintenance, and integrated vegetation management programs. – Nalcor and its contractors and sub-contractors will apply the principles and procedures outlined in the Benefits Strategy (prepared for both the Labrador-Island Transmission Link and the Lower Churchill Hydroelectric Generation Project) regarding employment, business activities and benefits. – Nalcor will continue to participate in an informal working group with relevant government departments to identify issues and planning to meet the Project's labour force requirements. – Nalcor will consult with relevant stakeholder organizations and provincial departments and agencies to develop and implement a Gender Equity Program and a Diversity Program for the Project. – Nalcor's hiring (i.e., consistent with the Canadian Charter of Human Rights and Freedoms, as well as any associated terms and conditions of governmental approvals for the Project) and training policies (i.e., including health and safety requirements, work place protocols and skill development programs) developed for the Project Construction phase will apply to Project Operations and Maintenance. – Nalcor will follow the contracting and purchasing practices developed for the Project Construction phase.

Table 16.9.1-2 Operations and Maintenance Mitigation Strategies and Methods – Socioeconomic Environment (continued)

VEC	Proposed Mitigation
	– Nalcor will adhere to the Lower Churchill Innu IBA which defines how the Labrador Innu will participate in and benefit from this development, including processes for continued consultation and cooperation throughout Project Operations and Maintenance.
Land and Resource Use	– Nalcor and its contractors will identify, obtain and comply with all authorizations, approvals and permits from relevant provincial and federal agencies that are required in relation to its Project Operations and Maintenance activities. – Nalcor will continue to communicate with the public regarding upcoming maintenance activities and the overall operation of the transmission system, and general planning and scheduling will be done to avoid interfering with adjacent land and resource uses and users within or adjacent to the ROW as much as possible. – Nalcor will adhere to the Lower Churchill Innu IBA which defines how the Labrador Innu will participate in and benefit from this development, including processes for continued consultation and cooperation throughout Project Operations and Maintenance. – Nalcor will continue to consult with other relevant Aboriginal communities and organizations in Labrador and Quebec, particularly those with demonstrated contemporary land use in the vicinity of the Project, to provide Project information and discuss any issues that arise. – Nalcor will consult with the DND during operations and maintenance to schedule activities for sections of the proposed transmission line that will occur within the designated low level flight training area in Labrador.
Marine Fisheries	– The FLC established for the Construction phase will continue to function during at least the initial years of Project operations and maintenance, if all parties consider it to be useful and necessary; the FLC's role is to facilitate information exchange and communications between Nalcor and the fishing industry, and to identify and seek to resolve any concerns or issues that arise during Operations and Maintenance. – Nalcor will consult and address any issues related to commercial fisheries in the Strait of Belle Isle that result from Project activities. – A Safety Zone (500 m radius), within which only Project support and service vessels will be allowed, will be in place around any vessel(s) engaged in routine maintenance or major system repair work for the submarine cables. – Working with the CCG's Notices to Shipping and the Canadian Broadcasting Corporation's Fisheries Broadcast, Nalcor will ensure that all fishing vessels operating in the Strait of Belle Isle are given advance notice of planned maintenance or repair programs. – The VTMP developed for marine construction activities in the Strait of Belle Isle will be adapted and applied to any cable maintenance and / or repair activities.
Tourism	– Nalcor will follow standard safety and notification procedures when using provincial transportation infrastructure. – Nalcor and its contractors will coordinate and schedule Project-related transportation of large equipment and materials required for Project maintenance activities to avoid heavy seasonal tourism traffic to the extent practical. – Nalcor will communicate and consult with relevant agencies and tourism industry organizations and representatives as part of its coordination and scheduling efforts.
Visual Aesthetics	– Nalcor will allow the majority of the ROW (except for the access trail) to revegetate and will encourage natural reclamation of the Project components (e.g., camps, marshalling yards, temporary access) not required during Operations and Maintenance.

16.9.2 Accidents and Malfunctions

Chapter 5 identified and described potential incidents (i.e., accidents and malfunctions) related to Project Construction, and Operations and Maintenance. It also described the potential environmental consequence (i.e., magnitude, extent, and duration) of these incidents and their probability of occurrence. The risk of each incident, a function of both probability of occurrence and environmental consequence, was then assessed as low, moderate or high.

Incidents that are considered to have low risk (i.e., have a low to high probability of occurrence, and a low consequence) have been assessed as part of the environmental effects assessment for potentially affected socioeconomic VECs elsewhere in this chapter. Incidents that are considered to have a moderate to high risk and have potential effects on the socioeconomic environment are addressed in this section. Table 16.9.2-1 lists the moderate to high risk potential incidents that may affect the socioeconomic environment. Table 16.9.2-1 also summarizes the potential effects of the incident and describes the prevention and response measures that will be implemented by Nalcor to address the incident.

Moderate to high risk incidents in the Socioeconomic Environment are assessed below. Because they are not likely to occur and effects management measures will be in place, the effects of such moderate to high risk incidents are not likely to be significant.

Table 16.9.2-1 Summary of Potential Moderate to High Risk Incidents that Could Affect the Socioeconomic Environment

Description of Incident	Likely Effects on the Socioeconomic Environment	Prevention and Response Measures
Electrocution due to human contact with transmission lines, submarine cable, or electrodes.	– Human injury or death.	– The Environmental Protection Plan (EPP), the Safety, Health and Environmental Emergency Response Plan (SHERP) and the Occupational Health and Safety Plan (OHSP) will contain measures for the prevention of and response to electrocution incidents. – "High voltage" signage will be posted at converter stations, transition compounds, electrode sites and buried power lines. – Fencing will restrict public access to converter stations and the electrode sites. – Horizontal directional drill (HDD) and a rock berm will be used to prevent interaction between fishing activity and the submarine cable. – The transmission system will be designed to trip out in the event of a ground fault.

Table 16.9.2-1 Summary of Potential Moderate to High Risk Incidents that Could Affect the Socioeconomic Environment (continued)

Description of Incident	Likely Effects on the Socioeconomic Environment	Prevention and Response Measures
Large spill (e.g., 1,000 L) of diesel fuel during construction that spills over the ground and into a watercourse.	– Groundwater contamination may interact with human health if the diesel fuel reaches an aquifer used for human consumption. – Changes in soil quality may affect agricultural activities and /or property values. – Degradation of vegetation may result in changes to the visual aesthetics of the area. – Increased demand on local safety, security and emergency services. – Historic and Heritage Resources may be affected.	– The SHERP will contain a spill prevention and response plan. – The EPP will contain conditions for fuel handling and storage, including procedures for spill response. – Spill kits will be available at all worksites. – A spill response team will be formed and trained prior to construction. – Spills will be reported to the appropriate federal or provincial authority to coordinate the provincial response. – Mobile storage tanks will comply with the *Transportation of Dangerous Goods Regulation* SOR/2008-34, as well as the *Storage and Handling of Gasoline and Associated Products Regulations,* 2003, under the *Environmental Protection Act.* – Fuelling or servicing will not be permitted within 50 m of a waterbody. – Biodegradable lubricants and hydraulic fluids will be used, where practical, when working near a waterbody. – Fuels and oils will be stored at least 100 m from any surface water. – Converter station sites will be surrounded by a constructed berm or dyke to prevent release of transformer oils or other substances into the environment.
Large fuel spill into the marine environment, during construction, due to vessel collision.	– Wildlife mortality, degradation of marine water quality, and resulting effects on the fishing industry. – Historic and Heritage Resources may be affected.	– The SHERP will contain safety measures for vessel operation and collision prevention. – Project vessels will comply with the *Canada Shipping Act.*

Table 16.9.2-1 Summary of Potential Moderate to High Risk Incidents that Could Affect the Socioeconomic Environment (continued)

Description of Incident	Likely Effects on the Socioeconomic Environment	Prevention and Response Measures
Large forest fire in Labrador, originating along the access roads or right-of-way (ROW), during the summer.	– Health effects resulting from the release of particulate matter into the atmosphere. – Reduction in visibility and long-term effects to the visual landscape. – Effects on land use (e.g., outfitting, recreation, hunting). – May pose a risk to public safety. – Historic and Heritage Resources may be affected.	– Adherence to terms and conditions of Operating Permits issued by the Forest Services Branch. – The SHERP will contain a fire prevention plan. – The EPP will contain forest fire prevention measures and a fire response plan. – Firefighting equipment will be available at each worksite. – In the event of a forest fire, steps will be taken to extinguish the fire (if safe to do so), and the fire will be reported to the provincial Forest Services Branch.
Forest fire near a populated community in Newfoundland, originating along the access roads or ROW, during the summer.	– Health effects resulting from release of particulate matter into the atmosphere. – Reduction in visibility and long-term effects to the visual landscape. – Effects on land use (e.g., outfitting, recreation, hunting). – May pose a risk to public safety. – Increased demand on local safety, security and emergency services. – May affect tourism travel and visitation. – Historic and Heritage Resources may be affected.	– Adherence to terms and conditions of Operating Permits issued by the Forest Services Branch. – The SHERP will contain a fire prevention plan. – The EPP will contain forest fire prevention measures and a fire response plan. – Firefighting equipment will be available at each worksite. – In the event of a forest fire, steps will be taken to extinguish the fire (if safe to do so), and the fire will be reported to the provincial Forest Services Branch.
Vehicle-vehicle or vehicle-pedestrian collision resulting in multiple deaths.	– Human injury or mortality.	– The SHERP will include safety measures for vehicle operation, including collision prevention. – The SHERP and vehicle operator awareness programs will address high potential collision areas, time of day and seasons. – Where possible, Project highway activities will avoid periods of peak traffic.

Table 16.9.2-1 Summary of Potential Moderate to High Risk Incidents that Could Affect the Socioeconomic Environment (continued)

Description of Incident	Likely Effects on the Socioeconomic Environment	Prevention and Response Measures
Vessel-vessel collision resulting in multiple deaths.	– Human injury or mortality. – Spilled fuel could affect marine fisheries.	– The SHERP will include safety measures for vessel operation, including collision prevention. – The SHERP and vessel operator awareness programs will address high potential collision areas, time of day and seasons, and marine vessel observation procedures.
Aircraft collision or released sling load within a populated area.	– Human injury or mortality.	– Helicopter operation for Project construction and operation (including slinging) will comply with Canadian Aviation Regulations. – Nalcor has provided Project description information to DND and has discussed with DND the nature of ongoing military flight activities in the area. Nalcor will continue to consult with DND during detailed Project design. – Nalcor and / or its contractor(s) will provide briefings to DND authorities regarding its planned and ongoing construction activities, particularly those involving aircraft activity in Labrador.

The following sections provide a description of the conditions or activities that could lead to each incident listed in Table 16.9.2-1, the potential effects of the incident on the socioeconomic environment, and a description of prevention and mitigation measures that will be implemented. Additional information on each incident is provided in Chapter 5.

Electrocution due to human contact with transmission lines, submarine cable, or electrodes.

Description of Incident

During Project operation, an electrical current will travel through the Project converter stations, through on-land transmission lines, through the submarine cables and through the electrodes and wood pole electrode lines. Human contact with a live wire or electrical equipment could lead to electrocution.

Likely Effects of Incident on the Socioeconomic Environment

The potential effects of electrocution on a human depends on the magnitude of the current, the voltage and amperage, the duration of contact, and the electrical resistance of the body. In the case of electrocution of a human, serious injury (e.g., burns, loss of limbs, damage to internal organs, and neurological damage) or death may result.

Summary of Prevention and Response Measures

Nalcor will proactively identify potential electrical hazards related to Project Construction, and Operations and Maintenance. Prevention measures and response procedures will be described in the EPP, the SHERP, and the OHSP. The following measures will be implemented to reduce likelihood of electrocution during Project Construction, and Operations and Maintenance:

- the transmission towers will be designed in accordance with Canadian Standards Association (2009) standards, using the fail safe design principle, as described in Section 5.4.1;
- "High voltage" signage will be posted at the converter stations, transition compounds and electrode sites;
- "High voltage" signage will be posted where power lines are buried (e.g., between the transition compounds and their respective landing points) so that there is no excavation or development in the cable areas;
- public access to the converter stations will be restricted by galvanized steel security fences and locked gates;
- the electrode sites will be enclosed by locked, chain link fences to prevent public access from the land and sea sides. Sea side fencing will be installed on the permeable berm crest; and
- the submarine cable will be protected from interaction with fishing activity by HDD and by a rock berm.

The transmission system will be designed to trip out in the event of a ground fault. The system will attempt to clear the fault by reclosing and re-energizing the line. It will make a fixed number of attempts before remaining off-line. If a conductor failure occurs (i.e., if the conductor breaks), the line will trip out before coming into contact with anything. If a tower failure occurs and the conductor touches the tower, the system will trip out and the risk of electrocution is removed, unless a person or animal is in direct contact with the tower. If the conductor does not touch the tower at any point during the fall, the live conductor could (on its way to the ground) come into contact with a person or animal. Electrocution resulting from conductor or tower failure requires a specific combination of circumstances (e.g., tower failure during which the conductor does not touch the tower and a person or animal is located in the direct path of the falling conductor).

Large spill of diesel fuel during construction that spills over the ground and into a watercourse.

Description of Incident

During Project Construction, and Operations and Maintenance, environmentally hazardous materials such as hydrocarbons (e.g., gasoline and diesel), lubricating oils and hydraulic fluid will be used. Diesel fuel for the re-fuelling of heavy equipment will be transported in a 1,000 L portable fuel storage tank. There is a potential that this fuel tank could be breached due to a mishap (e.g., roll over), and that up to 1,000 L of diesel fuel could spill over the ground and into a watercourse.

Likely Effects of Incident on the Socioeconomic Environment

If the diesel fuel reaches an aquifer that is used for human consumption, the spill could affect the health of the people or communities using the aquifer as a drinking water supply. Depending on the location of a fuel spill, this type of incident could also have a localized effect on agricultural activities and / or property values through the degradation of soil quality, and it could have a localized effect on the visual aesthetics of the area through the degradation of vegetation. A large fuel spill could also temporarily put an increased demand on safety, security and emergency services (e.g., spill response).

Summary of Prevention and Response Measures

The SHERP will include specific instructions for the prevention of and response to spills or leaks of hazardous material. Spill response kits will be maintained at all worksites, and spill kit contents will be based on the

volume of fluids in use, the type of fluid, proximity to water and other relevant factors at a particular worksite. All personnel involved in hydrocarbon transport and transfer will be trained in spill response. A Response Team will be formed, trained and will receive regular practice in "mock" responses for incidents that require co-ordinated action. Any spills in excess of the amount, concentration, level, or rate of release authorized by the *Newfoundland and Labrador Environmental Protection Act* (*NLEPA*) or any Project approvals granted under the *NLEPA* will be reported to the Government of Newfoundland and Labrador Department of Environmental and Conservation (NLDEC).

All mobile storage tanks will be registered under, and comply with, the *Transportation of Dangerous Goods Regulation* SOR/2008-34, as well as the *Storage and Handling of Gasoline and Associated Products Regulations*, 2003, under the *Environmental Protection Act*. Records will be maintained of all storage tank contents to reconcile inventories as a check against undetected leakage. All transport vehicles will be licensed and maintained according to safety requirements. Fuelling or servicing of mobile equipment will not be permitted within 30 m of a waterbody.

Large fuel spill into the marine environment, during Construction, due to vessel collision.

Description of Incident

The operation of marine vessels in the Strait of Belle Isle could lead to a marine incident. Vessel-vessel or vessel-ground collisions are influenced by marine traffic, weather conditions, vessel watch procedures and human factors such as fatigue. A collision between the fallpipe vessel or a material transport ship and another boat or the seabed could result in a large spill of fuel into the marine environment. The worst case scenario would involve a fully-fuelled vessel releasing all of its fuel into the sea.

Likely Effects of Incident on the Socioeconomic Environment

A large fuel spill into the marine environment would affect the quality of the water in the Strait of Belle Isle, and could result in the direct mortality of marine wildlife and fish and / or the loss or alteration of marine vegetation and habitat. Changes to fish, wildlife and their habitat in the Strait of Belle Isle could affect marine fisheries, and have subsequent economic effects on communities that rely on marine fisheries.

Summary of Prevention and Response Measures

The SHERP will include safety measures for vessel operation, including the prevention of collisions. All Project personnel will be made aware of the SHERP and designated staff will receive SHERP training, and vessel operator awareness programs will limit the potential for collisions. Project vessels will also comply with the *Canada Shipping Act.* The SHERP and vessel operator awareness programs will address high potential collision areas, time of day and seasons, and marine vessel observation procedures.

Forest fire affecting 470 ha in Labrador, originating along the access roads or ROW, during the summer, or forest fire in the vicinity of a populated community in Newfoundland, originating along the access roads or ROW, during the summer.

Description of Incident

The operation of combustion engines (e.g., vehicles, heavy equipment, chain saws), blasting activity and workers smoking have the potential to ignite forest fires. Both combustion engines and workers are expected to be present during most Project Construction, and Operations and Maintenance activities, and blasting may occur during foundation construction. Several Project activities will occur in forested areas where the ignition source could lead to a forest fire.

Given the Forest Services Branch's policy not to fight fires that do not threaten communities or harvestable resources, a forest fire in Labrador could affect a large tract of land. The average extent of forest fires in Labrador is approximately 470 ha (Sullivan 2010, pers. comm.). A similar fire in Newfoundland would be more

actively fought because it would have a greater likelihood of approaching a populated community. Consequently, a large forest fire in Newfoundland could temporarily put an increased demand on safety, security and emergency services (e.g., fire fighting response).

Likely Effects of Incident on the Socioeconomic Environment

Forest fires can affect air quality through the release of particulate matter into the atmosphere. Particulate matter can cause eye, nose and throat irritation, breathing difficulties and reduced lung function in humans (Health Canada 2011, internet site). Emissions from forest fires can travel long distances, thus potentially affecting air quality far from the fire location.

Particulate matter also affects visibility, thus temporarily affecting the visual aesthetics of the area. Longer-term effects to the visual landscape result from large tracts of burned vegetation and forest cover. This may be a deterrent to tourists.

The alteration of a forest by fire also has the potential to affect other land uses, such as outfitting, hunting, trapping, general recreation and tourism. A forest fire may also result in a loss of infrastructure (e.g., power lines, buildings) and may pose a risk to public safety.

Summary of Prevention and Response Measures

The SHERP will include a plan for fire prevention. All Project personnel will be made aware of the SHERP and designated staff will receive SHERP training, and the forest fire prevention plan will be followed by Nalcor and its contractors. Forest fire prevention measures addressed in the SHERP will include the storage and disposal of flammable material, the use of designated smoking areas, and the prohibition of burning brush or debris.

Detailed information on firefighting equipment and procedures will be provided in the SHERP, the EPP and other environmental documents, such as terms and conditions of permits and authorizations. Fire fighting equipment, as described in Chapter 5, that is suitable to the labour force and working conditions will be available at each worksite and will be in proper working condition, as required by the Operating Permit. In the event of a forest fire, immediate steps will be taken to contain or extinguish the fire to the extent practical and safe, and fires will be reported immediately to the nearest regional office of the Forest Services Branch.

Vehicle-vehicle or vehicle-pedestrian collision resulting in multiple deaths.

Description of Incident

The operation of vehicles and heavy equipment on provincial highways, Project access roads and the ROW could result in vehicle-vehicle or vehicle-pedestrian collisions which could, in turn, result in one or more human deaths. The potential for these types of collisions is influenced by vehicle traffic volumes, pedestrian traffic volumes, speed of travel, weather conditions (i.e., visibility) and personal factors such as seat belt use, fatigue, and alcohol use.

Likely Effects of Incident on the Socioeconomic Environment

The consequence of a vehicle-vehicle or vehicle-pedestrian collision could range from vehicle damage to serious injury or death. Given the frequency of motor vehicle collisions in Canada, the probability of a Project vehicle being involved in a collision that results in minor injury or vehicle damage is considered moderate, as described in Chapter 5. A vehicle collision could also result in serious injury or death of one or more people. Although the likelihood of a fatal collision occurring is less than that of a minor injury collision, such a collision could directly affect those involved in the collision and indirectly affect the well-being of a community of friends, family and acquaintances.

Summary of Prevention and Response Measures

The SHERP will include safety measures for vehicle operation, including collision prevention. All Project personnel will be made aware of the SHERP and designated staff will receive SHERP training, and driver / operator awareness programs will limit the potential for vehicle collisions. The SHERP and driver awareness programs will address high potential collision areas, time of day and seasons, and speed restrictions on Project roads. Where possible, Project highway activities will avoid periods of peak traffic.

Vessel-vessel collision resulting in multiple deaths.

Description of Incident

The operation of marine vessels in the Strait of Belle Isle could lead to a marine incident. Vessel-vessel or vessel-ground collisions are influenced by marine traffic, weather conditions, vessel watch procedures and human factors such as fatigue.

Likely Effects of Incident on the Socioeconomic Environment

Marine vessels will be used for the transportation of materials, for laying the submarine cable, and for building the rock berm. Cable laying and rock berm construction activities will be conducted primarily from slow-moving vessels. Material distribution may use large ships travelling at higher speeds and with limited manoeuvrability. Vessel watch procedures will limit the potential for accidents in high traffic areas.

The effects of a vessel collision could range from vessel damage to serious human injury or death. The effects of a vessel collision depend on the speed of travel, the size of the vessels involved, and the point / angle of collision. Although the likelihood of a collision resulting in serious injury or death is less than that of vessel damage or minor injury, the effects would include the physical harm to those directly involved in the collision, and indirect effects to the well-being of a community of friends, family and acquaintances.

A vessel collision could also result in a large fuel spill into the marine environment. This may affect the quality of the water in the Strait of Belle Isle, and could result in the direct mortality of marine wildlife and fish and / or the loss or alteration of marine vegetation and habitat. Changes to fish, wildlife and their habitat in the Strait of Belle Isle could affect marine fisheries, and have subsequent economic effects on communities that rely on marine fisheries.

Summary of Prevention and Response Measures

The SHERP will include safety measures for vessel operation, including the prevention of collisions. All Project personnel will be made aware of the SHERP and designated staff will receive SHERP training, and vessel operator awareness programs will limit the potential for collisions. The SHERP and vessel operator awareness programs will address high potential collision areas, time of day and seasons, and marine vessel observation procedures.

Aircraft collision or released sling load within a populated area.

Description of Incident

During Project Construction, helicopter transport will be used, in some areas, for material distribution. Where helicopters are used, the transmission towers may be assembled in marshalling yards or lay down areas and slung by helicopter to the ROW. In all slinging operations, there is a risk of dropped loads. Helicopters may also be used for transmission line inspections in winter during Project Operations and Maintenance.

The Project is located in a region used for low-level flight training by DND. Flight training occurs at altitudes as low as 30 m above ground level and the transmission towers will reach a height of between 38 m and 49 m. As a result, there is a risk of collision between DND aircraft and Project helicopter traffic, and between DND aircraft and the transmission towers and transmission line during both Project Construction, and Operations and Maintenance.

Likely Effects of Incident on the Socioeconomic Environment

It is not known yet to what extent helicopters or slinging operations will be used for material distribution during Project Construction, or to what extent transmission line inspections will be conducted from the air during the Project Operations and Maintenance phase. An aviation accident (e.g., a collision or inadvertent release of a sling load) may result in serious injury or death of the passengers, or members of the public, if the incident occurs in or over a populated area. Such an incident would also affect the well-being of a community of friends, family and acquaintances.

Summary of Prevention and Response Measures

Helicopter operation for Project Construction, and Operations and Maintenance (including slinging) will comply with Canadian Aviation Regulations (CAR). CAR regulates flight operations, and provides instruction on safety measures / limitations such as:

- minimum visibility requirements for flight;
- minimum fuel requirements;
- weight and balance requirements;
- pre-flight inspections and safety briefings;
- horizontal and vertical distance that an aircraft must maintain if flight is conducted over a built up area; and
- standards for slinging (e.g., requirement for a quick release mechanism and back-up in case of emergency).

Nalcor has provided Project description information to DND and has discussed with DND the nature of ongoing military flight activities in the area. The discussions between Nalcor and DND also included potential concerns, future planning, and design and communication measures to prevent potential interactions between the Project and DND flight activity. Nalcor will continue to consult with DND during detailed Project design to identify issues related to tower design and transmission line routing and will address these issues, where possible, during the design process. Early communication with DND will allow Project activities (i.e., helicopter traffic) and Project components (e.g., transmission towers) to be incorporated into DND's planning and navigation aids (e.g., charts).

Nalcor and / or its contractor(s) will also provide full and regular briefings to DND authorities regarding its planned and ongoing construction activities, particularly those involving aircraft activity in Labrador, to coordinate planning and communication around Project construction activities. More information on that communication plan can be found in Section 16.5.

16.9.3 Residual Project Effects and Significance

The environmental effects assessment framework focuses the assessment on important and likely issues and interactions and considers the overall social and economic context. The framework integrally reflects socioeconomic and ecological interrelationships between VECs, other aspects of the natural and human environments, and associated Project related issues as indicated in the interactions tables. The socioeconomic VECs and KIs within various VECs are interrelated (e.g., Economy, Employment and Business affect Community Infrastructure and Services, Community Well-being, and Tourism; Visual Aesthetics and Protected Areas affect Tourism; Land and Resource Use, and Tourism affect the Economy, Employment and Business). As well, the Socioeconomic VECs and Biophysical VECs are interrelated (e.g., Vegetation, Caribou and Furbearers affect both recreational and Aboriginal Contemporary Land and Resource Use; Marine Fish and Fish Habitat affects Marine Fisheries). Nalcor's attention to sustainability as fundamental to the assessment also reflects the respect for the right of future generations to the sustainable use of renewable and non-renewable resources. This EIS integrally considers the capacity of renewable resources that are likely to be affected by the Project to meet the needs of present and future generations. This section summarizes the residual Project effects on the Socioeconomic Environment, and their significance.

Effects management measures are in place to minimize residual Project effects on the Socioeconomic Environment during both Construction, and Operations and Maintenance phases as indicated in Table 16.9.1-1 and Table 16.9.1-2. These measures include avoidance of historic and heritage sites and important resources or resource use locations where feasible; use of existing roads and facilities where possible; paralleling existing transmission lines where possible; specific pre-construction field surveys as necessary and appropriate; and, adherence to permit conditions. As well, the remoteness of the Project in much of Newfoundland and Labrador has helped to minimize likely interactions with the human environment. Implementation of the provincial Benefits Strategy and the current Innu IBA, Nalcor's planned ongoing communication with relevant regulatory agencies and potentially affected user and stakeholder groups, and Aboriginal communities to finalize Project planning and design, and contingency and response measures included in the EPP to address issues that do arise will also minimize residual effects. The residual effects identified in the assessment reflect the interrelationships between the various VECs and associated issues.

Likely residual effects on the Socioeconomic Environment are primarily temporary in nature, occurring mainly during Project Construction, and include increased demand on local transportation infrastructure, community services and waste facilities, temporary traffic delays, possible labour force competition and wage inflation, and noise or visual disturbance. Longer term effects during Operations and Maintenance include EMF, noise and other periodic disturbances. Beneficial effects of the Project include increased employment and business opportunities, increased income and increased tax revenue, and an increase in business activity throughout the province.

Historic and Heritage Resources

Considering the mitigation measures undertaken during Project planning to address effects on historic and heritage resources (e.g., avoidance, specific field surveys), and the contingency measures in place for the Construction, and Operations and Maintenance phases (i.e., Historic and Heritage Resources contingency and response measures included in the EPP), residual Project effects are unlikely. That is, no disturbance to or loss of historic and heritage resources, including Sites of Cultural-Historic Importance, is predicted; and, if such resources are disturbed, provincial protocols will be followed to evaluate and document the resource and record its historical and cultural context. Therefore, the likely residual Project effects on the Historic and Heritage Resources VEC are not significant.

Communities

Due to the scale and distribution of Project activities, the likely residual Project effects on communities throughout the life of the Project will be primarily local and of short duration (e.g., increased demand for transportation infrastructure and community services, noise disturbance) during Construction, or longer duration (e.g., EMF, noise or other disturbance) during Operations and Maintenance. Some localized beneficial effects (e.g., highway improvements, waste disposal revenue) will be long lasting. Therefore, the likely residual Project effects on the Communities VEC are not significant.

Economy, Employment and Business

Nalcor will apply the principles and procedures regarding employment (hiring protocols, skills development programs, Gender Equity and Diversity programs), business activities (such as procurement and contracting policies) and benefits (provincial and Labrador Innu) as set out in the current Benefits Strategy. Nalcor will also continue to consult with Aboriginal groups regarding issues that arise throughout the Project and with relevant provincial agencies regarding planning to meet labour force needs. Considering these effects management measures, the likely residual effects of the Project on economy, employment and business will be primarily and substantially beneficial (i.e., increased employment, incomes, tax revenues and business activity within the province and beyond) mainly during the four-year Construction phase, but also extending over the life of the Project, and experienced thoughout the province and beyond. Therefore, the likely residual Project effects on the Economy, Employment and Business VEC are not significant.

Land and Resource Use

Nalcor has undertaken considerable consultation regarding land and resource use with relevant commercial and public groups and organizations during Project planning and design to identify appropriate effects management measures (e.g., avoiding locations of specific commercial, municipal and recreational land and resource uses, traditional Aboriginal uses, and protected areas). Considering this, and the planned ongoing consultation and discussion with relevant groups and organizations to seek to avoid undesirable interactions with traditional and contemporary land and resource users, the likely residual effects of the Project on land and resource use include occasional and temporary disruption of existing land or resource users near Project work areas, and the creation of additional access to previously inaccessible areas, which may be beneficial to land users in some areas. However, the presence of the Project is not likely to change the ecological integrity, cultural value or societal use and enjoyment of protected areas. Design, consultation, permitting, communications and / or other effects management will identify and address most issues. Therefore, the likely residual Project effects on the Land and Resource Use VEC are not significant.

Marine Fisheries

Nalcor will implement a variety of measures (consultation with fishers, notification of Project activities, ongoing liaison through the FLC, a VTMP and Safety Zones) aimed at limiting Project-related interference with fishing activities in the Strait of Belle Isle. Nalcor will also develop programs to compensate for damage to gear or loss of income during Construction in conjunction with the FLC. Considering this and the planned ongoing consultation and discussion with the FLC to provide information and address concerns related to commercial fishing enterprises, the likely residual effects of the Project on Marine Fisheries will include some short-term interference with fishing activities over a small area in the Strait of Belle Isle. However, overall landings or fishing income and recreational fishing opportunities are not likely to decrease. Therefore, the likely residual Project effects on the Marine Fisheries VEC are not significant.

Tourism

Nalcor has undertaken effects management measures (i.e., avoiding construction in visually sensitive locations and near tourism sites) and will continue to implement other measures (e.g., Project workforce primarily housed in camps, effective scheduling to avoid heavy tourist periods, ongoing communications with appropriate agencies and stakeholders) to prevent interference with the tourist experience and loss of revenue to tourism enterprises. The likely residual Project effects on tourism include intermittent, temporary disruption to the quality of the tourism experience due to noise, dust, visual disturbance, traffic delays, or accommodation shortages during Project Contruction. This is normal in relation to construction activities within the province, and current tourism opportunities are expected to remain available and viable, and future tourism opportunities are not expected to be compromised. The transmission system is largely in remote areas, and will not be visible in most regions of the province except the Avalon Peninsula where it parallels existing structures, thereby having a minor to negligible effect on the quality of the tourism experience. Therefore, the likely residual Project effects on the Tourism VEC are not significant.

Visual Aesthetics

Clearing of the ROW, and installation of transmission towers and other Project components will result in changes to existing viewscapes in the province to varying degrees during Construction, depending on view location and the stage of Construction, and the Project components (e.g., the ROW, transmission towers, converter stations and shoreline electrode sites) will likely be visible throughout the life of the Project, depending on the viewing location. However, from a regional perspective, the presence of the Project will not alter the overall aesthetic character, quality, value and use of the location for the overall population. Therefore, the likely residual Project effects on the Visual Aesthetics VEC are not significant.

A summary of the VECs selected for the Socioeconomic Environment, and the significance of the likely residual effects of the Project VEC, are provided in Table 16.9.3-1.

Table 16.9.3-1 Summary: Significance of Residual Effects on Socioeconomic Valued Environmental Components

VEC	Likely Significant Residual Effect	Comment
Historic and Heritage Resources	No	The effects of the Project on Historic and Heritage Resources are unlikely to result in the loss of identified Archaeological Resources and /or Palaeontological Resources without the appropriate documentation or retrieval of the material-culture and the scientific information it contains, or the loss of unidentified Archaeological and /or Palaeontological Resources such that the overall understanding of the history of a region would be negatively affected. The effects of the Project on Sites of Cultural-Historical Importance are unlikely to result in the direct disturbance of a known site such that its integrity and cultural value is diminished.
Communities	No	The effects of the Project on Communities are unlikely to result in a change in the overall availability and quality of infrastructure and services for current users and / or in the health and well-being of affected individuals or communities that lead to a detectable and sustained decrease in the overall quality of life and / or health of a population.
Economy, Employment and Business	No	The effects of the Project on Economy, Employment and Business are unlikely to cause an overall, detectable and sustained decrease in the economy, employment or business activity over the life of the Project.
Land and Resource Use	No	Considering the effects management measures in place and planned, the effects of the Project on Land and Resource Use are unlikely to negatively affect the successful operation or overall economic viability of commercial enterprises; or prevent or substantially restrict overall levels of ongoing development in and planned growth of communities; or result in a decrease in the nature and / or cultural value of Aboriginal contemporary traditional land use activities or other recreational land and resource users; or compromise the ecological integrity, cultural value and / or societal use and enjoyment of Protected Areas.
Marine Fisheries	No	Nalcor's planned consultation, ongoing liaison, compensation programs during Construction and other effects management means for commercial Marine Fisheries will ensure that any Project interference with fishing activities will not result in a decrease in overall landings or fishing income as compared to pre-Project levels and adverse effects on the successful operation and overall economic viability of fishing enterprises in the area are not likely. The Project will have no likely measurable adverse effect on recreational fisheries (i.e., no loss of overall recreational fishing opportunity or decrease in quality of the experience) in the Strait of Belle Isle or Conception Bay.
Tourism	No	The effects of the Project on Tourism are unlikely to cause a decrease in the overall quality and enjoyment of Newfoundland and Labrador's tourism product, in such a way that it results in a detectable decrease in tourism visitation and expenditure levels in one or more regions of the province and / or where it threatens the successful operation and overall economic viability of one or more tourism enterprises.
Visual Aesthetics	No	The effects of Project Construction and the presence of Project infrastructure and / or activities over the life of the Project are unlikely to affect Visual Aesthetics such that it dominates the visual landscape of an area such as to cause an unacceptable change in the overall aesthetic character, quality, value and use of that location for the overall population. The Project residual effects on Visual Aesthetics will be acceptable.

While the Project is likely to have residual effects on the Socioeconomic Environment as represented by the VECs assessed, effects will be primarily positive and within the capacity of the environment. The Project will not adversely affect the integrity and cultural value of archaeological and /or palaeontological resources such that the resources will be diminished or the historical context within the region will be lost, or that the integrity and cultural value of a site of cultural-historical importance will be diminished. Neither will the Project adversely affect the economic viability of existing enterprises, reduce the tourism experience, restrict the overall levels of community development, reduce the level of recreational land and resource use, including Aboriginal contemporary land use activities, or, compromise the ecological integrity, or visual, cultural or societal value and enjoyment of protected areas. Therefore, the residual effects of the Project on the Socioeconomic Environment are likely to be not significant.

16.9.4 Cumulative Environmental Effects

The cumulative effects assessment considered the overall effect of the Project on the Socioeconomic Environment (Historic and Heritage Resources; Communities; Economy, Employment and Business; Land and Resource Use; Tourism; Marine Fisheries; and Visual Aesthetics VECs) as a result of the Project's residual environmental effects in combination with those of other projects and activities that have been or will be carried out. The existing environment considers all projects and activities that have been undertaken in the past, or are ongoing. The future projects and activities considered for the cumulative effects assessment included those with potential overlapping environmental effects within the RSA. Reasonably foreseeable future projects and activities considered in the cumulative effects assessment for the Socioeconomic Environment include the Lower Churchill Hydroelectric Generation Project, the TransCanada Highway Phase 3 development, Hebron offshore oilfield development, Long Harbour Processing Plant, Iron Ore Company of Canada expansion, commercial forest harvesting, general economic infrastructure development, increased off highway vehicle use due to improved access, tourist industry / recreational activities, and general marine shipping activities in the Strait of Belle Isle and Conception Bay.

Historic and Heritage Resources

Adverse Project-related effects on historic and heritage resources are not anticipated to occur, and if unregistered historic or heritage sites are encountered or disturbed, they will be addressed according to provincial protocols, and are not likely to result in significant effects. The potential for overlapping or cumulative effects is limited to situations where the physical zone of disturbance of the Project would overlap directly with that of another project and activity that affects a historic and heritage resource. For example, ground disturbance from general infrastructure work and increased OHV access associated with forestry roads could contribute to cumulative effects in the vicinity of communities, or seabed disturbance from fishing activities could contribute to cumulative effects on marine archaeological resources in the Strait of Belle Isle. However, there is very low potential for cumulative effects because the Project and all other development activities are subject to the Newfoundland and Labrador *Historic Resources Act* (1985) and will be governed by application of the assessment and mitigation policies. The cumulative effects on the Historic and Heritage Resources VEC are not significant.

Communities

In Labrador, Nalcor's Lower Churchill Hydroelectric Generation project will overlap with the proposed Project in relation to demand on existing infrastructure (e.g., Port of Goose Bay, highway in the Happy Valley-Goose Bay area) and community services (e.g., waste disposal). On the Island, the Project will overlap with other known projects requiring transportation infrastructure (i.e., TCH) in the Isthmus of Avalon area. Nalcor is involved in consultation regarding development of the Port of Goose Bay, and may be involved in addressing highway traffic effects in Happy Valley-Goose Bay through consultation with the Newfoundland and Labrador Department of Transport and Works.

Cumulative effects on community well-being and health conditions as a result of employment and income opportunities from the Project in combination with others are generally beneficial and any adverse effects will likely be negligible and / or not significant. The cumulative effects on the Communities VEC are not significant.

Employment, Economy and Business

The main consideration for the Employment, Economy and Business VEC from a cumulative effects perspective relates to competing sources of demand for labour and business resources, which may adversely affect individual operations or, more generally, may reduce the full realization of total and sustained provincial economic benefits. Nalcor is involved in addressing potential labour shortages through a variety of effects management strategies, and any such adverse cumulative effects are considered not significant.

Given the nature and health of the provincial economy at present, substantial economic benefits to Newfoundland and Labrador are expected as a result of this Project in combination with other existing and future projects; the projects will all generate benefits to the province in terms of increased total incomes, increased employment and training opportunities, opportunities for business activity and growth, and government tax revenue. These cumulative outcomes will generate immediate direct benefits to the economy, and also lead to longer-term indirect changes such as development of a skilled and experienced labour force with higher skills that commands higher wages and employment opportunities, and more competitive businesses. The cumulative effects on the Employment, Economy and Business VEC are not significant.

Land and Resource Use

There is limited new or proposed development activity in the regions through which the proposed Project passes, and the nature and intensity of existing land and resource use activities is not expected to change; therefore, little potential exists for overlapping effects of other projects and activities with the proposed Project with respect to land and resource use. Given this and the planned ongoing Project-related effects management measures and the appropriate management, regulation and enforcement of other future developments and activities, the cumulative environmental effects on Land and Resource Use are not significant.

Marine Fisheries

Other marine activities in the Strait of Belle Isle and Conception Bay that are relevant to the Marine Fisheries VEC are limited to long established general shipping activities. The nature and intensity of general vessel traffic is not expected to change, and there are no other proposed development projects in the area. Considering this and the planned Project-related effects management measures and the appropriate management, regulation and enforcement of other future developments and activities, the cumulative environmental effects on Marine Fisheries are not significant.

Tourism

Other projects (e.g., TLH3, Lower Churchill Hydroelectric Generation Project) and activities (general economic development in Labrador and on the Island) could combine with the proposed Project to result in cumulative effects on Tourism (i.e., quality of tourism experience, tourism visitation and expenditures). Increased traffic (on Route 510 in Labrador) plus an increased need for worker accommodation, or more frequent traffic delays (on Route 430 in the Northern Peninsula) as a result of general economic development during the peak tourism season could affect the ability of tourists to find available or suitable accommodations or diminish the overall quality of tourism experience. From the perspective of the Project, the potential for cumulative effects on Tourism will be greatest during Project Construction because noise, dust, visual aesthetics, traffic delays, transportation shortages and accommodation competition will be greatest during this phase, particularly along major traffic routes.

Considering that Project Construction will occur over four years, the Project workforce will primarily be housed in camps, a traffic management plan will be in place, and Nalcor will adjust its schedule to accommodate the

high tourism season, the contribution of the Project to cumulative effects is considered low. The cumulative effects on the Tourism VEC are not significant.

Visual Aesthetics

The likely effects of the Project on Visual Aesthetics in combination with other projects and activities may result in cumulative visual aesthetic effects, which are at least partially influenced by the perception of the viewer. Alterations to existing viewscapes are due to clearing of vegetation to accommodate activities, or infrastructure construction related to the projects (e.g., Lower Churchill Hydroelectric Generation Project, highway maintenance, forestry access roads and harvesting areas, infrastructure developments)

The level of contribution of the Project to cumulative effects on visual aesthetics is limited, considering the remoteness of much of the corridor and the use of existing disturbance corridors where practical. The cumulative effects on the Visual Aesthetics VEC are not significant.

16.9.5 Environmental Monitoring and Follow-up

Monitoring programs are those implemented to meet regulatory requirements and / or demonstrate compliance to commitments made by Nalcor for this Project. Follow-up programs are those implemented to verify EIS predictions and / or deal with issues of uncertainty, such as the effectiveness of effects management measures. Monitoring and follow-up programs proposed for socioeconomic issues are outlined below. Several of these programs involve ongoing consultation with stakeholder groups and regular provision of information to regulatory agencies. Nalcor will address any issues that become apparent through its monitoring and follow-up programs appropriately through its adaptive management process.

Historic and Heritage Resources

The Project is subject to the Newfoundland and Labrador *Historic Resources Act* (1985) and will be governed by application of accepted protocols. Consequently, no specific monitoring and follow-up activities are recommended or proposed for the Historic and Heritage Resources VEC.

Communities

The monitoring of components, services (e.g., highway use statistics, waste volumes and landfill capacity) and social characteristics related to community infrastructure and services, and community health and well-being are typically the responsibility of municipal, Aboriginal, provincial and / or federal authorities. Nalcor does not have responsibility to monitor these aspects. However, Nalcor will continue to provide Project information to authorities with monitoring responsibilities, and to consult with relevant groups regarding community issues throughout the Project.

Employment, Economy and Business

As described in Section 16.4.10, under the terms of the provincial Benefits Strategy (GNL 2010, internet site), Nalcor will provide information to the GNL on a monthly basis on a number of employment parameters (e.g., person-hours, resident hires) and economic parameters (goods and services, purchases by industry category, contracts). Also, as described in Section 16.4.10, Nalcor will report on a quarterly basis on hiring and employment objectives and targets, and other commitment-related parameters such as level of compliance with the Benefits Strategy, activities carried out in relation to employment programs, and procurement forecasts.

Also, as part of its ongoing governmental, Aboriginal, stakeholder and public consultation activities throughout the Project, Nalcor will provide information and updates on Project activities and effects related to Economy, Employment and Business on a regular basis. This information will be used to facilitate planning and continuous improvement of Nalcor strategies to optimize Project benefits to Newfoundland and Labrador.

Land and Resource Use

Nalcor is not responsible for monitoring parameters related to the Land and Resource Use VEC (e.g., municipal land use, hunting and angling activity, cabin development, outfitting, resource exploration and development) required for management purposes. However, Nalcor will use its ongoing processes of communication with government departments, communities, stakeholder groups and individual land and resource users as a means to identify and address any Project-related issues and effects as they arise throughout the Project.

Also, as described in Section 16.5.10, Nalcor will continue to use information collected during past and ongoing discussions with potentially affected Aboriginal groups and communities to avoid conflicts with and adverse effects on contemporary land use for traditional purposes to the extent practical.

Marine Fisheries

Monitoring commercial and recreational marine fisheries and the fishing industry through the collection of statistical data (e.g., catch quantities, locations, values) is the responsibility of federal authorities. While it does not have responsibility to monitor marine fisheries, Nalcor will provide Project information to authorities with monitoring responsibilities as required and requested. Nalcor will also continue to communicate and consult with area fishers as a means to identify and address any Project-related issues and effects that may arise throughout the Project.

Tourism

Nalcor is not responsible for monitoring the tourism industry in Newfoundland and Labrador; this monitoring is undertaken by the appropriate government departments and agencies, industry organizations and others (e.g., through the collection of statistical data on visitation and accommodation occupancy rates, expenditures, quality and satisfaction rates). However, Nalcor will continue to provide Project information to the responsible agencies as required and requested. Planned effects management measures, including those related to Nalcor's ongoing communication and cooperation with authorities and tourism industry representatives, will serve as a means to identify and address Project-related issues and effects as they arise throughout the Project.

Visual Aesthetics

As indicated in Section 16.8.11, monitoring or follow-up programs related to visual aesthetics are not considered to be warranted for the Project due to the findings of the assessment and the individual, subjective nature of the perception related to the effects of the Project on the Visual Aesthetics.

16.10 Aboriginal Summary

Nalcor's understanding of interests, values, concerns, contemporary and historic land and resource use activities (including cultural aspects), and Aboriginal traditional knowledge (Aboriginal Ecological Knowledge in this EIS) including important issues facing Aboriginal groups is demonstrated throughout this EIS. To gain this understanding of Aboriginal interests, values, issues and concerns, Nalcor has planned, offered and undertaken various consultation processes and activities with all potentially affected Aboriginal communities and organizations.

Nalcor recognizes and acknowledges that Aboriginal groups and communities often require additional resources and support to engage in consultation processes, particularly with regard to large development projects and their EAs. While there is no legal requirement for formal capacity arrangements, Nalcor has developed an approach to consultation which includes the provision of funding and / or other support to Aboriginal communities and organizations to facilitate Project-related consultation, where appropriate. Further details on Nalcor's correspondence, discussions and other consultation initiatives and offers with individual groups are provided in Chapter 7, Aboriginal Consultation and Issues Scoping.

The key objectives and elements of Nalcor's Aboriginal consultation program have included the following:

- providing Aboriginal communities with information on the proposed Project, including its purpose and associated components and activities;
- identifying and documenting any questions or concerns about the Project and its potential environmental and socioeconomic effects (both beneficial and adverse);
- collecting and considering information on contemporary land use activities (including sites of cultural and historical importance) by Aboriginal persons in or near the Project area, as well as relevant Aboriginal Ecological Knowledge; and
- discussing possible approaches and measures to avoid or reduce any likely adverse effects and enhance benefits of the Project on Aboriginal communities and their interests and activities, and on the environment in general.

As presented in Chapter 7, the results of the issues scoping include the identification of areas of concern about the Project as determined through the consultation process. Each of these issues and concerns have been addressed in the EIS, as shown in Table 7.2.2-1, Table 7.3.3-1, Table 7.4-1, and Table 7.5.2-1.

Nalcor appreciates that populations living in proximity to the Project may have substantial and distinct knowledge, which can be considered in the assessment of the effects of the Project, and the mitigation. As such, Nalcor considered Aboriginal traditional knowledge of the existing environment as an integral part of this EIS, to the extent that it was available. As outlined in Section 2.3 of the EIS Guidelines and Scoping Document (Government of Newfoundland and Labrador and the Government of Canada 2011), in the EA process, Aboriginal traditional knowledge may be regarded as the knowledge, understanding and values that residents of Aboriginal communities have in relation to the environment and the potential environmental effects of the Project and proposed mitigation measures. Aboriginal traditional knowledge (referred to as Aboriginal Ecological Knowledge in this EIS) related to the biophysical existing environment is presented in Chapter 10. Aboriginal knowledge on the socioeconomic existing environment is incorporated into the baseline information and not presented separately, but rather integrally considered throughout Chapter 15, as appropriate.

Nalcor considered the Aboriginal traditional knowledge to assist in its understanding, including the inter-relationships among such matters as: ecosystem function; resource abundance, distribution and quality; social and economic well-being; and, use of the land and resources. Nalcor also considered the traditional knowledge that was available, to inform the development of adequate baseline information, identification of key issues, prediction of effects, and assessment of their significance.

In this EIS, Nalcor has demonstrated its understanding of the interests, values, concerns, contemporary and historic activities, Aboriginal Ecological Knowledge and important issues facing Aboriginal groups. With this understanding, Nalcor has determined, based on the results of this EIS, that the Project is likely to cause no significant environmental effects on the various aspects of the environment valued by Aboriginal persons, including air quality, water quality (freshwater and marine), fish (freshwater and marine), vegetation (including medicinal plants), wildlife (terrestrial and marine), and the respective habitats (i.e., freshwater, marine, and terrestrial). This indicates the continued functionality / sustainability of all the ecological and biological processes by which the landscape, ecosystems and species levels are linked. Nalcor also has determined, based on the results of this EIS, that the Project is not likely to cause significant environmental effects on Historic and Heritage Resources or Land and Resource Use. With all of these aspects of the environment considered, the Project is not likely to affect Aboriginal contemporary land and resource use, or compromise the ability of future generations to meet their needs.

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NALCOR ENERGY

LABRADOR-ISLAND TRANSMISSION LINK

ENVIRONMENTAL IMPACT STATEMENT

Chapter 17

Commitments, Sustainability and Conclusions

April 2012

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LIST OF ACRONYMS

Acronym	Description
ac	alternating current
ATV	All Terrain Vehicles
CCG	Canadian Coast Guard
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CSA	Canadian Standards Association
dBA	Decibels (A-weighted scale)
dc	direct current
DND	Department of National Defense
e.g.	for example
EA	Environmental Assessment
EIS	Environmental Impact Statement
ELC	Ecological Land Classification
EPP	Environmental Protection Plan
EPRI	Electric Power Research Institute
FLC	Fisheries Liaison Committee
GHG	greenhouse gases
GNL	Government of Newfoundland and Labrador
HDD	horizontal directional drilling
HSEQ	Health and Safety, Environment and Quality
HVdc	High Voltage direct current
i.e.	that is
IATNL	International Appalachian Trail - Newfoundland and Labrador
IBA	Impacts and Benefits Agreement
ISO	International Standards Organization
KI	Key Indicator
km	kilometre
LSA	Local Study Area
LWCRT	Labrador Woodland Caribou Recovery Team
m	metres
NL	Newfoundland and Labrador
NLDEC	Newfoundland and Labrador Department of Environment and Conservation
OHSP	Occupational Health and Safety Plan
OHV	off highway vehicle

Acronym	Description
PAO	Provincial Archaeology Office
RCMP	Royal Canadian Mounted Police
ROW	right-of-way
RSA	Regional Study Area
SARA	*Species at Risk Act*
SHERP	Safety, Health and Environmental Response Plans
SIMOPS	Simultaneous Operations
TSS	total suspended solids
VEC	Valued Environmental Component
VTMP	Vessel Traffic Management Plan
WEP	Women's Employment Plan

17 COMMITMENTS, SUSTAINABILITY AND CONCLUSIONS

17.1 The Project

Nalcor Energy's (Nalcor) vision is to help build a strong economic future for successive generations of Newfoundlanders and Labradorians. Nalcor's core values of open communication, accountability, safety, honesty and trust, teamwork, respect and dignity, and leadership set common direction on how to make decisions. Nalcor recognizes that it is not only what they achieve, but how they achieve it, that truly makes them proud of their accomplishments. The Labrador-Island Transmission Link (the Project) has been planned with this vision and these core values in place.

Nalcor considers the Project to be the best option, from an engineering and environmental perspective, to transport the hydroelectricity generated at the Muskrat Falls Generating Station to the converter station at Soldiers Pond in Newfoundland.

The Project will include the following key components:

- an alternating current (ac) to direct current (dc) converter station at Muskrat Falls;
- approximately 400 kilometres (km) overhead High Voltage direct current (HVdc) transmission line from Muskrat Falls to Forteau Point;
- three, approximately 35 km long, submarine cables across the Strait of Belle Isle (i.e., between Forteau Point and Shoal Cove), with associated onshore infrastructure (transition compounds and land cables at both cable landings);
- approximately 700 km of overhead HVdc transmission line from Shoal Cove to the Avalon Peninsula;
- a dc to ac converter station at Soldiers Pond; and
- shoreline electrodes at L'Anse au Diable and Dowden's Point, and overhead, wood pole electrode lines between the shoreline electrode sites and their respective converter stations.

As directed by the Government of Newfoundland and Labrador and the Government of Canada in the Guidelines, Nalcor's approach to this environmental assessment (EA) included adherence to the basic principles of environmental assessment:

- conducting the EA to allow consideration of the potential effects of the Project in a careful and precautionary manner;
- Aboriginal and public participation;
- consideration of Aboriginal Traditional and Community Knowledge;
- integration of sustainable development factors; and
- application of the Precautionary Principle / Precautionary Approach.

Nalcor will use the Environmental Impact Statement (EIS) as they enter the detailed design phase, to refine and optimize technical, economic and environmental features, in consultation with regulators, Aboriginal groups, and stakeholders, as outlined throughout this EIS.

17.2 Purpose of the Project

The purpose of the Project is to provide the least-cost domestic electricity supply alternative, and address the current and future energy requirements of residents and industry on the Island of Newfoundland. The Project will address the growing demand for electricity by transmitting a clean, sustainable source of energy, thereby reducing reliance on oil-fired thermal generation and bringing about lower and more stable electricity rates in the province over the long term.

17.3 Key Environmental, Social and Economic Benefits of the Project

The Project can significantly reduce atmospheric emissions (including greenhouse gases (GHGs)) resulting from electricity generation activities on the Island. Once the Project is operational, and with the displacement of existing thermal generation from the Holyrood plant, over 98% of the province's electrical energy will be emission-free. The transmission of clean, renewable hydroelectricity from the lower Churchill River to the Island through the Project will play an important role in helping the province meet its climate change policies and objectives.

The Project will also result in socioeconomic benefits throughout its Construction and Operations phases. This includes direct, indirect and induced employment, and business opportunities related to the requirement for goods and services. Over the longer term, the Project will provide energy and infrastructure to facilitate development and growth in Newfoundland and Labrador's energy sector and overall economy. The Project will provide adequate and reliable electrical power that is characterized by lower and more stable electricity costs into the long-term, both for use by current residents and businesses, as well as to help attract new industry to the province.

17.4 Commitments

As indicated in Section 2.1 of the Environmental Impact Statement Guidelines and Scoping Document (the Guidelines) (Government of Newfoundland and Labrador and the Government of Canada 2011), EA is a planning tool that enables consideration of the potential effects of a project in a careful and precautionary manner before actions are taken to allow that project to proceed. As such, Nalcor has presented their corporate information, the alternatives to the Project, alternative methods for carrying out the Project, the environment that will be affected, the important environmental effects associated with the Project, measures that are designed to mitigate adverse effects and enhance benefits, and the significance of residual environmental effects.

In this EIS, Nalcor has demonstrated adherence to the basic principles of EA by addressing: Environmental Assessment: A Planning Tool; Aboriginal and Public Participation; Aboriginal Traditional and Community Knowledge; Sustainable Development; and the Precautionary Principle, as stated in Section 2 of the EIS Guidelines and Scoping Document (Government of Newfoundland and Labrador and the Government of Canada 2011).

The Project is being planned by Nalcor in a manner that considers environmentally (i.e., biophysical and socioeconomic) sensitive areas of the province and has avoided many such areas to the extent practical. Nalcor has incorporated best industry practices and mitigation options for routing, Construction, and Operations and Maintenance to limit residual adverse effects; used Traditional and Community Knowledge of the existing environment; and, will continue to engage in consultation with government, Aboriginal, and public stakeholders.

Nalcor's commitments (i.e., high level approaches / principles) for this Project are presented in Table 17.4-1. For ease of reference, these are provided by chapter, with a reference to the section of the EIS where the commitments are made. Keeping in alignment with the precautionary principle during the planning of the Project, Nalcor has developed, and will apply appropriate mitigation, despite any uncertainty of the level of an effect of the Project on a Valued Environmental Component (VEC) or a Key Indicator (KI). Mitigation measures (i.e., environmental protection for a specific issue) proposed by Nalcor for the Project are discussed throughout the assessment and summarized at the end of each assessment chapter (i.e., Chapter 11, Atmospheric Environmental Effects Assessment; Chapter 12, Terrestrial Environment: Environmental Effects Assessment; Chapter 13, Freshwater Environment: Environmental Effects Assessment; Chapter 14, Marine Environment: Environmental Effects Assessment; and Chapter 16, Socioeconomic Environment: Environmental Effects Assessment).

Table 17.4-1 Commitments for the Labrador-Island Transmission Link

Section	VEC	Aspect	Commitment
Chapter 1: Introduction			
1.1	—	Overview of Project	As illustrated throughout this EIS, the EA process, including its associated governmental, Aboriginal and stakeholder consultation, has been and will continue to be a key aspect of Project planning and design.
1.2	—	Proponent	As a proud, diverse energy company, its people are committed to a bright future for the province, united by the following goals and core values: **Goals** *Safety:* To be a world class safety leader *Environment:* To be an environmental leader *Business Excellence:* Through operational excellence to provide exceptional value to all consumers of our energy *People:* To ensure a highly-skilled and motivated team of employees who are strongly committed to our success and future direction *Community:* To be a valued corporate citizen in Newfoundland and Labrador **Core Values** *Open Communication:* Fostering an environment where information moves freely in a timely manner *Accountability:* Holding ourselves responsible for our actions and performance *Safety:* Relentless commitment to protecting ourselves, our colleagues and our community *Honesty and Trust:* Being sincere in everything we say and do *Teamwork:* Sharing our ideas in an open and supportive manner to achieve excellence *Respect and Dignity:* Appreciating the individuality of others by our words and actions *Leadership:* Empowering individuals to help guide and inspire others
1.2	—	Proponent	Committed to marketing these opportunities around the world, Nalcor – Oil and Gas will maximize benefits from these resources to help attract continued investment that will strengthen the economy in Newfoundland and Labrador.
1.2	—	Proponent	As reflected in its above-listed corporate goals and values, Nalcor is striving to be a leader in environmental protection and sustainability, and is committed to maintaining a high standard of environmental responsibility and performance
1.2	—	Proponent	The corporation has state-of-the-art and proven policies and procedures related to environmental protection and management which will be implemented throughout this Project.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
1.2	—	Proponent	The corporation has an outstanding record of environmental protection and stewardship, and this objective and experience will be applied to the planning and development of this Project to avoid or reduce potential environmental effects during its Construction, and Operations and Maintenance phases.
Chapter 2: Project Rationale and Planning			
2.4.1	—	Economic Evaluation	To facilitate analysis, *Strategist*® was used to develop least-cost Isolated Island (without the Project) and Interconnected Island (with the Project) generation expansion plans. A comparison of the two expansion plans will be provided, and the plan with the lowest Cumulative Present Worth is the preferred expansion plan.
2.5	—	Environmental Considerations	The company must meet any current environmental regulations laid out in both provincial and federal legislation and also must consider potential new environmental legislation due to the longer term nature of its generation expansion decisions. The company must also adhere to any provincial policy provided in this regard.
2.5.8	—	Wind	Wind power has a place in the electricity generation mix on the island and, due to its low environmental footprint, it will be incorporated whenever economically viable.
2.5.13.3	—	—	Nalcor will continue to avail of all appropriate channels to obtain the firm transmission services required to develop an export sales portfolio for the Gull Island project.
2.11.1.4	—	Interest Rates	Prior to Decision Gate 3, the Project will have established and secured equity financing, and remaining financing will be provided via debt markets.
2.13.7	—	—	The following additional alternatives are also listed specifically in the EIS Guidelines and Scoping Document: a. Alternative means of accessing the corridor including, but not limited to, helicopter, permanent access roads, temporary access roads and ice roads: ▪ LCP Engineering providing information on potential use of helicopters and ice roads (and why / why not). b. Alternative clearing methods, including mechanical and manual clearing: ▪ Right-of-way (ROW) clearing will be carried out in accordance with standard utility practices and procedures, and will involve the removal of all vegetation that exceeds 2 m at maturity. ▪ Vegetation will be removed primarily by mechanical harvesters, with chain saws or other hand-held equipment potentially used in small areas (e.g., along watercourses). ▪ Given the size of the area required to be cleared and the volume of wood along the ROW (an approximately 1,100 km long by 60 m wide area), the use of mechanical harvesters is the only technically and economically viable means of clearing the ROW.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
			c. Construction sequence: ▪ The process for the construction of transmission lines is standard and defined by the sequence of required steps and elements, as follows: ROW clearing and access, material distribution, tower foundation installation, tower assembly and erection, and conductor stringing. ▪ Due to the linear nature of transmission lines, construction activities can typically be conducted in succession and concurrently. The start of each activity is often staggered to allow crews to move down the transmission line route completing each construction phase ahead of the next. In addition, work programs can begin and proceed separately in different segments of the line, through a series of strategically placed and timed work fronts. ▪ Chapter 3 presents an overview of the Project construction process and schedule. The specific timing and sequencing of all specific aspects of Project construction will again be defined as part of the detailed engineering design of the Project, and will primarily be determined by the eventual construction contractor(s) involved. d. Construction labour force accommodation: ▪ As described in Chapter 3, the construction workforce will be housed in a series of work camps located throughout the province at strategic locations along and near the transmission line ROW. ▪ All camps will be established and operated in accordance will all applicable regulations and permits, including those related to environmental and human (health and hygiene) considerations. ▪ This Project design decision has been made by Nalcor based on Project requirements, as well as the stated preferences of stakeholders through EA consultations, in order to reduce interactions between the Project workforce and local communities, as well as to prevent potential effects on the tourism industry by filling up hotel and other accommodations throughout the province during the peak tourist season. e. Alternative means of controlling vegetation within the right of way, including both mechanical and chemical means: ▪ Nalcor will incorporate the HVdc transmission line into its integrated vegetation management program for its transmission and distribution systems. ▪ Vegetation will be controlled manually / mechanically, as well as through the selective application of vegetation-control agents in certain areas. ▪ As described in Chapter 3, the use of herbicides for vegetation control along transmission lines is a common and highly regulated activity in Newfoundland and Labrador and elsewhere, and is required for this Project given the overall length and scale of the ROW, as well as to ensure effective control of certain species.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
			▪ Any and all such herbicide use will be subject to approval from the Department of Environment and Conservation, and will be undertaken in full compliance with the *Pesticides Control Regulations*. As is standard practice, there will be a public notification and an evaluation of any environmental sensitivities wherever herbicides are to be used. Vegetation control personnel will be appropriately trained and qualified.
2.14	—	Routing and Design	Once identified, and prior to final Project design and construction, Nalcor will conduct public consultations to present these transmission line routing(s) to the interested public and stakeholders.
2.14	—	Routing and Design	Nalcor and / or its contractors will identify, apply for and adhere to all require permits and other authorizations that are required for Project Construction and / or Operations and Maintenance
2.15.2.1	—	Environmental Protection Plan (EPP)	Nalcor will implement its state-of-the-art and proven policies and procedures related to environmental protection and management during the Construction and Operations and Maintenance of this proposed Project.
2.15.2.1	—	EPP	Each activity-specific Environmental Protection Plan (EPP) will be a field-useable document, addressing provisions that will avoid or reduce environmental effects which may be associated with construction.
2.15.2.1	—	EPP	As appropriate, each EPP will include items relating to vegetation clearing, grubbing and grading, storage and handling of fuel, blasting, quarrying, dust control, waste and sewage disposal, work in water, contingency plans for unplanned events such as spills, rehabilitation and compliance monitoring.
2.15.3	—	Safety, Health and Environmental Emergency Response Plan (SHERP)	Nalcor will conform to both provincial and federal legislation relating to safety, health and environmental emergency response planning with the intent of meeting both its legal and corporate responsibilities.
2.15.3	—	SHERP	Project-specific SHERPs will address: roles and responsibilities, personal protective equipment, materials storage, driving safety, working at heights, working near or over water, working near or on ice, vessel operation and safety, animal encounters, emergency response communications, spill response, personnel injury response, search and rescue, fire and explosion response, and vehicle / vessel accidents.
2.15.4	—	Benefits Strategy	Nalcor and its contractors and sub-contractors will follow the Benefits Strategy, which outlines activities and protocols regarding employment and business benefits to ensure that work is performed in the province for the benefit of industry and employees; and, is similar to benefits arrangements that the province has had in place with oil and mining companies.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
2.15.4	—	Benefits Strategy	Some of the highlights of the Benefits Strategy relevant to this Project include: *Engineering and Project Management* – Project management activities associated with the projects will be executed in the province. – The Engineering, Procurement and Construction Management (EPCM) contractor will establish its own engineering, procurement, construction management and overall project management office in the province with appropriate personnel and decision-making authority. – The Lower Churchill Construction Project team and its EPCM contractors and sub-contractors will perform all engineering and project management, with the possible exception of specialized engineering, for the project in the province. – All reasonable efforts will be made to have specialized engineering performed in the province. In the event there is specialized engineering undertaken outside the province, Nalcor-Lower Churchill Project will ensure that such work is done in full collaboration with and is integrated into the local engineering effort. – No less than the following number of engineering and project management hours for the Transmission Link will take place within the province: 1.0 million person hours. *Procurement and Contracting* – Procurement will be managed from the Lower Churchill Project and its EPCM contractor offices in the province. – Nalcor-Lower Churchill Project and its EPCM contractor will be responsible for the following: ▪ issue all Requests for Proposals and procurement related documents; ▪ primary point of contact for all inquiries regarding contracts and procurement; ▪ co-ordinate supplier development activities; ▪ make all decisions related to procurement; ▪ issue procurement awards; and ▪ conduct all meetings with suppliers related to procurement. – Contractors and sub-contractors will be aware of, and must comply with, the applicable terms of the benefits strategy. – Nalcor-Lower Churchill Project will conduct appropriately-timed supplier development workshops to ensure local suppliers and contractors can prepare for bidding and establish business relationships. Workshops will be held on both the Island and Labrador.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
			Construction and Assembly – No less than the following number of construction and assembly person hours for the Transmission Link will take place in the province: 2.5 million person hours. – A construction hiring protocol will be established and implemented, and will include a gender equity program, including a women's employment plan, and a diversity program to address employment equity. *Gender Equity* – Nalcor-Lower Churchill Project will implement a gender equity program, including a women's employment plan. – The program will establish quantitative goals and emphasize continuous improvement which will increase access and employment for women. *Diversity* – The objectives of the diversity program will be to address employment equity for the projects, including access to employment for disadvantaged groups. *Reporting* – Nalcor will provide to the Provincial Government monthly and quarterly reports on the total number of person hours of work and number of person hours of project management and design work, as required over the life of the project.
Chapter 3: Project Description			
3.3.2.1	—	Transmission Line	Nalcor will meet the Canadian Standards Association (CSA) conductor clearance standard applicable to the type and size of the watercourse and will comply with the *Navigable Waters Protection Act*.
3.5	—	Operations and Maintenance	Nalcor will integrate activities associated with the Operations and Maintenance of the Project into Nalcor's existing transmission system inspection and maintenance program.
3.5.2.3	—	Vegetation Maintenance	Nalcor will incorporate the Project into its integrated vegetation management program for its transmission and distribution systems.
3.5.2.3	—	Vegetation Maintenance	A survey will be undertaken before each vegetation management program is initiated to determine priority vegetation management areas.
3.6.1	—	EPP	Nalcor's Environmental Policy and Guiding Principles will be implemented during the Construction, Operations and Maintenance of the Project.
3.6.2	—	SHERP	Nalcor will proactively identify potential safety, health and environmental emergencies related to Project Construction, Operations and Maintenance.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
3.6.2		SHERP	The SHERP will be a field-useable document that describes the prevention measures and emergency response procedures for unplanned safety, health and environmental events.
3.7.2	—	Workforce	The Operations and Maintenance workforce will form part of Nalcor's overall transmission line maintenance program and will consist of Nalcor employees based in Labrador and on the Island.
Chapter 4: Effects of the Environment on the Project			
4.1.1	—	Biophysical, Vegetation	Nalcor will attempt to use existing disturbances (e.g., clear cuts) to the extent practical, and will also attempt to use parallel (or otherwise) existing disturbance corridors (e.g. roads, transmission line ROWs) to reduce the amount of new access that is required, and thus the amount of clearing. In addition, the amount and type of equipment required for the clearing process will be determined by the vegetation types within the areas that require clearing.
4.1.7.1	—	Biophysical, Currents and Tides	Nalcor is conducting a two year current monitoring program, commencing in 2011, to add to Nalcor's existing substantial knowledge of the currents in the Strait of Belle Isle cable crossing corridor.
4.1.11.2	—	Biophysical, Climate Change	Nalcor will inspect 100% of the transmission line each year via ground patrol or helicopter.
4.1.11.2	—	Biophysical, Climate Change	Nalcor will monitor extreme weather events and have emergency response plans in place to address the effects of these events on the Project.
Chapter 5: Accidents and Malfunctions			
5.2	—	Management Systems	Nalcor will proactively identify potential incidents related to Project Construction, and Operations and Maintenance.
5.2	—	Management Systems	Prevention measures and response procedures will be described in the EPP, the SHERP, and the Occuptational Health and Safety Plan (OHSP).
5.2	—	Management Systems	The EPP, the SHERP and the OHSP will be field-useable documents that address prevention measures and incident response procedures for unplanned safety, health and environmental events.
5.2	—	Management Systems	Nalcor will implement Health and Safety, Environment, and Quality (HSEQ) Management Systems to meet the requirements of ISO14001:2004 (Environment), CAN Z1000-06 (Health and Safety), and ISO 9001:2000 (Quality). Existing systems within the Nalcor HSEQ Management System will be used for the Project, as appropriate, for these common elements: – document and records control; – communication; – incident preparedness and response;

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
			– compliance and management system auditing; – management review; and – existing systems within the Nalcor HSEQ Management System will be used for the Project.
5.2	—	Management Systems	All Project Construction, and Operations and Maintenance personnel will be required to maintain a high level of vigilance, undergo regular safety training, and be familiar with the SHERP, the EPP and the OHSP.
5.2	—	Management Systems	Third-party contractors will be screened for compatibility with Nalcor policies and procedures and only those that meet the criteria will be hired.
5.4.1	—	Transmission Tower Failure, Prevention and Response	The transmission towers will be designed in accordance with CSA (2009) standards.
5.4.1	—	Transmission Tower Failure, Prevention and Response	The transmission towers will be constructed in accordance with CSA standards and guidelines, and with the principle of Good Utility Practice.
5.4.1	—	Transmission Tower Failure, Prevention and Response	In accordance with the principle of Good Utility Practice, the construction of the transmission towers will be conducted by qualified, specialized contractors, with workers experienced in the erection of steel lattice tower transmission lines.
5.4.2	—	Transmission Tower Failure, Risk Evaluation	The transmission towers for the Project will meet Nalcor's current ice load standard and are designed for a 50-year return period meteorological event.
5.4.2	—	Transmission Tower Failure, Risk Evaluation	Nalcor will proactively identify potential electrical hazards related to Project Construction, and Operations and Maintenance.
5.5.1	—	Electrocution, Prevention and Response	Prevention measures and response procedures to address potential electrical hazards will be described in the EPP, the SHERP, and the OHSP.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
5.5.1	—	Electrocution, Prevention and Response	The following measures will be implemented to reduce likelihood of electrocution during Project Construction, and Operations and Maintenance: – The transmission towers will be designed in accordance with CSA standards, as described in Section 5.8.1. – "High voltage" signage will be posted on High Voltage direct current (HVdc) towers, the converter stations, transition compounds and electrode sites. – "High voltage" signage will be posted where power lines are buried (e.g., between the transition compounds and their respective landing points) to ensure that there is no excavation or development in the cable areas. – Public access to the converter stations will be restricted by galvanized steel security fences and locked gates. – The electrode sites will be enclosed by locked, chain-link fences to prevent public access from the land and sea sides. Sea side fencing will be installed on the electrode berm crest. – Avian-safe separation of the energized and / or grounded parts of the power line will be incorporated into the transmission line design. – The submarine cable will be protected from interaction with fishing activity by horizontal directional drilling (HDD) and the rock berm.
5.9.1	—	Fires, Prevention and Response	All Project personnel will be made aware of the SHERP and designated staff will receive SHERP training, and the fire prevention plan will be followed by Nalcor and its contractors.
5.9.2	—	Fires, Risk Evaluation	Nalcor will ensure that all Project field personnel are trained in the use of fire-fighting equipment and that trained personnel are available to respond immediately to an incident.
5.10.1	—	Forest Fires, Prevention and Response	All Project personnel will be made aware of the SHERP and designated staff will receive SHERP training, and the forest fire prevention plan will be followed by Nalcor and its contractors.
5.10.1		Forest Fires, Prevention and Response	Nalcor will ensure that all Project field personnel are trained in the use of fire-fighting equipment and that trained personnel are available to respond immediately to an incident.
5.10.1	—	Forest Fires, Incident Prevention and Response	Nalcor will require that its contractors have fire-fighting expense coverage as part of the Commercial General Liability requirement.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
5.12.1		Motor Vehicle Collisions, Incident Prevention and Response	All Project personnel will be made aware of the SHERP and designated staff will receive SHERP training, and driver / operator awareness programs will limit the potential for vehicle collisions, and other vehicle-wildlife incidents.
5.13.1	—	Marine Vessel Collisions, Incident Prevention and Response	All Project personnel will be made aware of the SHERP and designated staff will receive SHERP training, and vessel operator awareness programs will limit the potential for wildlife collisions, and other vessel-wildlife incidents.
5.13.1	—	Marine Vessel Collisions, Incident Prevention and Response	Simultaneous Operations (SIMOPS) procedures will be developed by Nalcor to ensure safe and efficient operations of multiple vessels while working in the Strait of Belle Isle.
5.14.1	—	Aviation Accidents, Incident Prevention and Response	Nalcor will continue to consult with Department of National Defense (DND) during detailed Project design to identify issues related to tower design and transmission line routing and will address these issues, where possible, during the design process.
5.14.1	—	Aviation Accidents, Incident Prevention and Response	Nalcor and / or its contractor(s) will provide full and regular briefings to DND authorities regarding its planned and ongoing construction activities, particularly those involving aircraft activity in Labrador to ensure coordinated planning and communication around Project Construction activities.
Chapter 6: Environmental Setting			
			No commitments were made in this chapter.
Chapter 7: Aboriginal Consultation			
7	—	Consultation and Issue Scoping	Nalcor is committed to consulting Aboriginal communities and organizations appropriately on the proposed Project.
7.1	—	Labrador Inuit	Although the proposed Project does not cross through or near land areas covered by the *Labrador Inuit Land Claims Agreement*, Nalcor is committed to open discussions with the Nunatsiavut Government and has and will continue to provide information on the Project and its EA to the Labrador Inuit.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
7.3.1	—	Proposed Agreements, Quebéc Innu and Naskapi	Although there was no formalized consultation agreement put in place with some Québec Innu groups or with Naskapi Nation of Kawawachikamach, Nalcor has and will continue to provide these groups with Project-related information and opportunities to identify any interests, issues and concerns.
Chapter 8: Regulatory and Public Consultation			
			No commitments were made in this chapter.
Chapter 9: Environmental Assessment Approach and Methodology			
9.3.5	—	Construction	Nalcor is responsible for the implementation of planned mitigation measures and all contractors and subcontractors will be required to adhere to the mitigation measures outlined in this EIS and associated documents (e.g., the EPP).
9.3.5	—	Construction	As per section 4.10 of the EIS Guidelines and Scoping Document (Government of Newfoundland and Labrador and Government of Canada 2011) Nalcor will prepare an EPP for each main construction site, and have the EPPs approved by the regulatory authorities before starting construction.
9.4.6	—	EA Summary, Monitoring and Follow-up	Nalcor will comply with the monitoring requirements (including details such as scheduling, sampling design, frequency, and reporting) stipulated by the regulators in the eventual Project permits.
9.4.6	—	EA Summary, Monitoring and Follow-up	Nalcor has committed to working with the regulators and other stakeholders to finalize the details of many of the follow-up programs outlined in this EIS.
9.4.6	—	EA Summary, Monitoring and Follow-up	Monitoring programs will include, as appropriate: – the objectives of the monitoring program and a schedule for collection of the monitoring data required to meet these objectives; – the sampling design, methodology, selection of the subjects and indicators to be monitored, and their selection criteria; – the frequency, duration and geographic extent of monitoring, and justification for the extent; – the application of the principles of Adaptive Environmental Management; – reporting and response mechanisms, including criteria for initiating a response and procedures; – the approaches and methods for monitoring the cumulative effects of the Project with existing and future developments in the Project area; – integration of monitoring results with other aspects of the Project including adjustments to operating procedures and refinement of mitigation measures;

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
			– experience gained from previous and existing monitoring programs; – the advisory roles of independent experts, government agencies, communities, holders of Aboriginal traditional and community knowledge and renewable resource users; – procedures to assess the effectiveness of monitoring and follow-up programs, mitigation measures and recovery programs for areas disturbed by the Project; and – a communications plan to describe the results of monitoring to interested parties.
9.4.6	—	EA Summary, Monitoring and Follow-up	Nalcor will explain how the public and Aboriginal groups will continue to be involved in monitoring programs, including participation in the design and implementation of environmental management and monitoring and follow-up programs, as appropriate. This process will include describing plans to maintain communications and working relationships with the affected communities, Aboriginal organizations, municipalities and government agencies throughout the life of the Project, as appropriate.
9.4.6	—	EA Summary, Monitoring and Follow-up	During the development of any monitoring and follow-up programs, Nalcor will discuss with the appropriate Aboriginal groups and communities, ways in which holders of Aboriginal traditional and community knowledge, including elders, women and youth, could be involved.
9.4.6	—	EA Summary, Monitoring and Follow-up	If unforeseen adverse environmental effects are identified during any of the monitoring or follow-up programs, Nalcor will, as part of their ongoing adaptive management process, adjust the existing mitigation measures or, if necessary, develop new mitigation or compensation measures to address those effects.
9.5.2	—	EA Principles, Aboriginal and Public Participation	Nalcor understands that meaningful public involvement can only take place if Aboriginal groups and the public have a clear understanding of the nature of the Project as early as possible in the environmental assessment process. As such, Nalcor: – will continue to provide up-to-date information, as it becomes available, to Aboriginal groups and the public, and especially to the communities likely to be affected by the Project; – will continue to involve the main interested parties in determining how best to deliver that information, that is, the type of information required, format and presentation methods, as well as the need for community meetings; – will explain the results of the EIS in a clear and direct manner (i.e., plain language summary) to make the issues comprehensible to the widest possible audience; and – will continue to consider and acknowledge all requests for consultation with Aboriginal groups during Project approvals and throughout the life of the Project.
9.5.5	—	EA Principles, Precautionary	Nalcor will use information obtained from any of the monitoring and / or follow-up programs undertaken to feed into their adaptive management process for continued improvement. The adaptive management process will ensure timely, proactive responses to identified issues to limit the resulting effect.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
Chapter 10: Existing Biophysical Environment			
			No commitments were made in this chapter.
Chapter 11: Atmospheric Environment: Environmental Effects Assessment			
11.2.5.1	Atmospheric Environment	Construction, Overview	Following their Environmental Policy and Guiding Principles of 'Preventing Pollution', 'Improve Continually', and 'Comply with Legislation', Nalcor is committed to reducing adverse environmental effects to the extent practical.
11.2.5.4	Atmospheric Environment	Construction Effects, Air Quality	Nalcor will not burn slash or other debris during Construction.
11.2.5.5	Atmospheric Environment	Construction Effects, Sound	Nalcor will conduct construction activities in accordance with municipal by-laws regarding noise.
11.2.5.5	Atmospheric Environment	Construction Effects, Sound	During the drilling activity at Forteau Point and Shoal Cove, Nalcor will evaluate and apply the appropriate mitigation with respect to noise control.
11.2.6.3	Atmospheric Environment	Operations and Maintenance Effects, Climate	Nalcor's proposed mitigation measures to reduce environmental effects of Project Operations and Maintenance on the Climate KI (GHG emissions) will be implemented wherever technically and economically feasible.
11.2.6.5	Atmospheric Environment	Operations and Maintenance Effects, Sound	Nalcor will conduct line inspections via helicopter and / or ground patrol annually.
11.2.6.5	Atmospheric Environment	Operations and Maintenance Effects, Sound	In addition to the helicopter inspections, Nalcor will thoroughly inspect approximately 10% of the line each year, which will include a tower and conductor inspection, via land based equipment such as all terrain vehicles (ATV).
11.2.10	Atmospheric Environment	Monitoring and Follow-up	Nalcor will employ a complaint driven process to address the generation of excessive airborne dust during any phase of the Project. The validity of the complaint will be ascertained by Nalcor and corrective actions implemented as warranted and appropriate.
11.2.10	Atmospheric Environment	Monitoring and Follow-up	Nalcor will employ a complaint driven process to address noise issues identified during any phase of the Project. The validity of the complaint will be investigated by Nalcor, and corrective actions implemented as warranted and appropriate.
11.3.1	Atmospheric Environment	EA Summary, Effects Management Measures	Nalcor is proposing to use best management practices and accepted, proven mitigation options to avoid or limit the effects of the Project on the Atmospheric Environment. Further, through their adaptive management process, Nalcor will assess issues that arise so that appropriate changes can be made to mitigation strategies or methods, and adopted in a timely manner.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
11.3.2	Atmospheric Environment	EA Summary, Accidents and Malfunctions	All Project personnel will be made aware of the SHERP and designated staff will receive SHERP training, and the forest fire prevention plan will be followed by Nalcor and its contractors.
11.3.2	Atmospheric Environment	EA Summary, Accidents and Malfunctions	Nalcor will implement fire prevention measures and adhere to conditions of Operating Permits.
11.3.5	Atmospheric Environment	EA Summary, Monitoring and Follow-up	Nalcor will employ a complaint driven process to address the generation of excessive airborne dust and / or noise during any phase of the Project. Nalcor will confirm the validity of the complaint and implement corrective actions as warranted and appropriate.
Chapter 12: Terrestrial Environment: Environmental Effects Assessment			
12.2.4.1	Vegetation	Approach to Analysis, Methods	Nalcor will avoid environmental sensitivities (e.g., known occurrences of listed plants, regionally uncommon plants and their associated habitat) to the extent practical during final ROW routing, or employ appropriate mitigation measures.
12.2.4.1	Vegetation	Approach to Analysis, Methods	The hypothetical centre line ROW and 20% contingency were not used in the assessment of this KI, as Nalcor will avoid known occurrences of listed plants in the final routing of the ROW or employ appropriate mitigation.
12.2.4.1	Vegetation	Approach to Analysis, Methods	Nalcor plans to avoid regionally uncommon plants and their associated habitat.
12.2.5.1	Vegetation	Construction, Overview	Nalcor will comply with existing provincial legislation and regulation (Newfoundland and Labrador *Forestry Act* 1990), and with the vegetation clearing requirements of all applicable permits and follow standard industry mitigation measures, including avoidance (e.g., wetlands, known listed plant species locations), setbacks and buffers (e.g., riparian areas) to limit the effects on Vegetation to the extent practical.
12.2.5.1	Vegetation	Construction, Overview	Nalcor is proposing a number of Project-specific mitigation measures designed specifically to reduce potential environmental effects on vegetation, as outlined below, by KI.
12.2.5.1	Vegetation	Construction, Overview	All Nalcor mitigation requirements referencing setbacks and buffers for waterbodies will also be applied to wetlands, as appropriate.
12.2.5.1	Vegetation	Construction, Overview	If construction is required in wetland areas, Nalcor will conduct the work in winter, fall, late summer, summer, spring (in order of preference), to the extent practical.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
12.2.5.1	Vegetation	Construction, Overview	Nalcor will adhere to federal and provincial guidelines or management plans relating to listed or regionally uncommon plants (e.g., NL Species at Risk Policy, Committee on the Status of Endangered Wildlife in Canada (COSEWIC) Status Reports, *Species at Risk Act* (*SARA*) Recovery Strategies), unless otherwise approved by appropriate regulatory agencies.
12.2.5.1	Vegetation	Construction, Overview	Nalcor will consult with Newfoundland and Labrador Department of Environment and Conservation (NLDEC) Wildlife Division regarding siting, routing or mitigation strategies for Project infrastructure in the vicinity of known listed plants or species of concern, particularly within the Northern Peninsula where a diversity of such species exists.
12.2.5.1	Vegetation	Construction, Overview	Where avoidance is not possible, Nalcor, in consultation with federal and provincial regulators, will develop protection measures and environmental management techniques for listed or regionally uncommon plant species based on site-specific conditions and species sensitivity criteria.
12.2.5.1	Vegetation	Construction, Overview	Nalcor will inspect equipment required for Construction before use to reduce the potential for the introduction of non-native and invasive plant species.
12.2.5.1	Vegetation	Construction, Overview	Nalcor will comply with existing provincial legislation and regulation (Newfoundland and Labrador *Forestry Act* 1990).
12.2.5.4	Vegetation	Construction Effects, Wetlands	Nalcor will limit the alteration / loss of wetland habitat to the extent practical by routing of the ROW to avoid wetlands where feasible.
12.2.5.4	Vegetation	Construction Effects, Wetlands	This wetland habitat will be avoided by Nalcor to the extent practical, and where effects occur, appropriate mitigation will be employed in a proactive manner.
12.2.5.5	Vegetation	Construction Effects, Shoreline	Nalcor will limit the amount of riparian shoreline alteration to the extent practical by routing of the ROW to avoid large waterbodies and rivers (and their associated shoreline)
12.2.5.6	Vegetation	Construction Effects, Listed Plants	Nalcor will avoid known occurrences of listed plants and / or important habitat during the final routing and siting of the Project ROW and associated Project components, where possible.
12.2.5.6	Vegetation	Construction Effects, Listed Plants	When routing or siting of Project components cannot avoid known occurrences of listed plants and / or important habitat, Nalcor will conduct pre-construction floristic listed plant surveys of important habitat for listed plants affected by the final Project component location or alignment
12.2.5.6	Vegetation	Construction Effects, Listed Plants	Should any individual listed plant species be located, Nalcor will retain a qualified botanist to assist in the development and implementation of an appropriate mitigation strategy, in consultation with the appropriate regulatory agencies, as discussed above.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
12.2.5.7	Vegetation	Construction Effects, Regionally Uncommon Plants	Nalcor's commitment to consult with NLDEC Wildlife Division once the ROW has been selected allows for a more precise identification of areas with high potential habitat for regionally uncommon plants.
12.2.5.7	Vegetation	Construction Effects, Regionally Uncommon Plants	Nalcor has committed to re-run the Regionally Uncommon Plant model once a ROW has been selected, based on input and advice from the NLDEC Wildlife Division.
12.2.6.1	Vegetation	Operations and Maintenance, Overview	Nalcor is proposing additional mitigation measures that will be in place to avoid or minimize potential adverse effects of the Project on vegetation during Operations and Maintenance, and include:
12.2.6.1	Vegetation	Operations and Maintenance, Overview	Nalcor will not use sterilants as a means of vegetation control, but will rely on non-residual herbicides (i.e., Tordon 101 with Sylgard 309 as a surfactant) and mechanical methods, where practical.
12.2.6.1	Vegetation	Operations and Maintenance, Overview	Nalcor will inspect equipment required for Operations and Maintenance before use to reduce the potential for the introduction of non-native and invasive plant species.
12.2.10	Vegetation	Monitoring and Follow-up	Based on the nature of the Project, compliance with federal and provincial regulatory requirements and concerns raised by the public during the consultation process, Nalcor is proposing to monitor the effects on listed plants or induced effects resulting from improved access.
12.3.5.1	Caribou	Construction, Overview	Nalcor is proposing mitigation measures to reduce the potential effect of habitat alteration or loss / fragmentation, including using existing disturbed areas as much as possible, limiting the number of access roads and decommissioning these roads following Construction wherever practical.
12.3.5.1	Caribou	Construction, Overview	Nalcor will use the data on caribou core areas provided by the NLDEC Wildlife Division during final ROW alignment selection to avoid Primary Core area, to the extent feasible.
12.3.5.1	Caribou	Construction, Overview	Nalcor will comply with laws and regulations pertaining to fish and wildlife, forest fires, forest travel, smoking and littering.
12.3.5.1	Caribou	Construction, Overview	Nalcor will continue its participation on the Labrador Woodland Caribou Recovery Team (LWCRT) and support of related research, such as the telemetry monitoring program.
12.3.5.3	Caribou	Construction Effects	Although the assessment area overlaps with 3% of the Primary Core area and these areas of overlap contain primary ranked habitat (55%), Nalcor will undertake special management initiatives to limit access and disturbance of calving / post-calving habitat to mitigate avoidance effects.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
12.3.6.1	Caribou	Operations and Maintenance, Overview	Nalcor will develop access control measures to monitor and manage public off highway vehicle (OHV) use of corridor roads and trails; they will be applied during the Construction and the Operations and Maintenance phases of the Project.
12.3.6.1	Caribou	Operations and Maintenance, Overview	Nalcor will use existing disturbed areas as much as possible, limiting the number of access roads, and will decommission those access roads and trails used during Construction that are not required for the Operations and Maintenance activities.
12.3.6.1	Caribou	Operations and Maintenance, Overview	Nalcor will use non-residual herbicides (i.e., Tordon 101 with Sylgard 309 as a surfactant) and mechanical methods, where practical.
12.3.6.1	Caribou	Operations and Maintenance, Overview	Nalcor will implement a policy of no wildlife harvesting during working hours, no feeding, and no possession of firearms or pets by transmission line maintenance and repair personnel.
12.3.6.1	Caribou	Operations and Maintenance, Overview	Nalcor will avoid conducting non-essential activity in caribou Primary Core area in Newfoundland during the sensitive calving and post-calving season, to the extent feasible.
12.3.6.1	Caribou	Operations and Maintenance, Overview	Nalcor will consider employing such mitigation measures as avoiding activity in Primary Core area in Newfoundland during the sensitive calving / post-calving season, to the extent feasible.
12.3.6.3	Caribou	Operations and Maintenance Effects	Nalcor will use non-residual herbicides (i.e., Tordon 101 with Sylgard 309 as a surfactant) and mechanical methods, where practical.
12.3.10	Caribou	Monitoring and Follow-up	Nalcor will continue its participation on the LWCRT and will continue to support research (such as telemetry work) that will lead to further understanding of the threatened herds.
12.3.10	Caribou	Monitoring and Follow-up	Nalcor will work closely with all stakeholders and will be able to assist in such aspects as monitoring and controlling access.
12.4.4.1	Furbearers	Analysis Approach, Methods	In specific areas where identified Newfoundland marten habitat overlaps the transmission corridor, Nalcor will consult with the NLDEC Wildlife Division to identify the most suitable route for the ROW.
12.4.5.1	Furbearers	Construction, Overview	Nalcor will have mitigation measures in place to limit the potential effect of habitat loss or alteration and fragmentation.
12.4.5.1	Furbearers	Construction, Overview	Nalcor will use existing disturbed areas and corridors as much as possible, limit the number of access roads, and decommission roads used during Construction that are not required for Operations and Maintenance.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
12.4.5.1	Furbearers	Construction, Overview	Nalcor will comply with laws and regulations pertaining to fish and wildlife, forest fires, forest travel, smoking and littering.
12.4.5.1	Furbearers	Construction, Overview	Nalcor will consult with the NLDEC Wildlife Division regarding final routing of the ROW in the vicinity of known marten habitat, particularly within the Northern Peninsula.
12.4.5.3	Furbearers	Construction Effects, Marten	Nalcor will consult with the NLDEC Wildlife Division to identify the most suitable alignment for the final ROW and the amount of primary habitat that would be affected.
12.4.5.3	Furbearers	Construction Effects, Marten	Project personnel will not be permitted to possess firearms on-site, and Nalcor will enforce a 'no-harvesting' policy during working hours.
12.4.5.4	Furbearers	Construction Effects, Red Fox	Nalcor will not permit Project personnel to possess firearms on-site, and will enforce a 'no-harvesting' policy during working hours.
12.4.5.5	Furbearers	Construction Effects, Porcupine	Project personnel will not be permitted to possess firearms on-site, and Nalcor will enforce a 'no-harvesting' policy during working hours.
12.4.5.6	Furbearers	Construction Effects, Beaver	Project personnel will not be permitted to possess firearms on-site, and Nalcor will enforce a 'no-harvesting' policy during working hours.
12.4.6.1	Furbearers	Operations and Maintenance, Overview	Nalcor may consider modifying the vegetation management program to maintain the habitat connectivity created during construction in core marten areas in Newfoundland
12.4.6.1	Furbearers	Operations and Maintenance, Overview	Nalcor will use non-residual herbicides (i.e., Tordon 101 with Sylgard 309 as a surfactant) and mechanical methods, where practical.
12.4.6.1	Furbearers	Operations and Maintenance, Overview	Nalcor personnel and contractors will not interfere with traplines or associated equipment.
12.4.6.3	Furbearers	Operations and Maintenance Effects	Nalcor will meet or exceed the requirements of the regulations for application of herbicides.
12.4.8	Furbearers	Monitoring and Follow-up	Nalcor will work with the NLDEC Wildlife Division to design a study to investigate the effects of ROW Construction and Operations on marten habitat use in the Main River core area, utilizing a before-after-control-impact experimental design.
12.5.5.1	Avifauna	Construction, Overview	Nalcor will have in place a number of mitigation measures designed specifically to reduce potential environmental effects on avifauna.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
12.5.5.4	Avifauna	Construction Effects, Passerines	Nalcor will limit the amount of riparian shoreline alteration to the extent practical by routing of the ROW to avoid large waterbodies and rivers (and their associated shoreline).
12.5.6.1	Avifauna	Operations and Maintenance, Overview	Nalcor will use non-residual herbicides (i.e., Tordon 101 with Sylgard 309 as a surfactant) and mechanical methods, where practical.
12.5.6.3	Avifauna	Operations and Maintenance, Waterfowl	During final routing of the ROW, Nalcor will attempt to minimize the crossing and disturbance of wetland habitat, with particular attention given to large wetland complexes or those that are known to be important for waterfowl.
12.5.9	Avifauna	Cumulative Effects	Nalcor has committed to mitigation measures that will limit Project effects on avifauna habitat and populations.
12.5.10	Avifauna	Monitoring and Follow-up	Nalcor will undertake a follow-up study to evaluate the presence of breeding pairs of Harlequin Duck on rivers known to support this species that are affected by the Project.
12.5.10	Avifauna	Monitoring and Follow-up	Nalcor will survey relevant portions of rivers known to support breeding Harlequin Duck pairs (i.e., 5 km upstream and downstream) during the appropriate season before construction activities commence to determine the extent of breeding activities. In Labrador, this will involve the Traverspine and St. Paul rivers and on the Island, particularly rivers on the Northern Peninsula (e.g., Torrent River). The information collected will be used by Nalcor for consideration in the identification of final alignment across these rivers in consultation with the Canadian Wildlife Service.
12.5.10	Avifauna	Monitoring and Follow-up	Nalcor will conduct Harlequin Duck surveys along rivers crossed by the Project that are known to support breeding populations, immediately following Project Construction and for a period of two years following commencement of Operations and Maintenance, to document the abundance and distribution of Harlequin Duck and determine the Project effects on breeding pairs.
12.5.10	Avifauna	Monitoring and Follow-up	Nalcor will note any observations of Red Knot or other avian species of conservation status during Project Construction activities.
12.5.10	Avifauna	Monitoring and Follow-up	Nalcor will conduct aerial surveys to identify Osprey and Bald Eagle nests and nesting activity within the Local Study Area (LSA) prior to Project Construction.
12.5.10	Avifauna	Monitoring and Follow-up	During Nalcor's routine inspection of the ROW and other Project components (e.g., access) throughout the life of the Project, the inspectors will maintain a log of observations or evidence of avifauna involved with vehicle collisions or interactions with the transmission line (i.e., collisions or electrocutions), note the presence of nests on transmission towers or poles, and note any areas of environmental concern related to avifauna within or adjacent to the Project components.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
12.5.10	Avifauna	Monitoring and Follow-up	Nalcor will note public OHV use of transmission corridor roads and trails observed during maintenance and inspections, as part of the access control measures.
12.6.1	Terrestrial Environment	EA Summary, Effects Management Measures	Nalcor will use best management practices and mitigation options designed to avoid or reduce the effects of the Project on the Terrestrial Environment.
12.6.1	Terrestrial Environment	EA Summary, Effects Management Measures	Through Nalcor's adaptive management process, Nalcor will assess issues that arise during the Construction, and Operations and Maintenance phases to allow appropriate changes to be made to mitigation strategies or methods, and adopted in a timely manner.
12.6.1	Terrestrial Environment	EA Summary, Effects Management Measures	Nalcor will adhere to federal and provincial guidelines or management plans relating to listed or regionally uncommon plants (e.g., NL Species at Risk Policy, COSEWIC Status Reports, *SARA* Recovery Strategies), unless otherwise approved by appropriate regulatory agencies.
12.6.1	Terrestrial Environment	EA Summary, Effects Management Measures	Nalcor will consult with NLDEC Wildlife Division regarding siting, routing or mitigation strategies for Project infrastructure in the vicinity of known listed plants or species of con*cern*, particularly within the Northern Peninsula where a diversity of such species exists.
12.6.1	Terrestrial Environment	EA Summary, Effects Management Measures	Where avoidance of listed or regionally uncommon plant species is not possible, Nalcor, in consultation with federal and provincial regulators, will develop protection measures and environmental management techniques for the plants based on site-specific conditions and species sensitivity criteria.
12.6.1	Terrestrial Environment	EA Summary, Effects Management Measures	Nalcor will comply with existing provincial legislation and regulation (Newfoundland and Labrador *Forestry Act* 1990).
12.6.1	Terrestrial Environment	EA Summary, Effects Management Measures	Nalcor will use detailed imagery to route the ROW to minimize the amount of primary and secondary marten habitat traversed, and identify areas where other mitigation options (e.g., restricting the width of the ROW or leaving slash piles within the ROW to provide security areas for marten) would be implemented.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
12.6.1	Terrestrial Environment	EA Summary, Effects Management Measures	Nalcor will enforce a 'no-harvesting' policy during working hours, and Project personnel will not be permitted to possess firearms or have pets on-site.
12.6.6	Terrestrial Environment	EA Summary, Monitoring and Follow-up	During Project Construction and routine ground and air inspections during Operations and Maintenance, Nalcor will note any areas of environmental concern related to vegetation (e.g., erosion, poor vegetation establishment, weeds) and incidents related to effects on wildlife and avifauna species (e.g., vehicle collisions, electrocutions, unauthorized access and resulting disturbance presence of nests on transmission towers or poles).
12.6.6	Terrestrial Environment	EA Summary, Monitoring and Follow-up	Nalcor will address any issues that become apparent through their follow-up studies, monitoring and inspection programs appropriately through their adaptive management process.
12.6.6	Terrestrial Environment	EA Summary, Monitoring and Follow-up	In consultation with Environment Canada and the NLDEC Wildlife Division, Nalcor proposes to design a follow-up program to target known locations of listed plant species and their important habitats, coupled with a review of OHV use facilitated by the Project.
12.6.6	Terrestrial Environment	EA Summary, Monitoring and Follow-up	Nalcor will work with the NLDEC Wildlife Division to develop an effective monitoring program to support the Red Wine Mountain Herd (RWMH) population, and work with all stakeholders to monitor and control access and deter illegal hunting.
12.6.6	Terrestrial Environment	EA Summary, Monitoring and Follow-up	If modified vegetation management techniques are adopted to help facilitate marten movement across the ROW, Nalcor would work with the Wildlife Division to design an appropriate study to investigate their effectiveness.
12.6.6	Terrestrial Environment	EA Summary, Monitoring and Follow-up	Prior to Project Construction commencement, Nalcor will conduct a study to evaluate the presence of breeding pairs of Harlequin Duck on rivers that are affected by the Project and known to support this species, to determine the extent of breeding activities.
Chapter 13: Freshwater Environment: Environmental Effects Assessment			
13.2.5.1	Freshwater Resources	Construction	Following Nalcor's Environmental Policy and Guiding Principles of 'Preventing Pollution', 'Improve Continually' and 'Comply with Legislation', Nalcor is committed to reducing adverse environmental effects to the extent practical.
13.2.5.1	Freshwater Resources	Construction	Nalcor will obtain all permits required for all construction that is located within 15 m of the high water mark of a waterbody (e.g., fording), and comply with all permit conditions.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
13.2.5.1	Freshwater Resources	Construction	Storage and handling of fuels and hazardous or controlled products will be in compliance with the Transportation of Dangerous Goods regulation SOR/2008-34, as well as the Storage and Handling of Gasoline and Associated Products Regulations under the *NLEPA.*
13.2.5.1	Freshwater Resources	Construction	All discharges of run-off from Construction activities will conform to the *Environmental Control Water and Sewage Regulations*, 2003 under the *Water Resources Act* (O.C. 2003-231).
13.2.5.1	Freshwater Resources	Construction	Nalcor will conduct the appropriate site evaluations during the final routing of the Project so that, to the extent practical, the selected crossing locations will have the least possible adverse effects on the watercourse.
13.2.7.2	Freshwater Resources	Significance Determination	As required by provincial authorities, Nalcor will undertake a pre-examination of the watercourse crossing (including collecting information on the stream's morphology, substrate, water velocity, depth, and bank slope at the proposed crossing location) to select the preferred location at each crossing.
13.2.10	Freshwater Resources	Monitoring and Follow-up	Nalcor will comply with regulatory requirements to monitor water quality during the life of the Project.
13.2.10	Freshwater Resources	Monitoring and Follow-up	Nalcor will conduct monitoring as required to comply with permit conditions or regulatory requirements, and data collected will be entered into Nalcor's International Standards Organization (ISO) documentation.
13.3.5.1	Fish and Fish Habitat	Construction	Standard mitigation (as documented in standard operating procedures, guidelines, and recommendations) will be applied by Nalcor to reduce the likelihood and magnitude of adverse effects.
13.3.5.1	Fish and Fish Habitat	Construction	Nalcor will conduct the appropriate site evaluations during the final routing of the Project so that, to the extent practical, the selected crossing locations will have the least possible adverse effects on the watercourse, and thus fish and fish habitat.
13.3.5.3	Fish and Fish Habitat	Construction	Nalcor will include mitigation such as a minimum 20 m buffer on all watercourses, and a reduced ROW of 3 m width at stream crossings; therefore, this effect is not considered further in this assessment.
13.3.7.2	Fish and Fish Habitat	Significance Determination	As required by provincial authorities, Nalcor will undertake a pre-examination of the watercourse crossing (including collecting information on the stream's morphology, substrate, water velocity, depth, and bank slope at the proposed crossing location) to select the preferred location at each crossing.
13.3.7.2	Fish and Fish Habitat	Significance Determination	Nalcor is committed to adhere to the associated legislation, Newfoundland and Labrador Operational Statements (NLOS) and standard mitigation from both industry and government (where feasible), and any permit conditions.
13.3.10	Fish and Fish Habitat	Monitoring and Follow-up	Nalcor will conduct monitoring as required to comply with permit conditions or regulatory requirements, and data collected will be entered into Nalcor's International Standards Organization (ISO) documentation.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
13.4.1	Freshwater Environment	Summary, Effects Management Measures	Nalcor will use best management practices and accepted, proven mitigation options to avoid or reduce the effects of the Project on the Freshwater Environment.
13.4.1	Freshwater Environment	Summary, Effects Management Measures	Through Nalcor's adaptive management process, Nalcor will assess issues that arise so that appropriate changes can be made to mitigation strategies or methods, and adopted in a timely manner.
13.4.1	Freshwater Environment	Summary, Effects Management Measures	Nalcor will enforce a 'no-harvesting' policy for all Project personnel during working hours.
13.4.1	Freshwater Environment	Summary, Effects Management Measures	Nalcor will use non-residual herbicides (i.e., Tordon 101 with Sylgard 309 as a surfactant) and mechanical methods, where practical.
13.4.3	Freshwater Environment	Summary, Accidents and Malfunctions	All Project personnel will be made aware of the SHERP and designated staff will receive SHERP training, and the forest fire prevention plan will be followed by Nalcor and its contractors.
13.4.3	Freshwater Environment	Summary, Accidents and Malfunctions	Nalcor will implement leak and spill prevention measures and fire prevention measures in accordance with relevant regulations, and adhere to conditions of relevant permits, and other mitigation measures.
13.4.6	Freshwater Environment	Summary, Accidents and Malfunctions	Nalcor will conduct monitoring during the life of the Project to comply with provincial and federal permits and regulatory requirements.
Chapter 14: Marine Environment: Environmental Effects Assessment			
14.2.5.1	Marine Fish and Fish Habitat	Construction, Overview	Other mitigation measures of the Project construction phase that Nalcor will employ to minimize effects on the Marine Fish and Fish Habitat VEC include: – cable corridor will not be swept prior to cable installation; – chemically-benign rock will be used for berm construction to minimize the effect on seawater and surficial sediment chemistry; – construction time will be minimized to decrease the amount of exposure to vessel noise by invertebrates and fishes; – drill mud will be recovered from the bore holes and conduit to the extent possible; – drill mud will be recycled and the cuttings will be disposed of on land;

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
			– silt curtains will be deployed during electrode site dredging to minimize the extent of increased turbidity; – biodegradable lubricants and hydraulic fluids will be used where practical, when working near waterbodies; – proper protocols will be implemented to avoid accidental introduction of potentially deleterious substances to the marine environment including all applicable regulations to minimize effect on seawater and surficial sediment chemistry; – spill kits and trained personnel will be present on-site at all times, allowing for prompt containment; – a spill response team will be formed and trained; – spills will be reported to the appropriate authority; – fuelling or serving or mobile equipment on-land will not be permitted within 50 m of a waterbody; – Nalcor will prepare and implement a SHERP (Safety, Health and Environment Emergency Response Plan), which will include spill prevention and response plan; and – Nalcor will prepare and implement an EPP (Environmental Protection Plan), which will include conditions for fuel handling and storage, including procedures for spill response.
14.2.6.1	Marine Fish and Fish Habitat	Operations and Maintenance, Overview	Mitigation that Nalcor will apply to Project activities during the Operations and Maintenance phase are as follows: – screen / armouring of the cable is on the same electric potential as the outside ambient so that the electric field is confined to the inside of the cable; – submarine cable armour and protective rock berm will minimize electric fields; – the rock berm will serve as a partial barrier to the EMF generated by the cable; – the cable will be laid on the seabed rather than buried which reduces the potential for a temperature increase to occur to the seabed and the associated biota; – the rock breakwater berm at each electrode site will act as a barrier for invertebrates and fishes; – routine visual inspections will be conducted with a remotely operated vehicle (ROV); – electrodes will be designed to minimize electric and magnetic fields (e.g., through electrode design, electrode materials, electrode surface area, low resistivity surroundings); – operation of electrodes under normal conditions as a bipole system will involve only low levels of electric current flowing through the electrodes (<1%); – operation of electrodes under upset conditions as a monopole system will be minimized to the extent possible; – minimization of contact area between the shoreline saltwater pond and the breakwater to ensure a safe voltage gradient on the sea side of the breakwater;

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
			– system is expected to operate during monopolar operations (100%) for less than 40 hours per year; and – Nalcor will use biodegradable lubricants and hydraulic fluids where practical, when working near waterbodies.
14.2.9	Marine Fish and Fish Habitat	Monitoring and Follow-up	A follow-up program will be conducted by Nalcor to evaluate the electromagnetic fields (EMFs) that will be generated by the operating submarine cable and electrodes.
14.3.6.1	Marine Mammals and Sea Turtles	Operations and Maintenance, Overview	Mitigation that Nalcor will apply to Project activities during the Operations and Maintenance phase are as follows: – Project vessels will maintain constant course and speed to the extent practical; – Project vessels will detour around marine mammals and sea turtles if feasible; – routine visual inspections of the submarine cable will be completed with an ROV; – screen / armouring of the cable is on the same electric potential as the outside ambient so that the electric field is confined to the inside of the cable; – submarine cable armour and protective rock berm will minimize electric fields; – the rock berm will serve as a partial barrier to the EMF generated by the cable; – electrodes will be designed to minimize electric and magnetic fields (e.g., through electrode design, electrode materials, electrode surface area, low resistivity surroundings); – operation of electrodes under normal conditions as a bi-pole system will involve only very low levels of electric current flowing through the electrodes (<1%); – the HVdc system is designed to require less than 40 hours per year of monopolar operations (100%) using the electrode; – minimization of contact area between the shoreline saltwater pond and the breakwater to ensure a safe voltage gradient on the sea side of the breakwater; and – Nalcor will use biodegradable lubricants and hydraulic fluids where practical, when working near waterbodies.
14.3.9	Marine Mammals and Sea Turtles	Monitoring and Follow-up	A follow-up program will be conducted by Nalcor to evaluate the EMFs that will be generated by the operating submarine cable and electrodes.
14.4.6.1	Seabirds	Operations and Maintenance, Overview	Electrodes will be designed by Nalcor to minimize the electric and electromagnetic fields (e.g., through selection of electrode materials and maximization of electrode surface area).

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
14.4.9	Seabirds	Monitoring and Follow-up	During Project construction and routine inspections during Operations and Maintenance, Nalcor will note any incidents related to effects to seabirds (e.g., stranding) and address these issues appropriately through their adaptive management process.
14.5.1	Marine Environment	EA Summary, Effects Management Measures	Nalcor has designed the marine Project components specifically to address identified issues, and will use best management practices and mitigation options designed to avoid or limit the effects of the Project.
14.5.1	Marine Environment	EA Summary, Effects Management Measures	Through Nalcor's adaptive management process, Nalcor will assess issues that arise during construction and Operations and Maintenance phases to allow appropriate changes to be made to mitigation strategies or methods, and adopted in a timely manner.
14.5.3	Marine Environment	EA Summary, Accidents and Malfunctions	Nalcor will develop and follow the Simultaneous Operations (SIMOPS) protocol to promote safe and efficient operation of vessels working in the Strait of Belle Isle.
14.5.3	Marine Environment	EA Summary, Accidents and Malfunctions	Nalcor will provide notification of Project activities and schedule to mariners and prepare fisheries broadcast announcements of Project activities and schedule directed at marine vessel operators in the Project area.
14.5.6	Marine Environment	EA Summary, Monitoring	During the Project Construction and routine inspections during Operations and Maintenance, Nalcor will note any incidents related to effects on seabirds (e.g., stranding) or other marine wildlife species, and will address these issues appropriately through their adaptive management process.
14.5.6	Marine Environment	EA Summary, Monitoring	Nalcor will conduct a follow-up program to verify effect predictions concerning the EMFs that will be generated by the operating submarine cable and electrodes. Findings from the program will be used to refine and optimize mitigation measures or any concerns that arise in relation to baleen whales and sea turtles of conservation concern, as appropriate and as part of Nalcor's adaptive management process.
Chapter 15: Existing Socioeconomic Environment			
			No commitments were made in this chapter.
Chapter 16: Socioeconomic Environment: Environmental Effects Assessment			
16.2.5.1	Historic and Heritage Resources	Construction, Overview	– Nalcor will consult with the Provincial Archaeology Office (PAO) on known Historic and Heritage Resources during the detailed Project design and final transmission line ROW selection. – Once the transmission line ROW is defined, Nalcor will conduct an historic resources field survey of those sections of the ROW that cross through areas identified high potential for undiscovered Historic and

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
			Heritage Resources. The specific nature and locations of such surveys will be planned in consultation with the PAO.
16.2.5.1	Historic and Heritage Resources	Construction, Overview	– Nalcor and its contractors will apply for and adhere to all required provincial and federal permits required for Project Construction and Operations and Maintenance. – Nalcor or its contractors will identify any known Historic and Heritage Resources within 100 m of planned Project activities, and these will be made known to supervisory personnel. A 50 m radius "no work" buffer will be maintained around all known sites to avoid interactions of Project activities with the known resources. – The orientation and training programs provided to construction personnel will include briefings related to Historic and Heritage Resources. – Standard precautionary and reporting procedures will apply throughout Project Construction, and Operations and Maintenance. In the event that unregistered Historic and Heritage Resources are discovered, work will be halted immediately at that location, the PAO will be notified, and a Stage 1 Historic Resources Overview Assessment would be initiated by Nalcor in accordance with provincial guidelines.
16.2.5.1	Historic and Heritage Resources	Construction, Overview	– Where Project components are constructed in any area which is known to have high potential to contain palaeontological resources, periodic inspections of disturbed areas by qualified palaeontologists will be undertaken to limit the potential for disturbance of fossils and the loss of any information they may provide. – Nalcor will continue to consult appropriately with relevant Aboriginal communities and organizations, to further understand any sites of cultural-historical importance or other historic and heritage resources that may be located within or near planned Project activities. Any such information that is made available to the proponent will be considered throughout ongoing Project design and eventual implementation, and Aboriginal groups will be kept informed as Project work progresses.
16.2.10	Historic and Heritage Resources	Monitoring and Follow-up	Nalcor will have full-time On-Site Environmental Monitors at various construction sites. These individuals will continually inspect worksites and activities for conformance with the EPP and mitigation measures required by design, and compliance with government regulations and permits.
16.3.5.1	Communities	Construction, Overview	Nalcor will use standard practices and procedures and will comply with applicable regulatory requirements during Project Construction.
16.3.5.1	Communities	Construction, Overview	Nalcor will work with government departments and agencies before and during Project Construction to facilitate planning and preparation for Project activities.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
16.3.5.3	Communities	Construction Effects, Transportation	Nalcor has liaised with and will continue to liaise with the relevant planning authorities and be involved to the extent appropriate and necessary to upgrade the Goose Bay dock.
16.3.5.3	Communities	Construction Effects, Transportation	Nalcor will continue to consult regularly with various authorities such as the Department of Transportation and Works and the Town of Happy Valley-Goose Bay, to reduce any adverse socioeconomic effects of additional road traffic within the community.
16.3.5.3	Communities	Construction Effects, Transportation	Nalcor will liaise with the responsible authority (provincial Department of Transportation and Works) and local stakeholders and communities to explore ways to minimize and address issues relating to Route 510 road conditions.
16.3.5.3	Communities	Construction Effects, Transportation	Nalcor will liaise with provincial and local authorities to provide them with the necessary information to plan and manage the expected traffic volumes.
16.3.5.3	Communities	Construction Effects, Transportation	All traffic operations will be conducted in accordance with provincial legislation, including the *Uniform Highway Transport Vehicle Regulations*, which regulate both the weight and dimensions of highway vehicles operating in Atlantic Canada.
16.3.5.4	Communities	Construction Effects, Waste Disposal	Nalcor will dispose of Project waste in accordance with regulatory requirements and with the approval of local and regional waste management authorities.
16.3.5.5	Communities	Construction Effects, Safety	Nalcor's Occupational Health and Safety Guidelines and Emergency Response Plans do and will conform to provincial and federal legislation with the intent of meeting Nalcor's legal and corporate responsibilities.
16.3.5.5	Communities	Construction Effects, Safety	Nalcor will develop Safety, Health and Environmental Emergency Response Plans (SHERP) to address potential unplanned incidents and emergency situations; all Project personnel will be made aware of the SHERP and designated staff will receive SHERP training.
16.3.5.7	Communities	Construction Effects, Community Well Being	Nalcor will discuss with private property owners any issues related to intrusion on their property.
16.3.5.8	Communities	Construction Effects, Summary	Where infrastructure requirements are insufficient or where the Project is considered to have the potential to negatively affect the quality of existing infrastructure, Nalcor will continue to liaise with the appropriate authorities and key stakeholders to help address these matters.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
16.3.6.1	Communities	Operations and Maintenance, Overview	Nalcor will integrate activities associated with the operation of the HVdc system into Nalcor's existing system-wide inspection and maintenance program.
16.3.6.1	Communities	Operations and Maintenance, Overview	Nalcor will incorporate the Project into its established vegetation management program for its transmission and distribution system.
16.3.6.3	Communities	Operations and Maintenance Effects, Transportation and Waste	Nalcor will integrate activities related to transmission line inspection and vegetation management into Nalcor's existing transmission system inspection and maintenance program.
16.3.6.4	Communities	Operations and Maintenance Effects, Safety	Nalcor will develop Safety, Health and Environmental Emergency Response Plans (SHERP) to address potential unplanned incidents and emergency situations.
16.3.6.5	Communities	Operations and Maintenance Effects, Health	Nalcor will not use sterilants as a means of vegetation control, but will rely on non-residual herbicides and mechanical methods, where practical.
16.3.6.6	Communities	Operations and Maintenance Effects, Well Being	Nalcor has adopted criteria of 50 dBA at the edge of the ROW, as recommended by the Electric Power Research Institute (EPRI) in the United States for HVdc transmission lines (EPRI 2008).
16.3.10	Communities	Monitoring and Follow-up	Nalcor has provided and will continue to provide Project information regarding social parameters to relevant authorities (including community and government organizations and agencies) as input to their monitoring and decision-making processes, and to consult with relevant groups throughout the life of the Project.
16.4.1	Economy, Employment and Business	Operations and Maintenance Effects	Nalcor will work with its staff to minimize any potential job loss resulting from the closure of the Holyrood Thermal Generating Station and find solutions that work for the employees and Nalcor.
16.4.5.1	Economy, Employment and Business	Construction, Overview	Nalcor and its contractors and sub-contractors will follow the principles and procedures outlined in the Benefits Strategy regarding employment and business activities and benefits for Newfoundland and Labrador.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
16.4.5.1	Economy, Employment and Business	Construction, Overview	Nalcor will make efforts to optimize economic, employment and business opportunities to Newfoundland and Labrador workers and companies; however, there inevitably will be economic leakages to other areas of Canada and elsewhere, as some of the required materials, equipment and specialized labour will have to come from manufacturers and suppliers from outside the province and country.
16.4.5.1	Economy, Employment and Business	Construction, Overview	Nalcor will implement commitments made in any executed Impacts and Benefits Agreement (IBA), followed by first consideration for employment of qualified Newfoundland and Labrador residents, considering gender equity and diversity provisions.
16.4.5.1	Economy, Employment and Business	Construction, Overview	Any collective agreements entered into by Nalcor or its primary contractors will contain provisions consistent with the employment protocol in the Benefits Strategy.
16.4.5.1	Economy, Employment and Business	Construction, Overview	Prior to sanction, Nalcor will engage in consultation with relevant stakeholder organizations and provincial departments and agencies to develop and implement a Gender Equity Program and a Diversity Program for the Project.
16.4.5.1	Economy, Employment and Business	Construction, Overview	The Gender Equity Program will include a Women's Employment Plan (WEP) and Business Access Strategy, in which Nalcor will establish goals for the employment of women in Project construction, Operations and Maintenance based on Statistics Canada's Employment Equity Data Report.
16.4.5.1	Economy, Employment and Business	Construction, Overview	Nalcor has worked, and will continue to work, with governments, Aboriginal groups, women's organizations, training institutions and labour organizations to discuss Project labour requirements, to identify existing or anticipated gaps in the labour supply pool, and will explore and discuss potential approaches to address gaps.
16.4.5.1	Economy, Employment and Business	Construction, Overview	Nalcor will: – Encourage pre-construction training initiatives to enable people in the province to participate fully in the Project. – Work with successful contractors to provide adequate workplace training (including health and safety, cultural awareness, gender sensitivity, environmental awareness, respectful workplace programs, specialized skills training for employees. – Work with contractors who have the responsibility to develop and implement apprenticeship programs for the Project. – Work with training institutions and government agencies throughout the province to offer technical advice and expertise where appropriate and to assist in coordinating training for Project-related work with relevant stakeholders.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
16.4.5.1	Economy, Employment and Business	Construction, Overview	Nalcor will engage employees and potential employees through a variety of programs and practices to: – Maintain a work environment that facilitates the achievement of their career goals and provides the training and support they need to meet Nalcor's business objectives; – Encourage employed journeypersons to participate in post-journeyperson training; – Support initiatives to increase the number of women who have skills required to support the Project, including supporting post-secondary education institution efforts that encourage the participation of women in trades and other occupations required by the Project; – Provide or encourage contractors and sub-contractors to provide on-the-job-training opportunities for qualified participants during the construction phase; – Communicate with school staff and students about career options, participating in career fairs and supporting training efforts; – Contribute to and participate in activities and initiatives designed to help students become aware of and interested in the skilled trades in general, upcoming Project employment opportunities, and associated training opportunities and requirements; – Contribute to student achievement awards and provide summer student employment opportunities and work-term placement opportunities on the Project; – Nalcor and Innu Nation have agreed to co-operate to develop a specific Innu Training Plan to help encourage and assist Innu to participate in and become qualified for employment on the Project.
16.4.5.1	Economy, Employment and Business	Construction, Overview	Nalcor will support employees through: – Access to an Employee Assistance Program (EAP), which will provide counselling for employees and their families who are experiencing problems in their work or personal lives. – Establishment of a workplace committee that serves as a discussion forum for identifying and discussing perceived or potential workplace issues and makes recommendations to Nalcor and its contractors on any requirements and measures for improvement.
16.4.5.1	Economy, Employment and Business	Construction, Overview	Goods and services will be acquired on a Best Value basis, which is defined as a blend of total cost, quality, technical suitability, credit worthiness, delivery and continuity of supply and services, and where total cost comprises initial purchase price plus Operations and Maintenance costs as deemed applicable by Nalcor.
16.4.5.1	Economy, Employment and Business	Construction, Overview	Nalcor will investigate the capabilities of businesses in communities in the vicinity of the Project, and disseminate information on the scope of the Project as details are available.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
16.4.5.1	Economy, Employment and Business	Construction, Overview	Nalcor will follow its Contracting and Purchasing policy for the Lower Churchill Project.
16.4.5.1	Economy, Employment and Business	Construction, Overview	During Project construction Nalcor will establish a Business Opportunities Committee with representation from Nalcor, key Project contractors and representatives of the provincial business community, to encourage dialogue on its Industrial Benefits Planning activities and help provincial businesses effectively pursue Project opportunities.
16.4.5.2	Economy, Employment and Business	Construction, Existing Knowledge	Nalcor will make efforts to hire qualified people from within the province and to encourage training for residents of Newfoundland and Labrador in those occupational categories in which it is warranted and feasible.
16.4.6.1	Economy, Employment and Business	Operations and Maintenance, Overview	Nalcor will integrate activities associated with the operation of the HVdc system into its existing inspection and maintenance program.
16.4.6.1	Economy, Employment and Business	Operations and Maintenance, Overview	Nalcor's Project Construction hiring and business contract protocols will apply to the Operations and Maintenance phase.
16.4.6.4	Economy, Employment and Business	Operations and Maintenance Effects, Employment	Nalcor's Project Construction hiring and training policies will apply to the Operations and Maintenance of the Project.
16.4.6.5	Economy, Employment and Business	Operations and Maintenance Effects, Business	Nalcor will undertake much of the Operations and Maintenance activities for the new HVdc transmission system as part of its normal operations and maintenance programs.
16.4.6.5	Economy, Employment and Business	Operations and Maintenance Effects, Business	Nalcor's contracting and purchasing practices will apply to the Project Operations and Maintenance, with full and fair opportunity given to all suppliers, and with goods and services being acquired on a Best Value basis and with Newfoundland and Labrador benefits included in the selection factors for contract awards.
16.4.9	Economy, Employment and Business	Cumulative Effects	Potential labour shortages are being and will continue to be addressed through a variety of effects management strategies to mitigate potential effects both by Nalcor in terms of the Project and the construction industry generally.
16.4.10	Economy, Employment and	Monitoring and Follow-up	Under the terms of the Benefits Strategy (Government of Newfoundland and Labrador (GNL) 2010, internet site), Nalcor will, on a monthly basis from the date of sanction of the Project and throughout construction, provide information to the Government of Newfoundland and Labrador on the following (broken out by

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
	Business		National Occupational Classification Code, location, contractor, Aboriginal affiliation and gender relating to the Project for the period): – total number of person-hours of all work on the Project in that month and to date; – number of person-hours of Project management in the province in that month and to date; – number of person-hours of engineering design work in the province in that month and to date; – number of person-hours of construction and assembly in the province in that month and to date; – number of residents hired for the Project Team and the percentage of Project Team members who are residents; – number of residents hired for engineering design work and the percentage of engineering design workers who are residents; – number of residents hired for construction and the percentage of construction workers who are residents; and – number of person-hours of specialized engineering performed outside the province (if any) by component.
16.4.10	Economy, Employment and Business	Monitoring and Follow-up	Nalcor will report to the Government of Newfoundland and Labrador monthly, providing information on the: – total value of goods and services purchased; – total value of services purchased from businesses in the province by geographic location; – total value of purchases by industry category (e.g., transportation, fuel, equipment); – cumulative total value of goods and services referred to above for the year to date; and – details of contracts awarded in that month.
16.4.10	Economy, Employment and Business	Monitoring and Follow-up	Nalcor will report to the Government of Newfoundland and Labrador on a quarterly basis on hiring and employment objectives and targets. In addition, quarterly reports will be provided on: – the level of compliance with the Benefits Strategy over the reporting period; – information regarding supplier development workshops performed during the reporting period; – report of activities carried out pursuant to the Gender Equity Program; – report of activities carried out pursuant to the Diversity Program; and – procurement forecasts.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
16.4.10	Economy, Employment and Business	Monitoring and Follow-up	Nalcor will continue to provide information and updates on Project activities and effects related to Economy, Employment and Business on a regular basis as part of its ongoing governmental, Aboriginal, stakeholder and public consultation activities throughout the Project. Such information and consultation will also be used, as necessary, to facilitate planning and continuous improvement through modification of Nalcor strategies to optimize Project benefits to Newfoundland and Labrador.
16.5.5.1	Land and Resource Use	Construction, Overview	Some key environmental effects management measures that relate to this VEC include those which are summarized below: – The avoidance of known land and resource use components and activities where possible during Project planning to date, including in the selection of the proposed transmission corridor, and in the identification of locations for other key project components (e.g., electrodes, submarine cable landing sites, converter stations). – This planning approach will be carried forward into the detailed route selection process for the transmission line ROW within this corridor, which will also involve additional and future consultation with government departments, Aboriginal and stakeholder groups and the public. – The selection of the transmission corridor and planning of other Project components has also be based on an approach of maximizing the use of existing access roads and trails wherever possible, utilizing existing industrial sites and other developed areas, using existing quarries and extracting borrow material from within the ROW wherever practical, and following existing transmission lines where possible (including for several hundred kilometres from Port Blandford in Eastern Newfoundland to Soldiers Pond on the Avalon Peninsula). – Designing, planning and scheduling Project-related elements and activities in specific areas to avoid interactions with land and resources users to the extent practical, as well as regular communication and consultation with relevant agencies, organizations and representatives as part of such planning and eventual implementation. – Nalcor will follow the IBA with the Labrador Innu, which covers both the Labrador-Island Transmission Link and the Lower Churchill Hydroelectric Generation Project, and defines how the Labrador Innu will participate in and benefit from these developments. The specific nature and provisions of the IBA are and will remain confidential. – Nalcor will continue to consult appropriately with relevant Aboriginal communities and organizations in Labrador and Québec, particularly those with demonstrated contemporary land use near the Project. This will include the provision of Project information and updates on ongoing and planned activities, and discussion of any issues and potential means to address them. – Nalcor will work directly with any commercial outfitter with an existing, active hunting and / or fishing

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
			camp located within the proposed transmission corridor, or within 5 km of the corridor or of the location of any other planned permanent Project component. This will include consultation during detailed design and planning for sections of the proposed transmission line within these areas (e.g., ROW selection, tower design and placement, scheduling), to seek to avoid or reduce any potential issues or interactions during construction and / or operations. It will also include exploring possible routing approaches to help minimize the eventual use of the ROW by ATVs and snowmobiles in areas that are currently remote and inaccessible. – Nalcor will meet and consult generally with the Newfoundland and Labrador Outfitters Association (NLOA) and / or other industry representatives to discuss general issues and potential effect management measures. – Nalcor will consult directly with the Department of National Defense (DND) during detailed design and planning for sections of the proposed transmission line that will occur within the designated low level flight training area in Labrador, including for example in ROW selection, tower design and placement and scheduling. Nalcor will also cooperate with DND to develop appropriate communications procedures for flight activity in the designated low level flight training area, and to include eventual Project infrastructure on relevant DND maps and navigational charts. – Nalcor will implement other standard effects management measures used by Nalcor and its subsidiaries during past and ongoing transmission line construction and maintenance activities, including discussion with private property owners regarding issues related to any intrusion on property both prior to and after doing so). – Nalcor and its contractors will identify, obtain and comply with all authorizations, approvals and permits from relevant provincial and federal agencies that are required in relation to Project Construction and / or Operations and Maintenance activities.
16.5.5.1	Land and Resource Use	Construction, Overview	When seeking to acquire required property rights, Nalcor will follow its *Property Acquisition Policy* to conduct negotiations and provide a fair balance between the needs of property owners, Nalcor and the ratepayers and citizens of the province. The objective is to secure voluntary property settlements in a timely manner at a reasonable cost.
16.5.5.1	Land and Resource Use	Construction, Overview	Nalcor will exercise its rights to secure land interests for public projects through the process of expropriation only when all other avenues are exhausted. An expropriation and the required property owner compensation follow specific procedures as set out in provincial legislation. Even after an expropriation is filed, Nalcor will continue to attempt to secure a negotiated settlement with affected property owners.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
16.5.5.1	Land and Resource Use	Construction, Overview	Nalcor will work directly with the GNL Natural Heritage Branch, Parks and Natural Areas Division (and other organizations as applicable) during detailed engineering design and planning (e.g., for ROW selection, tower design and placement, and scheduling) for those sections of the proposed transmission line that will occur within 1 km of the boundaries of an existing protected area, to seek to avoid or reduce any potential visual or other such interactions.
16.5.5.3	Land and Resource Use	Construction Effects, Commercial/ Municipal Land Use	Nalcor will consult with all relevant communities in or near the Project area as part of such planning, as well as during Project construction, to provide information and updates on ongoing and planned construction activities, identify questions or concerns, and to seek to address any issues through design and scheduling.
16.5.5.3	Land and Resource Use	Construction Effects, Commercial/ Municipal Land Use	While conducting any construction or maintenance activities within Protected Public Water Supply Areas, Nalcor will follow relevant environmental protection and regulatory requirements.
16.5.5.3	Land and Resource Use	Construction Effects, Commercial/ Municipal Land Use	Nalcor will work directly with Transport Canada, DND and other relevant authorities to ensure that the presence and characteristics of any transmission towers in the general vicinity of these facilities are in keeping with required guidelines and regulatory standards, so as to not interfere with the operations and safety of aircraft. Nalcor will cooperate to include Project infrastructure on maps and navigational charts, and coordinate and communicate regarding any Project-related aircraft activities in these areas during construction.
16.5.5.3	Land and Resource Use	Construction Effects, Commercial/ Municipal Land Use	During detailed engineering design, Nalcor will attempt to maximize the distance of the transmission line ROW from existing and commercially active outfitting camps in this area. Nalcor will work directly with any active commercial outfitter with an existing camp located within 5 km of the transmission corridor or of any other planned permanent Project component.
16.5.5.3	Land and Resource Use	Construction Effects, Commercial/ Municipal Land Use	Nalcor will provide Project information and updates to provincial forest planners and managers so that future operational plans (5 year or annual) can fully incorporate the Project ROW and any associated forest clearing.
16.5.5.3	Land and Resource Use	Construction Effects, Commercial/ Municipal Land Use	During detailed routing for the transmission line ROW and during construction, Nalcor will consult with adjacent operators and land owners (e.g., those with existing quarries, staked claims, oil and gas exploration parcels, impost land, mining leases, agricultural areas and Crown titles) as required, to provide up to date information on planned construction activities and to optimize planning and scheduling.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
16.5.5.3	Land and Resource Use	Construction Effects, Commercial/ Municipal Land Use	Nalcor will provide advanced notice of planned construction work in the Strait of Belle Isle through mechanisms such as the Canadian Coast Guard's (CCG) Notices to Shipping and the Canadian Broadcasting Corporation's Fisheries Broadcast.
16.5.5.4	Land and Resource Use	Construction Effects, Recreational Land Use	Nalcor will provide information and updates to organizations and the general public as appropriate regarding ongoing and planned construction activities, with the goal to facilitate good communication and planning to proactively avoid interactions with recreational uses and any safety issues.
16.5.5.4	Land and Resource Use	Construction Effects, Recreational Land Use	In the event that Nalcor has to acquire a recreational property (i.e., a cabin), Nalcor will follow its *Property Acquisition Policy* to conduct negotiations and provide a fair balance between the needs of property owners, Nalcor and the ratepayers and citizens of the province.
16.5.5.5	Land and Resource Use	Construction Effects, Aboriginal Land Use	Nalcor will provide information and updates to Aboriginal groups and organizations, as appropriate, for ongoing and planned construction activities, so as to facilitate good communication and planning to proactively avoid such interactions and any safety issues.
16.5.5.5	Land and Resource Use	Construction Effects, Aboriginal Land Use	Nalcor is engaged with NunatuKavut Community Council under a community engagement agreement and ongoing data collection of contemporary traditional land and resource use information as a result of the agreement will be considered where relevant during detailed Project design.
16.5.5.5	Land and Resource Use	Construction Effects, Aboriginal Land Use	Nalcor will consult with Aboriginal communities and organizations to explore possible approaches to transmission line routing.
16.5.5.5	Land and Resource Use	Construction Effects, Aboriginal Land Use	Nalcor will continue to use information collected during past and ongoing discussions with potentially affected Aboriginal groups and communities to avoid conflicts with contemporary land use for traditional purposes to the extent practical.
16.5.5.5	Land and Resource Use	Construction Effects, Aboriginal Land Use	Nalcor has a continued commitment to undertake and finalize land and resource use studies under the current community engagement agreements with NunatuKavut Community Council, Pakua Shipu and Unamen Shipu. Nalcor will consider and incorporate information where relevant, including the potential for mitigation and adaptive management during detailed design and routing.
16.5.5.5	Land and Resource Use	Construction Effects, Aboriginal Land Use	In the event that Nalcor has to acquire an existing Aboriginal property (i.e., campsite or cabin), Nalcor will follow its *Property Acquisition Policy* to conduct negotiations and provide a fair balance between the needs of property owners, Nalcor and the ratepayers and citizens of the province.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
16.5.5.6	Land and Resource Use	Construction Effects, Protected Areas	With respect to Newfoundland T'Railway Provincial Park, Nalcor will continue to explore options with the GNL Natural Heritage Branch, Parks and Natural Areas Division to address the Project-T'Railway Provincial Park interaction and arrive at a mutually acceptable approach which is in compliance with the necessary approvals.
16.5.5.6	Land and Resource Use	Construction Effects, Protected Areas	Nalcor will continue to work and consult with the NL Parks and Natural Areas Division and other relevant organizations as it proceeds with Project planning, in order to seek to incorporate any available information regarding proposed protected areas into its planning, design and implementation of the Project.
16.5.5.6	Land and Resource Use	Construction Effects, Protected Areas	Nalcor will integrate activities associated with the operation of the HVdc system into its existing system-wide inspection and maintenance program.
16.5.6.1	Land and Resource Use	Operations and Maintenance, Overview	Nalcor will integrate activities associated with the operation of the HVdc system into its existing system-wide inspection and maintenance program.
16.5.6.3	Land and Resource Use	Operations and Maintenance Effects, Commercial/ Municipal Land Use	Nalcor will continue to meet with the International Appalachian Trail - Newfoundland and Labrador (IATNL) to discuss the specific routing and tower placement for the Project as engineering progresses, to reduce visual issues in key areas where technical and cost considerations facilitate this.
16.5.6.3	Land and Resource Use	Operations and Maintenance Effects, Commercial/ Municipal Land Use	Nalcor will consult with government departments, Aboriginal groups, outfitters and other groups and individuals to explore possible transmission line routing approaches in currently remote and identified sensitive areas to help minimize the eventual use of the ROW by ATVs and other public.
16.5.6.4	Land and Resource Use	Operations and Maintenance Effects, Aboriginal Traditional Land Use	Nalcor will consult Aboriginal communities and organizations to explore possible transmission line routing approaches.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
16.5.6.4	Land and Resource Use	Operations and Maintenance Effects, Aboriginal Traditional Land Use	Nalcor has a continued commitment to undertake and finalize land and resource use studies under the current community engagement agreements with NunatuKavut Community Council, Pakua Shipu and Unamen Shipu.
16.5.10	Land and Resource Use	Monitoring and Follow-up	Nalcor will continue to provide Project information to relevant agencies and organizations responsible for planning, management, regulatory enforcement and monitoring related to land and resource use, as required and requested.
16.5.10	Land and Resource Use	Monitoring and Follow-up	Nalcor will continue to use information collected during past and ongoing discussions with potentially affected Aboriginal groups and communities to avoid conflicts with contemporary land use for traditional purposes to the extent practical.
16.5.10	Land and Resource Use	Monitoring and Follow-up	Nalcor has a continued commitment to undertake and finalize land and resource use studies under the current community engagement agreements with NunatuKavut Community Council, Pakua Shipu and Unamen Shipu.
16.5.10	Land and Resource Use	Monitoring and Follow-up	Nalcor will consider and incorporate information provided in land and resource use studies by Aboriginal groups where relevant, including the potential for mitigation and adaptive management during detailed design and routing.
16.5.10	Land and Resource Use	Monitoring and Follow-up	Nalcor will assess any new relevant information regarding contemporary traditional land use activities of the Quebec Innu of Uashat mak Mani-Utenam, Matimekush-Lac John, Nutashkuan, Ekuanitshit and the Naskapi Nation of Kawawachikamach become available, in relation to the Project-related components.
16.6.5.1	Marine Fisheries	Construction, Overview	Nalcor representatives will consult further with local fishers and other interested and applicable parties before Project construction activities commence in the Strait of Belle Isle.
16.6.5.1	Marine Fisheries	Construction, Overview	Nalcor will establish a Fisheries Liaison Committee (FLC) for the Project construction period to facilitate its ongoing fisheries consultation and advisory process during construction.
16.6.5.1	Marine Fisheries	Construction, Overview	Nalcor will establish a Safety Zone, in accordance with Rule 43 of the Collision Regulations under the *Canadian Shipping Act*, around all active construction areas within the marine environment.
16.6.5.1	Marine Fisheries	Construction, Overview	Nalcor will consult with relevant Transport Canada personnel to determine the most appropriate means for boundary demarcation and communication.
16.6.5.1	Marine Fisheries	Construction, Overview	Nalcor will develop a Vessel Traffic Management Plan (VTMP) before Project construction activities commence in the Strait of Belle Isle, in consultation with applicable agencies and organizations, including advice and guidance from experts with the Ship Safety Branch of Transport Canada and the CCG.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
16.6.5.1	Marine Fisheries	Construction, Overview	Nalcor will provide advance notice of planned construction work in the Strait of Belle Isle through mechanisms such as the CCG's Notices to Shipping and the Canadian Broadcasting Corporation's Fisheries Broadcast.
16.6.5.1	Marine Fisheries	Construction, Overview	Nalcor will make available Fishing Gear Loss or Damage Compensation to cover any damage to commercial fishing gear or other equipment if an incident occurs during the Project Construction phase that involves contact with a Project vessel outside the Safety Zone. This will be similar to programs currently in use within the province's offshore area for petroleum exploration and development.
16.6.5.1	Marine Fisheries	Construction, Overview	Nalcor will provide economic compensation for any Strait of Belle Isle commercial fishing enterprise that experiences a loss of fishing income as a result of marine construction activities. This compensation will be available to licence holders who have been actively involved in harvesting scallop in the relevant area in recent years, and will compensate for any demonstrated actual loss of net commercial fishing income.
16.6.5.1	Marine Fisheries	Construction, Overview	Further principles and operational components of economic compensation will be developed jointly by Nalcor through discussions with the FLC.
16.6.5.1	Marine Fisheries	Construction, Overview	Prior to the start of electrode construction activities in Conception Bay, Nalcor representatives will meet with local fishers and other interested and applicable parties, particularly those who use any fishing grounds along the shoreline near the Dowden's Point shoreline electrode site.
16.6.6.1	Marine Fisheries	Operations and Maintenance Overview	Nalcor will consult and address any issues related to commercial fisheries in the Strait of Belle Isle that result from Project activities.
16.6.6.1	Marine Fisheries	Operations and Maintenance Overview	Working with the FLC, CCG's Notices to Shipping and the Canadian Broadcasting Corporation's Fisheries Broadcast, Nalcor will provide advance notice of planned maintenance or repair programs in the Strait of Belle Isle.
16.7.5.1	Tourism	Construction, Overview	Project construction workers will be housed in temporary construction camps rather than in local hotels, B&Bs and other accommodations, so as to avoid placing demands on these services, especially during peak tourism seasons.
16.7.5.1	Tourism	Construction, Overview	Nalcor will coordinate and schedule Project-related transportation of large equipment and materials to avoid heavy seasonal tourism traffic to the extent practical, and communicate and consult regularly with relevant agencies and tourism industry organizations and representatives as part of Project planning.
16.7.5.2	Tourism	Construction, Existing Knowledge	Nalcor will schedule certain Project-related movements and presence of personnel, equipment and materials to accommodate heavy seasonal tourism traffic, and will communicate with their sub-contractors about alternate travel and living arrangements during high tourism season.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
16.7.5.4	Tourism	Construction Effects, Visitation	Nalcor will schedule certain Project-related movements and presence of personnel, equipment and materials to accommodate high volume seasonal tourism traffic.
16.7.5.4	Tourism	Construction Effects, Visitation	Nalcor will communicate to the public, the Royal Canadian Mounted Police (RCMP) and appropriate government departments and agencies when non-routine Project-related movement and presence of personnel, equipment and materials will occur in sufficient time for these departments and agencies to take appropriate action and / or for the public to make alternative arrangements.
16.7.6.3	Tourism	Operations and Maintenance, Effects	Nalcor will schedule certain non-routine traffic delays to accommodate heavy seasonal tourism traffic and Nalcor will communicate to the public, the RCMP and appropriate government departments and agencies of such action.
16.7.6.3	Tourism	Operations and Maintenance, Effects	Nalcor will also ensure that if large numbers of Operations and Maintenance personnel are required, that appropriate travel and accommodations arrangements are made during the high tourist season that would not unduly interfere with travel and accommodation needs of tourists.
16.7.6.3	Tourism	Operations and Maintenance, Effects	Nalcor will also make alternative accommodations' arrangements if large numbers of non-routine personnel are required in the field.
16.7.6.3	Tourism	Operations and Maintenance, Effects	Nalcor will schedule certain non-routine traffic delays to accommodate heavy seasonal tourism traffic and Nalcor will communicate to the public, the RCMP and appropriate government departments and agencies of such action.
16.7.6.3	Tourism	Operations and Maintenance, Effects	This notification will occur in sufficient time for officials to take appropriate action and / or for the public to adjust travel plans.
16.7.6.3	Tourism	Operations and Maintenance, Effects	Nalcor will also ensure that if large numbers of Operations and Maintenance personnel are required, that appropriate travel and accommodations arrangements are made during the high tourist season that would not unduly interfere with travel and accommodation needs of tourists.
16.7.6.3	Tourism	Operations and Maintenance, Effects	Nalcor will also make alternative accommodations' arrangements if large numbers of non-routine personnel are required in the field.
16.7.6.3	Tourism	Operations and Maintenance, Effects	Nalcor will schedule certain Project-related activities to accommodate heavy seasonal tourism traffic and will communicate to the public, the RCMP and appropriate government departments and agencies using traditional and social media when non-routine Project-related traffic is present.

Table 17.4-1 Commitments for the Labrador-Island Transmission Link (continued)

Section	VEC	Aspect	Commitment
16.7.6.3	Tourism	Operations and Maintenance, Effects	Notification regarding the scheduling of certain Project-related activities will be provided with sufficient time for officials to take appropriate action and / or for the public to make alternative arrangements.
16.7.6.3	Tourism	Operations and Maintenance, Effects	If appropriate, Nalcor will make alternative accommodation arrangements when large numbers of personnel are in the field.
16.7.9	Tourism	Cumulative Effects	Nalcor has neither the mandate nor the expertise to monitor the tourism industry in the Project areas, but has, and will continue to, provide Project information to such agencies as required and requested.
16.8.5	Visual Aesthetics	Construction	Nalcor has selected a corridor, within which the ROW will be constructed, in consideration of visually sensitive areas (e.g., Gros Morne National Park).
17.1	—	Planning	Nalcor will use the Environmental Impact Statement (EIS) as they enter the detailed design phase, to refine and optimize technical, economic and environmental features, in consultation with regulators, Aboriginal groups, and stakeholders, as outlined throughout this EIS.
17.4	—	EA Principles, Precautionary	Nalcor has developed, and will apply appropriate mitigation, despite any uncertainty of the level of an effect of the Project on a Valued Environmental Component (VEC) or a Key Indicator (KI).
17.7	—	Planning	Nalcor will continue to refine and optimize the Project (e.g., corridor selection) through planning and design, as more detailed information is collected, including the findings of the effects assessment and ongoing engineering.
17.7	—	Routing and Design	Nalcor will conduct public consultations to present the proposed final transmission line route to the interested public and stakeholders once identified, and prior to final Project design and construction.
17.7	—	Planning	Nalcor and / or its contractors will identify, apply for and adhere to all permit terms and other authorizations that are required for Project Construction, and / or Operations and Maintenance.
17.8	—	EA Principles, Precautionary	Nalcor will use information provided by Aboriginal and / or stakeholder groups, or obtained during any of the monitoring and / or follow-up programs undertaken to feed into their adaptive management process for continued improvement. The adaptive management process will ensure timely, proactive responses to identified issues to limit the resulting effect.

17.5 Valued Environmental Components Summary

Nalcor selected VECs to focus the environmental assessment on the components of the biophysical and socioeconomic environment that are most valued and / or sensitive, and which have a meaningful potential to be affected by the Project. Table 17.5-1 provides a summary of the VECs that Nalcor selected and the significance of the predicted residual effects on the VECs (see Chapter 11 (Atmospheric Environmental Effects Assessment), Chapter 12 (Terrestrial Environment Effects Assessment), Chapter 13 (Freshwater Environment Effects Assessment), Chapter 14 (Marine Environment Effects Assessment) and Chapter 16 (Socioeconomic Environment Effects Assessment) for details). The cumulative effects (i.e., predicted to occur on the VECs with consideration of effects from other projects in the Regional Study Area) and their likely significance are also presented in Table 17.5-1.

Table 17.5-1 Summary: Significance of Effects on Atmospheric, Terrestrial, Freshwater, Marine and Socioeconomic Valued Environmental Components

VEC	Likely Significant Residual Effect	Comment	Likely Significant Cumulative Effect
Atmospheric Environment			
Atmospheric Environment	No	The changes to climate (GHG emissions), air quality and sound resulting from the Project are unlikely to substantively influence ambient conditions within the Regional Study Area (RSA). Therefore, the Project is not likely to result in significant adverse effects on the Atmospheric Environment.	No
Terrestrial Environment			
Vegetation	No	The effects of the Project on the vegetation abundance and diversity, wetlands, riparian shoreline, listed and regionally uncommon plants, and timber resources are not expected to affect any Vegetation KIs such that its continued contribution to ecosystem function within the LSA and the RSA are not sustainable. The likely residual effects of the Project on Vegetation are not significant.	No
Caribou	No	The effects of the Project on woodland caribou are not expected to cause a decline in population, such that the viability or recovery of woodland caribou populations in Central and Southeastern Labrador and Newfoundland are threatened. The likely residual effects of the Project on Caribou are not significant. In recognition of the present status of RWMH, and that other activities and pressures such as poaching and predation may continue, the overall fate is likely one of continued decline with or without the Project. If these existing (pre-Project) factors remain unchecked, the cumulative environmental effects are predicted to be significant, and not a result of the Project effects. The cumulative effects on the remainder of the Caribou herds in the province are rated as not significant.	No – MMH Yes - RWMH No – Newfoundland
Furbearers	No	The effects of the Project on marten, red fox, porcupine and beaver are not expected to result in a decline in the numbers of animals such that a population cannot be maintained within the RSA or in any of the Project regions. The likely residual effects of the Project on Furbearers are not significant.	No

Table 17.5-1 Summary: Significance of Effects on Atmospheric, Terrestrial, Freshwater and Marine Valued Environmental Components (continued)

VEC	Likely Significant Residual Effect	Comment	Likely Significant Cumulative Effect
Avifauna	No	The effects of the Project on waterfowl, passerines, raptors, upland game birds or other avian species of special conservation status are not expected to cause a population decline for any of the KIs or representative species / guilds therein, such that the viability of that population is not sustainable. The likely residual effects of the Project on Avifauna are not significant.	No
Freshwater Environment			
Freshwater Resources	No	The predicted effects on freshwater resources (Water Quality) (i.e., increase in total suspended solids (TSS), nutrients, herbicides, toluene or ethylbenzene in exceedance of guidelines or relative to baseline conditions) during the Construction, and Operations and Maintenance of the Project consider standard, proven, effective mitigation. The effects are well understood, are unlikely to result in a decrease in water quality of a given watercourse, such that applicable guidelines are exceeded or the watercourse cannot sustain its baseline functions over the lifetime of the Project, and are not significant.	No
Fish and Fish Habitat	No	The predicted effects on Fish Habitat, and Fish Abundance and Species Assemblage during the Construction, and Operations and Maintenance of the Project consider standard, proven, effective mitigation. The effects are well understood, will be localized, are unlikely to affect Fish and Fish Habitat over the life of the Project, and are not significant.	No
Marine Environment			
Marine Fish and Fish Habitat	No	The effects of the Project on the benthic habitat, marine water quality, and marine fish are not expected to affect conditions, populations, distributions or activities (e.g., feeding, spawning, and migration) at a regional scale for a period exceeding one year, and are not significant.	No
Marine Mammals and Sea Turtles	No	The effects of the Project on baleen whales, toothed whales, pinnipeds and sea turtles are not expected to result in changes to conditions, populations, distributions or activities at a regional scale for a period exceeding one year, and are not significant.	No
Seabirds	No	The effects of the Project on migrating shorebirds, nesting seabirds, and at-sea seabirds are not expected to result in changes to conditions, populations, distributions or activities at a regional scale over the long-term, and are not significant.	No

Table 17.5-1 Summary: Significance of Effects on Atmospheric, Terrestrial, Freshwater and Marine Valued Environmental Components (continued)

VEC	Likely Significant Residual Effect	Comment	Likely Significant Cumulative Effect
Socioeconomic Environment			
Historic and Heritage Resources	No	No loss or permanent disturbance of Historic and Heritage Resources, including Archaeological and /or Palaeontological Resources, is predicted as a result of the Project; however, if such resources are disturbed, provincial protocols will be followed to evaluate and document the resource, and it is not expected that the integrity and cultural value of the resource will be diminished or the historical context within the region will be lost. The likely residual effects of the Project on Historic and Heritage Resources are not significant. The effects of the Project on Sites of Cultural-Historical Importance are unlikely to result in the direct disturbance of a known site such that its integrity and cultural value is diminished, and are not significant.	No
Communities	No	Due to the scale and distribution of Project activities, any adverse effects on Communities throughout the Project will mostly be local and of short duration (e.g., increased demand for transportation infrastructure and community services, noise disturbance) during Construction, or longer duration (e.g., EMF, noise or other disturbance) during Operations. Some localized beneficial effects (e.g., highway improvements, waste disposal revenue) will be long lasting. No effects will result in a detectable and sustained decrease in the overall quality of life and / or health of a population. The likely residual effects of the Project on Communities are not significant.	No
Economy, Employment and Business	No	The overall (net) Project effects on Economy, Employment and Business are overwhelmingly beneficial (i.e., increased employment, incomes, tax revenues and business activity within the province and beyond) throughout the Project; potential exists for adverse effects to local businesses due to labour force competition and wage inflation due to Project-related employment during Construction. The likely residual effects of the Project on Economy, Employment and Business are not significant.	No
Land and Resource Use	No	Considering the effects management measures in place and planned, the Project effects on Land and Resource Use are not expected to negatively affect the successful operation or overall economic viability of commercial enterprises, or the ongoing planned growth of communities, contemporary traditional land use by Aboriginal users or other recreational land and resource users, or the ecological integrity, cultural value and / or societal use and enjoyment of protected areas. The likely residual effects of the Project on Land and Resource Use are not significant.	No

Table 17.5-1 Summary: Significance of Effects on Atmospheric, Terrestrial, Freshwater and Marine Valued Environmental Components (continued)

VEC	Likely Significant Residual Effect	Comment	Likely Significant Cumulative Effect
Marine Fisheries	No	Nalcor's planned consultation, ongoing liaison and other effects management response plans and economic compensation programs during Construction for commercial marine fisheries will help ensure that any Project interference with fishing activities will not result in a decrease in overall landings or fishing income as compared to pre-Project levels; and, adverse effects on the successful operation and overall economic viability of fishing enterprises in the area are not likely. The Project is unlikely to have an effect on recreational fisheries that would result in a measurable decrease in overall participation levels in the Strait of Belle Isle or Conception Bay. The likely residual effects of the Project on Marine Fisheries are not significant.	No
Tourism	No	The quality of the tourism experience could be intermittently affected (e.g., noise, dust, visual disturbance, traffic delays, accommodation shortages) during Project Construction, but this is normal with respect to construction activities within the province, and is unlikely to cause a decrease in visitation and expenditures by tourists or negatively affect the successful operation and overall economic viability of tourism enterprises. The transmission system is largely in remote areas, and will not be visible in most regions of the province except the Avalon Peninsula where it parallels already existing structures, thereby having a minor to negligible effect on the quality of the tourism experience. The likely residual effects of the Project on Tourism are not significant.	No
Visual Aesthetics	No	Clearing of the ROW, and installation of the transmission towers and other Project components will result in changes to the existing views to varying degrees during Construction, depending on view location and the stage of Construction, and the Project components (e.g., the ROW, transmission towers, converter stations and shoreline electrode sites) will be visible throughout the life of the Project. However, the Project effect on Visual Aesthetics is predicted to be acceptable and not significant.	No

17.6 Description of the Environment with the Project

The natural environment of the province with the Project is summarized through a discussion on biodiversity and renewable resources, related to their availability to future generations (i.e., sustainability) in the following
5 subsections.

The socioeconomic environment of the province with the Project is summarized through a discussion of the opportunities available during and after the Project, as it relates to all Newfoundlanders and Labradorians.

17.6.1 Biodiversity

Biodiversity encompasses the variety of life at all levels of organization, from the genetic to the landscape level and all the ecological and biological processes by which these levels are connected (Biodiversity Convention Office 1996).

Components of biodiversity have been assessed separately and quantitatively / qualitatively for the Project in:

- Chapter 11, Atmospheric Environment: Environmental Effects Assessment;
- Chapter 12, Terrestrial Environment: Environmental Effects Assessment (see Section 12.2 Vegetation; Section 12.3 Avifauna; Section 12.4 Caribou; Section 12.5 Furbearers);
- Chapter 13, Freshwater Environment: Environmental Effects Assessment (see Section 13.3 Fish and Fish Habitat); and
- Chapter 14, Marine Environment: Environmental Effects Assessment (see Section 14.3 Fish and Fish Habitat (Marine); Section 14.4 Marine Mammals and Sea Turtles; Section 14.5 Marine Associated Avifauna).

- The intent of this discussion is to summarize overall potential effects of the Project on biodiversity, through a qualitative discussion. Biodiversity is not simply a function of the number of species present but rather includes an evaluation of the function of ecosystems and the effects that the Project may have on it (Chapin et al. 2000). For the purpose of this EA, Nalcor considered biodiversity at the landscape level, the ecosystem (e.g., habitat type) level, and the species level, and it is presented as a synthesis of ecological effects in consideration of the VEC effects assessments listed above.

17.6.1.1 Landscape Level

Landscape pattern refers to the mosaic of habitat types (e.g., wetlands, riparian, black spruce forest, deciduous forest, and freshwater and marine). In Newfoundland and Labrador, this mosaic is diverse, as the Project will cross four ecoregions in Labrador: High Boreal Forest – Lake Melville Ecoregion; Low Subarctic Forest – Mecatina River Ecoregion; String Bog – Eagle River Plateau Ecoregion; and, the Forteau Barrens Ecoregion, and in Newfoundland, the Project will cross six ecoregions: Strait of Belle Isle Ecoregion; Northern Peninsula Forest Ecoregion; Long Range Barrens Ecoregion; Central Newfoundland Ecoregion; Maritime Barrens Ecoregion; and, Avalon Forest Ecoregion, including hundreds of watercourse crossings within each of these ecoregions. Each of these ecoregions supports a diverse assemblage of habitat types, with their respective topographical variations, vegetation species assemblages and hydrological features (e.g., wetlands, watercourses, ponds). In addition, the Project also includes a submarine crossing of the Strait of Belle Isle, and shoreline electrodes at Dowden's Point (Conception Bay) and L'Anse au Diable (Strait of Belle Isle). Due to the primarily linear nature of the Project, the Project footprint within any one ecoregion is limited and predicted to be not significant.

17.6.1.2 Ecosystem Level

Nalcor developed an ecological land classification (ELC) (Stantec 2010a,b) for the Project that includes a 15 km wide area, centred on the transmission corridor. This ELC was used as the basis for assessment of the various habitat types crossed by the Project components. As the Project will involve clearing for various Project components, and vegetation management will also be required within the right-of-way (ROW) for safety, effects on vegetation are expected. These effects are predicted to be local and will not disproportionately affect any particular habitat type.

Based on the assessment, the amount of each of the ELC habitat types, listed plants and regionally uncommon plants affected by the Project will not be significant. This considers that the ROW and other Project components will affect a small proportion of the habitat available within the RSA. Health effects on vegetation are not anticipated due to the limited emissions, and dust deposition will occur primarily along the road access, and will be localized and seasonal.

With respect to wildlife, the ELC habitat types were used to delineate and assess the effects of the Project on wildlife habitat and wildlife. This includes loss of habitat related to indirect effects of avoidance of suitable habitat due to sensory disturbance from Project Construction, and Operations and Maintenance. No significant effects on wildlife or wildlife habitat are predicted.

Freshwater fish habitat (e.g., riparian areas and watercourses) will be crossed by Project components, in compliance with the DFO Newfoundland and Labrador Operational Statements (DFO 2010) to the extent feasible, and as permitted (e.g., fording). Effects are predicted to primarily be at the LSA level, the distribution and quality of the habitat is expected to remain sustainable, and effects on fish habitat are predicted to be not significant.

With respect to the Strait of Belle Isle submarine crossing component of the Project, it is expected that the habitat and distribution of fish and marine fauna will not be affected at the RSA level.

17.6.1.3 Species Level

Clearing of vegetation for the Project will result in the alteration / loss of vegetation. The various habitat types crossed by the Project will continue to be represented within the LSA and RSA, and therefore, effects on population viability of individual species are predicted to be not.

The effects of the Project on terrestrial wildlife species, including listed species, and their use of, and distribution within these habitat types on a seasonal or year-round basis are predicted to be not significant. On a regional basis, the distribution and populations are expected to remain sustainable. The mitigation proposed by Nalcor is expected to promote natural regeneration of vegetation within the ROW and other areas required for other Project components that are not required during the Operations and Maintenance phase thereby limiting effects of habitat loss and fragmentation. Wildlife populations are not expected to be affected at the RSA level.

Conflicts between wildlife and the Project components (e.g., vehicle and vessel traffic) may result in the death of individual animals. Mitigation is in place to address this, and with limited occurrences expected, no effect on populations at the regional level are expected. The effects on wildlife are predicted to be not significant.

The localized effects on freshwater fish and fish habitat are not expected to affect populations at the regional level, and are predicted to be not significant.

For the marine component, there are no fish, bird, mammal or reptile species, including listed species, that are predicted to be significantly affected by the Project. Installation of the cables and the rock berms across the Strait of Belle Isle will result in alteration / loss of flora and fauna on the seafloor, however, these species will continue to be represented in the LSA and RSA, and effects on population sustainability are expected to be not significant.

17.6.1.4 Summary of Project Effects on Biodiversity

Issues related to biodiversity that were considered by the study team were based on the EIS Guidelines and Scoping Document (Government of Newfoundland and Labrador and Government of Canada 2011), Nalcor's consultation, traditional ecological knowledge, community ecological knowledge and professional judgement. The following issues were addressed qualitatively and / or quantitatively in the relevant VEC sections, and considered for the discussion on effects of the Project on biodiversity:

- Air quality and noise;
- Freshwater and marine water quality;
- Habitat alteration / loss / fragmentation;
- Barriers to movement;

- Ability of habitat or species to adapt and / or recover;
- Response to changes in habitat (e.g., edge effects, increased access);
- Distribution of species;
- Invasive / non-native species;
- Response of species to Project disturbances (e.g., noise, lighting); and
- Species of special conservation concern.

The assessment of the effects on biodiversity resulting from the Project, considers the mitigation, both applied and proposed by Nalcor, as it relates to the terrestrial, freshwater and marine environments affected by the Project components. The definition and determination of significance for the effects of the Project on each of the VECs were developed to consider the aim of sustainable development (i.e., satisfying the needs of present generations without compromising the ability of future generations to meet their own needs). As such, this EA considered the sustainable development objective to preserve environmental integrity, which is linked with biodiversity. The assessment predicts that the effects of the Project will not affect the sustainability of populations, distributions or composition of fish, vegetation, and wildlife at the regional level, in any of the regions with which the Project overlaps.

The EA predicts that no significant residual effects on fish (freshwater and marine), vegetation and wildlife (terrestrial and marine), and their respective habitats (i.e., freshwater, marine, terrestrial) will occur as a result of Construction and / or Operations and Maintenance for the Project. This indicates the continued functionality of all the ecological and biological processes by which the landscape, ecosystems and species levels are linked, as they were evaluated in relation to the Project. As such, any likely effects on biodiversity within the LSA and RSA, and the province as a result of the Project, are not likely to be significant.

17.6.2 Renewable Resources

As per Section 4.5.4 of the EIS Guidelines and Scoping Document (Government of Newfoundland and Labrador and the Government of Canada 2011), Nalcor determined, based on the results of the assessment, that the Project is not likely to cause significant environmental effects on renewable resources and will not compromise their capacity to meet present and future needs. As discussed for biodiversity, renewable resources (i.e., resources that can be renewed on a regular basis, either naturally or by human action) are addressed by Nalcor as an integral part of the applicable VECs (e.g., fish (Freshwater Fish and Fish Habitat VEC; Marine Fish and Fish Habitat); wildlife (Furbearers VEC; Avifauna VEC; Caribou VEC; Marine Mammals and Sea Turtles VEC; Seabirds VEC); the forest (Vegetation VEC). As per the EIS Guidelines and Scoping Document, the analysis of the effects on renewable resources considers non-living resources (e.g., atmosphere (Atmospheric Environment VEC), freshwater (Freshwater Fish and Fish Habitat VEC) and marine (Marine Fish and Fish Habitat VEC)).

Considering the findings for each of the VECs in this EIS (i.e., no significant residual effects) and those noted for the assessment on biodiversity in the previous subsection (i.e., any likely effects on biodiversity of the LSA, RSA and the province as a result of the Project, are predicted to be not significant), the Project is not likely to result in significant effects on renewable resources. As it is predicted that the functionality of all the ecological and biological processes by which the landscape, ecosystems and species levels are linked will continue, the capacity of renewable resources to meet present and future needs is expected to continue, following Construction of the Project, extending through Operations and Maintenance.

17.6.3 Socioeconomic Environment

Components of the socioeconomic environment have been assessed separately and quantitatively / qualitatively for the Project in:

- Chapter 16, Socioeconomic Environment: Environmental Effects Assessment (see Section 16.2 Historic and Heritage Resources; Section 16.3 Communities; Section 16.4 Economy, Employment and Business; Section 16.5 Land and Resource Use; Section 16.6 Marine Fisheries; Section 16.7 Tourism; and, Section 16.8 Visual Aesthetics).

As summarized in Section 17.5, the Project is not likely to result in significant effects on the socioeconomic VECs.

The socioeconomic benefits generated through the Construction and Operations and Maintenance phases of the Project will include direct, indirect and induced employment, and business opportunities related to the requirement for goods and services. The energy transported by the Project is expected to facilitate continued development and growth in Newfoundland and Labrador's energy sector and overall economy. The electrical power that is provided will benefit current residents and businesses, as well as help attract new industry to the province. This will assist in the continued diversification of opportunities for all Newfoundlanders and Labradorians, including future generations, while at the same time, not precluding their use and enjoyment of the province's renewable resources and natural beauty (i.e., sustainable development).

17.7 Alternative Evaluation and Final Right-of-Way Routing

As discussed in Section 2.14, an important principle of EA is that it should occur at an early stage of, and therefore refine and optimize, Project planning and design. Therefore, in conjunction and concurrent with the EA process, Nalcor is continuing with its technical and environmental analysis of the identified transmission corridors, including the alternative segments, to identify and eventually select a specific ROW alignment for the transmission line.

Section 4.3.2.2 of the EIS Guidelines and Scoping Document (Government of Newfoundland and Labrador and the Government of Canada 2011) indicates that alternative means of carrying out the Project, which are technically and economically feasible, and the environmental effects of any such alternative means need to be discussed. The following discussion describes how Nalcor has, and is continuing to refine and optimize the Project (e.g., corridor selection) through planning and design, as more detailed information is collected, including the findings of the effects assessment and ongoing engineering.

The selection of a final ROW for the Project involves a "filter" approach that determines the final alignment through the consideration of engineering requirements or constraints and the avoidance of environmental, social or cultural issues, where possible and practical, at finer levels of scale, and as more detailed information is collected and considered. The process employed by Nalcor for routing the Project is discussed in detail in Section 2.12. Specifically, Section 2.12.1, describes the method of identifying a 10 km-wide transmission line study area for the Project based initially on a transmission proposal first made in the 1970s. The study area identified represents the most coarse level of filter. This exercise involved using 1:50,000 scale mapping and digital topographic data, and was undertaken with a view to reducing the line length, while at the same identifying and avoiding key known technical, environmental and socioeconomic issues and constraints such as difficult topography and meteorological conditions, protected areas and other known environmentally sensitive areas, where possible and practical.

As described in Section 2.12.2, a preferred 2 km wide transmission corridor was identified, along with various alternative corridor segments in particular areas. Corridor selection, including the alternative segments, was completed with consideration of the following factors when possible and practical, but at a finer spatial scale than the study area:

- minimize the length of the transmission line;

- avoid unfavourable meteorological conditions such as heavy icing and/or strong winds;
- avoid difficult terrain;
- minimize the requirement for new access roads and trails;
- minimize watercourse and wetland crossings;
- cross watercourses at right angles;
- avoid interactions with communities, protected areas and other known environmentally and socially important areas; and
- avoid known sites of archaeological and historic importance.

The selection of a final on-land corridor by Nalcor will require a determination of which, if any, of the alternative corridor segments will be part of that final corridor. Section 2.13.6 describes and discusses the alternative corridor segments that:

1. are specified in the EIS Guidelines and Scoping Document (Government of Newfoundland and Labrador and the Government of Canada 2011);
2. have been identified and evaluated by Nalcor and its engineering consultants as part of the Project planning and design process; and/or
3. have been identified and suggested by Aboriginal and stakeholder groups and the public as part of Nalcor's consultation activities to date.

The evaluation of the alternative corridor segments (see Table 2.13.6-1, Figure 2.13.6-1, Figure 2.13.6-2, Figure 2.13.6-3) will be based on consideration of technical and engineering requirements, cost and environmental and social issues. This evaluation of the alternative corridor segments will consider the information from the Evaluation of Project Alternatives section in Chapter 11, Chapter 12, Chapter 13, Chapter 14 and Chapter 16. In those chapters, Nalcor compared the likely residual effects predicted on the KIs of the VECs predicted for the proposed transmission corridor, with those likely residual effects on the KIs predicted for the comparable alternative corridor segment. The final corridor selected will represent a balance between engineering and technical requirements, environmental protection, and socioeconomic considerations.

During the preparation of this EIS, Nalcor continued to collect more information related to engineering and costs for the Project. Considering the engineering requirements, cost and environmental factors presented throughout the EIS, the corridor that is currently favoured includes the alternative corridor segments A2, A4, A6, and A7 with A8. Nalcor has determined that at this stage of engineering and Project planning it is this corridor alignment that is technically and economically feasible, and respects the environmental and social objectives identified.

Alternative corridor segment A2 is currently favoured at this stage of Project planning because it avoids an extreme icing zone with high altitude and high exposure. As such, A2 avoids the associated construction and operations issues and has a lower cost. From an environmental perspective there is little difference, although A2 has less adverse effects on Vegetation (i.e., wetlands and timber resources) and Avifauna (e.g., Wetland affiliated species), and greater adverse effects on Furbearers (i.e., marten, red fox, porcupine, beaver) and Avifauna (i.e., Conifer Scrub and Lichen Heathland affiliated species) as compared to the corresponding proposed corridor segment.

Alternative corridor segment A4 is currently favoured because it limits the exposure to salt contamination, increases the electrical reliability and has a lower cost. From an environmental perspective there is little difference, with greater adverse effects on Furbearers (i.e., red fox, beaver) and Avifauna (i.e., Open Conifer Forest and Scrub / Heathland / Wetland complex affiliated species) for A4 as compared to the proposed

corridor segment. The A4 alternative corridor segment would have less adverse effects on Visual Aesthetics because the towers would be approximately 3 km from the highway.

Alternative corridor segment A6 is currently favoured because from an environmental perspective A6 has less adverse effects on Caribou (i.e., less Primary Core area) and Avifauna (i.e., coniferous habitat affiliated species). This alternative corridor segment has greater adverse effects on Furbearers (i.e., red fox, beaver), Tourism (i.e., more recreational vehicles and mobile trailers) and Visual Aesthetics (i.e., scenic area crossed) as compared to the proposed corridor segment. There is no difference between the proposed corridor segment and the A6 alternative corridor segment from an engineering or cost perspective.

Alternative corridor segment A7 plus A8 is currently favoured because it avoids an extreme icing zone due to its lower altitude and exposure. As such, A7 plus A8 avoids the associated construction issues and has a lower cost, and from a maintenance and operations perspective it greatly improves system reliability. From an environmental perspective A7 plus A8 has less adverse effects on Vegetation (i.e., less wetlands, riparian vegetation and timber resources), Caribou (i.e., less Primary Core area), Land and Resource Use (i.e., better for recreation as it is further away from the proposed International Appalachian Trail network), Tourism (i.e., towers less visible from backcountry trails) and Visual Aesthetics (i.e., avoids a scenic area). The alternative corridor segment A7 plus A8 has greater adverse effects on Furbearers (i.e., red fox, beaver) and Avifauna (i.e., Conifer Habitat affiliated species and Wetland affiliated species).

Based on the above considerations, further engineering analysis, and aerial and ground surveys in the final design stage, a preferred transmission line on-land ROW averaging approximately 60 m wide will be selected (i.e., finest filter stage). The specific surveys would be developed in consultation with the appropriate regulators or as determined through the permitting process. To facilitate routing selection for the ROW, Nalcor's analysis will include a constraints mapping exercise. Inputs to this analysis and planning process will include available information on the biophysical and socioeconomic environments, any additional information collected and issues identified as part of the EA process, as well as the results of the associated Aboriginal, public and stakeholder consultations, discussions with regulators, and any associated terms and conditions of EA approval (e.g., requirements to avoid certain environmental sensitivities in the selection of a ROW).

Regardless of final ROW alignment and location of associated Project components (e.g., access), this EIS provides a comprehensive assessment of the biophysical environment and socioeconomic environment effects likely to result from the Construction, and Operations and Maintenance of the Project. This is due to Nalcor's experience and familiarity with projects of a similar nature and their likely effects, identification of well-known and effective mitigation, and employing a conservative and precautionary approach in the EIS, including consideration of the Precautionary Principle. The final alignment of the three submarine cables within the 500 m wide corridor across the Strait of Belle Isle will be selected during final engineering and driven by technical requirements, with consideration of biophysical environment and socioeconomic environment inputs and assessment (see Chapter 10, Chapter 14, Chapter 15 and Chapter 16). The sites for the L'Anse au Diable and Dowden's Point shoreline electrodes are as described in this EIS.

Once identified, and prior to final Project design and construction, Nalcor will conduct public consultations to present the proposed final transmission line route to the interested public and stakeholders. This will serve as a final check on the overall environmental acceptability of the ROW, and allow final amendments to address any important remaining environmental (biophysical and socioeconomic) issues, as required and possible. It is also important to note that many Project components and activities will require additional specific regulatory permits and / or other provincial, federal and municipal authorizations (see Chapter 3). This post-EA permitting process will provide additional opportunities for relevant regulatory departments and agencies to receive and review these detailed designs, and to establish specific terms and conditions to avoid or reduce environmental effects. Nalcor and / or its contractors will identify, apply for and adhere to all permit terms and other authorizations that are required for Project Construction, and / or Operations and Maintenance.

17.8 Monitoring and Follow-up Program Summary

The monitoring and follow-up programs are provided for each of the VECs within the EIS. As discussed, the monitoring and follow-up program details will be finalized through discussions with the appropriate regulators, Aboriginal groups and stakeholders, as outlined in Section 9.4.6 of this EIS.

As indicated in Section 9.5.5 of this EIS, Nalcor will use information provided by Aboriginal and / or stakeholder groups, or obtained during any of the monitoring and / or follow-up programs undertaken to feed into their adaptive management process for continued improvement. The adaptive management process will ensure timely, proactive responses to identified issues to limit the resulting effect.

17.9 Overall Conclusion

The Project consists of the construction and operation of a ± 350 kilovolt (kV) HVdc electricity transmission system from Central Labrador to the Avalon Peninsula on the Island. A two kilometre (km) wide corridor has been identified within which a transmission line right-of-way (ROW) with an average width of 60 metres (m) will be selected.

The Project will extend over a distance of approximately 1,100 km, and at this stage of engineering and planning includes the following key components:

- an ac to dc converter station at Muskrat Falls near the lower Churchill River in Central Labrador;
- an overhead transmission line from Muskrat Falls to the Strait of Belle Isle (approximately 400 km), using the A2 alternative corridor segment;
- marine cable crossings of the Strait of Belle Isle with associated infrastructure (transition compounds and land cables at both cable landings);
- an overhead transmission line from the Strait of Belle Isle to Soldiers Pond on the Island's Avalon Peninsula (approximately 700 km), using the A4, A6 and A7 plus A8 alternative corridor segments;
- a dc to ac converter station at Soldiers Pond, with some associated Island system upgrades; and
- electrodes, or high capacity grounding systems, in the Strait of Belle Isle (Labrador) and Conception Bay (Newfoundland), connected to their respective converter stations by small overhead transmission lines.

In this EIS, Nalcor has demonstrated adherence to the basic principles of environmental assessment as outlined in Section 2 of the EIS Guidelines and Scoping Document (Government of Newfoundland and Labrador and the Government of Canada 2011). These principles are: using environmental assessment as a planning tool; Aboriginal and public participation is a central objective; collection and consideration of Aboriginal traditional and community knowledge; promotion of sustainable development; and applying a precautionary approach (as per the Precautionary Principle) in the planning and assessment of the Project.

The conclusion of this EIS is that the likely residual environmental effects (positive or negative) that result from the Construction, and Operations and Maintenance of the Project, are not likely to be significant. Considering this, and the commitments made in this EIS, Nalcor respectfully submits that the Project will be constructed, and operated and maintained in an environmentally responsible manner, respecting the principles of sustainable development. The Project will preserve ecosystem integrity, respect the right of future generations to the sustainable use of renewable and non-renewable resources, and enhance the lives of all Newfoundlanders and Labradorians.

17.10 References

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ENVIRONMENTAL IMPACT STATEMENT

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Nalcor Energy
Hydro Place. 500 Columbus Drive
P.O. Box 12800. St. John's. NL
Canada A1B 0C9

T. 709.737.1833 or 1.888.576.5454
F. 709.737.1985
nalcorenergy.com/lowerchurchillproject.com

nalcor energy
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