PROPOSED BAY D'ESPOIR TO WESTERN AVALON TRANSMISSION LINE (TL 267)

Environmental Assessment Registration Pursuant to the *Newfoundland and Labrador Environmental Protection Act*

> Submitted by: Newfoundland and Labrador Hydro

> > July 2015



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Environmental Assessment Registration

Pursuant to the Newfoundland & Labrador Environmental Protection Act (Part X)

Submitted by:

Newfoundland and Labrador Hydro

A Nalcor Energy Company Hydro Place, 500 Columbus Drive PO Box 12400 St. John's, Newfoundland and Labrador A1B 4K7 Canada

Prepared by:

Amec Foster Wheeler Environment & Infrastructure

A Division of Amec Foster Wheeler Americas Limited 133 Crosbie Road, PO Box 13216 St. John's, Newfoundland and Labrador A1B 4A5 Canada

July 2015

Amec Fw TF 15104156



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1.0 INTRODUCTION

PROJECT NAME: Proposed Bay d'Espoir to Western Avalon Transmission Line (TL 267)

1.1 Nature of the Undertaking

Newfoundland Labrador Hydro (Hydro) owns and operates an extensive electrical generation and transmission system on the Island of Newfoundland, which includes a 613 megawatt (MW) hydroelectric generation station at Bay d'Espoir in the south-central portion of the Island, as well as several transmission lines that extend between it and other electrical infrastructure and load centres across the Island.

The proposed development project that is the subject of this Environmental Assessment (EA) Registration includes the construction and operation of a new 230 kilovolt (kV) transmission line that will be approximately 188 km long and connect the existing Bay d'Espoir and Western Avalon terminal stations (hereinafter also referred to as the "Project" or "TL 267"). The proposed TL 267 will parallel existing transmission line infrastructure (TL 202 and TL 206) from Bay d'Espoir to Come By Chance and further parallels TL 203 (and eventually, the existing TL 237) from Come By Chance to the Western Avalon substation in Chapel Arm (Figure 1.1). Along with the planned development of TL 267 itself, upgrades to existing infrastructure at the Bay d'Espoir and Western Avalon terminal stations will also be undertaken as part of this Project.

1.2 Purpose of the EA Registration

The proposed Project is subject to Part 10 of the Newfoundland and Labrador *Environmental Protection Act* and its associated *Environmental Assessment Regulations*. This document is intended to initiate the provincial EA review, and in doing so it:

- Identifies the Project's Proponent and outlines its goals, core values and environmental management approaches and procedures;
- Describes the proposed Project, including its overall purpose, rationale and alternatives, as well as its key components and planned construction and operational activities;
- Gives an overview of the existing environmental setting for the Project, including relevant aspects of the biophysical and socioeconomic environments in the Project Area and surrounding region;
- Describes a number of recent Project-related consultation activities undertaken by Hydro and the main findings of these engagement initiatives; and
- Identifies and assesses a number of environmental considerations that may be associated with the Project, as well as Hydro's planned approaches for addressing these in Project planning, design and eventual implementation.

This EA Registration document has been prepared and submitted by Hydro, as the Proponent of the Project, with assistance from Amec Foster Wheeler Environment and Infrastructure.





1.3 The Proponent

Newfoundland and Labrador has an immense and diverse energy warehouse. In 2007, guided by a long-term Energy Plan to manage these energy resources, the Government of Newfoundland and Labrador created a new provincial energy corporation - Nalcor Energy - whose vision is to build a strong economic future for successive generations of Newfoundlanders and Labradorians. The corporation currently has six lines of business (Figure 1.2):





Hydro is the Proponent of the proposed TL 267 Project, and is the primary generator of electricity in the province. With an installed generating capacity of 1,792.6 MW, the company generates and transmits over 80 percent of the electrical energy that is used by Newfoundlanders and Labradorians, most of which is comprised of clean, hydroelectric generation.

Hydro is committed to delivering safe, reliable, least-cost power to industrial, utility and over 38,000 direct customers in 200 communities in rural Newfoundland and Labrador, and has been doing so for more than 50 years. Hydro's regulated assets include nine hydroelectric generating stations (959 MW), one oil-fired plant (490 MW), four gas turbines (273.5 MW), and 25 diesel plants (70.1 MW), and the company also maintains 54 high-voltage terminal stations, 25 lower-voltage interconnected distribution stations, and thousands of kilometres of transmission and distribution lines throughout the province.

Hydro's electrical system includes the Bay d'Espoir Hydroelectric Generating Facility in south-central Newfoundland, which has been in operation since 1967. The headwaters of this system begin at Victoria Lake at an approximate elevation of 320 m. Through an array of dams and canals, water is directed to generating plants at Granite Canal, Upper Salmon and finally to its final tidewater destination at Bay d'Espoir, located some 150 km from Victoria Lake. Water is collected, stored and diverted from a number of drainage areas between Victoria Lake and Long Pond, the forebay for the Bay d'Espoir generators. The seven generating units at Bay d'Espoir utilize approximately 176 m of head to produce a rated output of 613 MW with a rated flow of 397 cubic metres per second. The plant produces an average of 2,650 gigawatt hours (GWh) annually, making it the largest hydroelectric plant on the Island of Newfoundland.

Hydro is focused on long-term strategic capital planning to ensure an on-going, reliable source of electricity now and for future generations. Its continuous infrastructure upgrades and use of new technology are some of the ways in which the company commits to providing excellent customer service. The utility is fully dedicated to operational excellence and environmentally sound practices while delivering reliable service at the least cost.

Name of Corporate Body:	Newfoundland and Labrador Hydro (a Nalcor Energy Company)
Address:	Hydro Place, 500 Columbus Drive
	P.O. Box 12400, St. John's, Newfoundland and Labrador
	Canada A1B 4K7
	Tel (709) 737-1400
	Toll Free 1 (888) 576-5454 (Canada only)
	Fax (709) 737-1800
	Email hydro@nlh.nl.ca
President and	
Chief Executive Officer:	Edmund J. Martin
Principal Contact Persons	
for the Purposes of	
Environmental Assessment:	Brent Sellars
	Team Lead, Capital Projects / Environmental Assessment
	Tel. (709) 737-1764, Email. bsellars@nalcorenergy.com
	Jackie Wells
	Environmental Specialist - Environmental Assessment
	Tel. (709) 737-1711, Email. jackiewells@nalcorenergy.com

Additional information on Hydro, including its overall organization, vision, goals, values, priorities and activities, can be found at: www.nlhydro.com

Hydro strives to be a leader in environmental protection and sustainability, and is committed to maintaining a high standard of environmental responsibility and performance. Hydro has constructed and currently operates an extensive electricity transmission system throughout Newfoundland and Labrador (Figure 1.3). This includes interconnected electrical power systems on the Island and in Labrador, as well as isolated distribution systems in rural areas of the province.

Environmental protection is an integral part of Hydro's planning, construction, operation and maintenance programs. 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. It also has an outstanding record of environmental protection and stewardship, and these objectives and this experience will be applied to the planning and development of this Project to avoid or reduce potential environmental effects during its construction and operations phases. This, in combination with the fact that the environmental effects of transmission lines are generally well understood and manageable, means that the Project can, and will be, planned and implemented to avoid or reduce potential adverse environmental effects and to optimize benefits.





1.4 Environmental Assessment Processes and Requirements

The Newfoundland and Labrador *Environmental Protection Act* (*NL EPA*) requires anyone who plans a project that could have a significant effect on the natural, social or economic environment (an "Undertaking") to present it for examination through the provincial EA process.

The associated *Environmental Assessment Regulations* (Part 3) list those projects that require registration and review. These include, for example:

34. (2) An undertaking that will be engaged in the construction of new electric power transmission lines or the relocation or realignment of existing lines where a portion of a new line will be located more than 500 metres from an existing right of way ...

The proposed Project will, as described earlier and throughout this document, be developed immediately adjacent to existing transmission lines that have been in place for several decades. The definition of an "Undertaking" in the *NL EPA* also includes proposed modifications, rehabilitations and extensions of such projects, and in addition, Section 28 of the *Environmental Assessment Regulations* state that:

28. An undertaking that will occur within 200 metres of the high water mark of a river that is a scheduled salmon river under the Fisheries Act (Canada) shall be registered.

Following public and governmental review of this EA Registration, the Minister of Environment and Conservation will determine whether the Project may proceed, subject to any terms and conditions and other applicable legislation, or whether further assessment is required.

In addition to approvals under the provincial EA process, the Project will also require a number of other authorizations from relevant regulatory authorities. These are discussed further in a later section of this document.

2.0 PROJECT DESCRIPTION

The proposed Project will involve the construction and operation of approximately 188 km of new, 230 kV steel tower transmission line between Bay d'Espoir and the western portion of the Avalon Peninsula on the Island of Newfoundland.

The proposed TL 267 will parallel existing transmission line infrastructure (TL 202 and TL 206) from Bay d'Espoir to Come By Chance and further parallels TL 203 (and eventually, the existing TL 237) from that location to the Western Avalon Terminal Station in Chapel Arm. In addition to the proposed development of TL 267 itself, upgrades to existing infrastructure are proposed at the Bay d'Espoir and Western Avalon terminal stations. Once operational, the Project will be subject to regular inspection and repair as required, as part of Hydro's overall maintenance programs for its electrical system on the Island of Newfoundland.

2.1 Project Purpose, Rationale and Need

Hydro currently owns and operates significant electrical generation and transmission infrastructure throughout Newfoundland and Labrador, including existing transmission lines to, from and within the Project Area that provide electrical power to industrial, commercial and residential customers in the province. Once developed, the proposed Project will be an integral component of the province's electrical system.

In December 2012, the Government of Newfoundland and Labrador announced the sanctioning and planned development of the Muskrat Falls Project as the least cost alternative to meeting the long-term energy requirements of the province. With this new electrical generation facility and associated transmission infrastructure coming online in the near future, the Island system will inevitably experience changes in terms of overall loading and system requirements and performance, and will require additional and expanded infrastructure to allow for the receipt and distribution of this large volume of power. Even without the Muskrat Falls Project and its associated Labrador-Island Transmission Link (L-ITL), maintaining Island system stability would have required the development of the new transmission line described herein, due to the associated requirement to develop additional electrical generation sources off the Avalon Peninsula and bring that power to the region.

The fundamental rationale for, and key driver of, the proposed TL 267 Project is to ensure the continued stability and reliability of the Island Interconnected System, particularly during future faulting events, such as those that may be caused by lightning strikes, equipment failure or other factors. During any such events, the system must be capable of interrupting and isolating the faulted equipment while it is being repaired without causing widespread interruptions to customers' power supply. The overall need for TL 267 was highlighted during the initial studies aimed at identifying the least cost option for providing a long term supply for the Island of Newfoundland, and as noted above it was determined to be required under both an isolated system and an interconnected (with Muskrat Falls) scenario. The presence of this new transmission line infrastructure may also help facilitate the future development of other renewable generation sources located off the Avalon Peninsula on the Island of Newfoundland.

The Board of Commissioners of Public Utilities approved the Project in December 2014. In its approval dated December 12, 2014, the Board noted that: "Hydro has established the need for this project and has completed

the necessary studies and analysis to select the least-cost alternative. The Board is satisfied that the proposed transmission line is necessary to ensure that Hydro can continue to provide service which is safe and adequate and just and reasonable." The full Order from the Board is included as Appendix A.

In addition to these overall and long-term rationales and benefits, the proposed TL 267 will also contribute to local and provincial economies as a result of the employment and business activity that it will create, especially during its construction phase. As its proponent, Hydro is very encouraged by the benefits that will be realized through this development, and is confident that any environmental questions and considerations that may be associated with it can be addressed through sound planning, design and implementation, supported by public and stakeholder consultation and involvement.

2.2 Project Planning and Alternatives

The consideration of environmental issues from the earliest stages of project planning and design is an important and integral part of Hydro's approach to its development projects and other activities. This approach allows potential environmental interactions to be identified early, so they can be considered and addressed in a proactive manner through appropriate development planning and design. The objective is to attempt to avoid adverse environmental effects where possible and practical, or at least, to put in place appropriate mitigation measures to ensure that these are maintained at acceptable levels.

Nowhere is this approach more relevant (and often possible) than in the case of transmission line planning and design. As a linear development with only its required start and end points established, a range of alternative approaches, designs and routings can typically be identified for these types of developments. These options can then be evaluated on the basis of technical, economic and environmental considerations and constraints, in order to identify and select a project design option that meets planning objectives, while at the same time being technically and economically feasible and environmentally acceptable.

As part of its planning and design processes to date for TL 267, Hydro has identified a preferred routing and several alternative routing options (Figure 2.1), each of which have been evaluated on the basis of environmental, socio-cultural, economic and technical factors. These included the following considerations and objectives:

- minimizing the overall length of the new transmission line to the extent possible and practical;
- attempting to follow along existing linear developments and other infrastructure where possible, for both technical reasons and to avoid opening up currently remote areas to increased human presence and associated resource harvesting activities;
- avoiding difficult terrain and/or unfavourable meteorological conditions where possible;
- minimizing the requirement for new access roads and trails for Project construction and future maintenance activities; and
- attempting to avoid interactions with identified environmentally sensitive and socially important areas.





As illustrated, Hydro's preferred transmission line routing option parallels existing transmission lines for its entire length from the Bay d'Espoir terminal station, east to Come By Chance for 144 km and then southeast for 44 km to the Western Avalon terminal station, for a total length of approximately 188 km.

The first alternative (north option), runs north from the Bay d'Espoir terminal station along Highway Route 306 until it crosses over the Terra Nova River, at which point it turns east, extending through the Middle Ridge area to Port Blandford where it then veers south terminating at the Western Avalon terminal station. The total length of the north option is approximately 259 km.

The second alternative (south option), follows the same routing as the above described preferred transmission route from Bay d'Espoir to the western edge of the Bay du Nord Wilderness Reserve. This option then veers south, and avoids the Reserve by going around its southern boundary for approximately 57 km before rejoining the existing transmission line and then following the preferred route to the Western Avalon terminal station. The total length of the south option is approximately 218 km.

As noted above, a number of factors have been identified and considered in the selection of the above noted preferred routing option for the TL 267 Project, an evaluation and summary of which is provided below for each of the identified alternatives:

1) North Option

- Requires approximately 259 km of new transmission line right of way, approximately 97 km of which is within undisturbed forest habitat.
- Its development would also provide access to various areas and locations which are currently inaccessible, with associated concerns regarding future (induced) human activities in these areas and their associated environmental effects.
- This routing would intersect with known calving and post-calving grounds for the Middle Ridge caribou population.
- The overall length of this option is approximately 71 km longer than the preferred route, resulting in considerably higher construction and maintenance costs and increased construction time.
- From an electrical system planning perspective, this option will also likely have higher additional costs and greater technical challenges with regard to tower design and placement and conductor selection.

2) South Option

- Requires approximately 30 km of additional transmission line right of way as compared to the preferred route, through undisturbed forest habitat with associated technical and economic considerations.
- Would result in the removal of an area of old growth forest habitat and would likely have a greater probability of interacting with a species of conservation concern, the Boreal Felt Lichen (*Erioderma pedicellatum*).

• The development of this alternative would also open up human access to areas which are currently inaccessible.

3) Preferred Route

Hydro's planning and design for the routing of TL 267 has again been based on the objective of establishing it along the existing transmission lines and/or other linear developments in the region for technical, economic and environmental reasons. For the proposed (preferred) route, the new transmission line will occupy a new cleared right of way of up to 40 m in width and approximately 188 km in length, located adjacent to existing transmission lines in the region.

As described earlier, there are currently two steel 230 kV transmission lines from the Bay d'Espoir terminal station to Sunnyside and a 230 kV wood pole line from Sunnyside to the Western Avalon terminal station. There are also existing access trails along the entire transmission line route, including west of Piper's Hole (approximately five kilometers west of Swift Current), which are in place for the ongoing maintenance of this infrastructure. The preferred route avoids the creation of new access to currently remote areas by paralleling existing linear developments, as well as minimizing the Project's overall environmental footprint by being the shortest and most direct route, which, in turn also reduces construction and maintenance costs. This route has therefore been identified as the most environmentally, economically, socio-culturally and technically feasible option.

An important principle of EA review (and particularly, the initiation of same) is also that it should occur at a relatively early stage of, and therefore influence and seek to improve, project design. In conjunction and concurrent with the EA registration and review process, Hydro will be continuing with detailed Project engineering and planning, including its technical and environmental analysis of the identified transmission route and the location and layout of the other Project-related components. Based on the results of on-going and future engineering analysis and aerial and ground surveys in the final design stage, the final transmission line right of way will be delineated and particular components for TL 267 will be designed and sited, including individual tower placements and other Project related components and infrastructure. Again, these will be evaluated and selected with consideration of technical, environmental and socioeconomic factors.

2.3 Project Components and Lay-out

The proposed Project includes the construction and operation / maintenance of the following primary elements (Figure 2.2):

- A 188 km long, 230 kV transmission line between the Bay d'Espoir and Western Avalon terminal stations, comprised of steel towers with both overhead ground wire (OHGW) and an optical ground wire (OPGW) which includes optical fibre for communication along its entire length;
- Required upgrades to the existing Bay d'Espoir and Western Avalon terminal stations; and
- Project construction and maintenance infrastructure requirements, including a temporary camp, access routes and other components as required.





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The following sections provide an overview description of the Project's key components, based on previous and ongoing engineering studies and reflecting the current stage of Project planning and design. As described above, the Project is the subject of ongoing planning and engineering design, and as with any development project this will be subject to continued refinement and optimization as its planning and eventual implementation phases move forward.

2.3.1 Transmission Line 267 from Bay d'Espoir to Western Avalon

The new transmission line will leave the existing Bay d'Espoir terminal station and extend east along the existing TL 202 and TL 206 for a distance of approximately 144 km until it reaches Come By Chance, at which point the proposed right of way line turns southeast and crosses the TCH. From there, the new TL 267 meets the existing 230 kV woodpole line (TL 203) in this area and follows it (and eventually, TL 237) south for a distance of approximately 44 km until it reaches the Western Avalon terminal station (see Figure 2.2). The proposed transmission line will be entirely located adjacent to existing transmission lines between the Bay d'Espoir and Western Avalon terminal stations (Figures 2.3 and 2.4). The centre line for the TL 267 right of way will be located approximately 40 m south of the centre line of the existing, adjacent transmission line from Bay d'Espoir to Come By Chance, and follows 40 m to the west of TL 203 and TL 237 centerline with few deviations from Come By Chance to the Western Avalon.



Figure 2.3 TL 267 Right of Way in Relation to Existing, Adjacent Transmission Lines



Figure 2.4 Photographs of Existing Transmission Lines from Bay d'Espoir (TL 202 and TL 206)



Potential variations from this particular routing may occur as engineering and planning progress, based on technical, topographic, environmental or other factors. The proposed transmission line will occupy a cleared right of way approximately 40 m in width, which is governed primarily by its electrical voltage, required conductor clearances and its proximity to existing transmission lines.

A number of possible transmission tower structure types are being considered and evaluated for the TL 267 Project. The most likely option would see the use of guyed-Y lattice steel structures for tangential structures (Figure 2.5) with free-standing lattice structures where angles and dead-ends are required. The guyed-Y structure uses a galvanized steel grillage foundation (approximately 2 m by 2 m in size) for the centre mast and has four supporting guy wires connected to foundations in the ground. Rock foundations may also be used where sound bedrock is present. The towers and any associated foundations will be contained entirely within the cleared transmission line right of way itself. Specific tower heights for the transmission line will be governed by ground clearance requirements and therefore will depend on the terrain at particular sites along the route, but towers will generally average approximately 105 feet (32 m). Under the current development concept, the transmission line towers will carry three phases (wires), each of which will be comprised of a single 804 kcmil, 54/19, AACSR/TW conductor. The transmission towers will carry two overhead wires, one to provide protection from lightning strikes (the OHGW) and one which will be a fibre optic cable for communications (the OPGW).



Figure 2.5 Typical Guyed-Y Lattice Steel Structure (Shown here without insulators or conductor)

The transmission towers will be spaced approximately 400 m apart from Bay d'Espoir to Piper's Hole and approximately 300 m apart from Piper's Hole to the Western Avalon terminal station. Based on this spacing, approximately 550 tower structures will be developed across the length of the transmission line. As described later, the specific locations and configuration of the transmission towers will be determined in the field during detailed design, and will be influenced by such factors as terrain, line angle, design capacity and environmental loading.

To reduce the electrical resistance between the transmission towers and the ground and to further protect the line against damage from lightning surges, counterpoise will be installed along the entire TL 267 right of way. This will be comprised of a galvanized steel wire that will be attached to the base of each tower and then ploughed approximately 30 cm beneath the ground and buried. The counterpoise will generally follow the approximate centre line of the right of way along the entire length of the transmission line, and where required it will be terminated using grounding rods, such as where the TL 267 crosses large waterbodies or watercourses.

Appendix B provides a map atlas that illustrates the proposed transmission line route in greater detail over a series of topographic maps.

2.3.2 Bay d'Espoir and Western Avalon Terminal Stations

At the existing Bay d'Espoir Terminal Station, three 230 kV circuit breakers, six 230 kV motor operated disconnect switches and associated control panels will be added to complete the breaker-and-one-half arrangement on the first two legs of the station layout and accommodate the new 230 kV transmission line termination on a third leg (Figure 2.6). The proposed work will effectively convert the existing ring bus to a breaker and half scheme adding additional reliability for some operating contingencies, such as breaker fail operations.

The original station design at the Bay d'Espoir terminal station included space for an additional electrical breaker and one half diameter, and expansion outside the existing station footprint is therefore not required. The new station diameter will include standard air insulated switchgear (AIS) using modern circuit breakers and associated equipment and infrastructure. Support equipment, including take-off structures for the overhead lines, will be similar to the existing infrastructure. New protection and control panels will be required in the existing control building, as well as associated station modifications to run the control wiring. Connection to the SCADA (supervisory control and data acquisition) system for communication with the Energy Control Centre is also required.

At the existing Western Avalon terminal station, a new 230 kV ring bus consisting of four 230 kV circuit breakers is proposed to be installed in the southwestern corner of the facility (Figure 2.7), which will result in a small expansion of the existing yard to the south, and realigning the internal switchyard access road slightly to the west.

The Western Avalon terminal station upgrade will involve the addition of a gas insulated switchgear module given the lack of easily usable space around the station and the cost of developing new land in the area, and thereby reducing the environmental footprint required.



Figure 2.6 Bay d'Espoir Terminal Station: Existing Infrastructure and Proposed Upgrades

Figure 2.7 Western Avalon Terminal Station: Existing Infrastructure and Proposed Upgrades



2.4 Construction

As described above, the Project will include the upgrading of existing stations and clearing for and erecting of overhead transmission lines and associated infrastructure in south-central and eastern Newfoundland. A general overview of the main activities that will be associated with the construction phase of TL 267 is provided in the following sections.

The transmission line itself will be very similar to other existing transmission infrastructure in Newfoundland and Labrador and elsewhere. It will be constructed with commonly used construction practices and in accordance with Hydro's standard practices and procedures and applicable regulatory requirements.

2.4.1 Construction Infrastructure

A key requirement for Project construction will be ensuring adequate access to the area for the transportation and distribution of personnel, equipment and materials to the work sites. As each transmission tower structure will require construction and installation activity involving heavy equipment, some degree of access is required to each work location.

The Trans-Canada Highway (TCH) provides year-round road access to and between the communities of Come By Chance and Chapel Arm (Western Avalon) and will be used to move equipment and materials to the TL 267 Project Area where required, including for use in the construction of the new 230 kV transmission line and the planned upgrades to the Western Avalon terminal station. For the section of new transmission line between the Heritage Run (Highway Route 210) and the TCH, it is likely that access will occur from both sides where the transmission line meets the road. The transmission line then runs adjacent to the Heritage Run for approximately 12 km. From there, there are several access points near Spencer Point and Piper's Hole. Hydro also maintains a number of access trails and approved fording sites as part of its on-going operation of the existing transmission lines through this region (see maps in Appendix B). Along the proposed transmission line route west of Piper's Hole, access becomes limited to these trails which are currently in place for the maintenance of the existing transmission lines.

These existing highways, access roads and trails will be used to transport construction equipment and materials to select staging and storage sites along the transmission line route (see below), from which these materials will eventually be transported along the existing and/or newly cleared transmission line right of way to individual work sites. This will involve the required upgrading of some existing access roads and trails in the areas, as well as the establishment of one or more access trails along (and within) the right of way (although in certain areas it may be necessary to route around waterbodies or other difficult terrain). The movement of equipment and materials along these trails will also require watercourse crossings at various locations, through fording (new and existing), and culvert or bridge installation, depending upon local site conditions, environmental characteristics and sensitivities and other technical, regulatory and economic considerations. In all cases, access approaches, routes and any associated watercourse crossings will be selected, designed, constructed and maintained in accordance with good industry practices and in compliance with all applicable legislation and regulations. In keeping with corporate policy and practice and regulatory requirements, each watercourse crossing will be evaluated and applicable permits acquired and complied with prior to and during construction.

Upon completion of TL 267 construction, a number of access trails will continue to be maintained to provide an appropriate level of access for transmission line maintenance activities.

Since the enactment of the provincial *ATV Regulations* in 1996, Hydro has had an on-going program to upgrade its existing transmission line access trails. This program involves the field assessment of existing access trails to identify terrain conditions and any environmental issues that may be associated with them. Where practical and terrain conditions permit, existing access trails are relocated to better, more stable, terrain with less potential environmental sensitivities. Existing ford sites are assessed and either upgraded as ford sites or converted to culvert or bridge sites to accommodate the proposed work. The intent is to undertake the same process for existing access trails within the existing Bay du Nord Wilderness Reserve. Sections of existing access trails abandoned as part of this process will no longer be used and left to re-vegetate naturally. The upgraded trails will be located using a GPS and mapped with the revised maps provided to Parks and Natural Areas and Crown Lands and included in the Hydro EPP that outlines how annual operation and maintenance activities are managed.

An assessment of existing access trails associated with the TL 202 / 206, TL 203 and TL 237 rights of way which will be used during the TL 267 Project was completed by Hydro in June and July 2015. The intent of this assessment was to identify the current condition of, and any environmental sensitivities associated with, these existing access trails. This assessment report will be used to identify existing trails that require relocation or upgrade as part of the TL 267 Project. Trail upgrade may include, but is not limited to, the placement of fill material, upgrade of ford sites and installation of bridges and culverts. Access trail upgrade work will be finalized as part of the on-going engineering design for the Project. The location of existing access trails and associated watercourse crossings are shown on maps included in Appendix B of this document.

As the current plan is to undertake Project construction year-round, the use of winter access trails will be optimized in order to minimize ground disturbance and any associated environmental issues. Ground access may also be supplemented by the use of helicopters for transporting construction personnel in particular areas, the specific nature and degree of which will be determined as Project planning progresses.

It is expected that most construction materials will arrive through Argentia on the western side of the Avalon Peninsula, and will be stored at Nalcor Energy's existing marshalling yard at that location before being transported to the Project Area. At strategic points along the right of way or at other key sites, a series of smaller, temporary laydown areas may also be established to receive and temporarily store materials and equipment for use in Project construction, the exact number and location of which will be determined and defined through eventual construction planning and associated logistical considerations.

The construction work force will be housed primarily in existing and available accommodations in communities near the western and eastern ends of the proposed transmission line, with construction personnel being transported to and from the work sites each day. Given the location and overall extent of the transmission line, at least one temporary construction camp will be required along the right of way. This facility would have the capacity to house approximately 150-200 workers, will occupy an area approximately 120 m by 120 m in size, and will be comprised of bunkhouses, a kitchen, a dining hall and a recreation area, as well as being equipped

with a first aid station, communications system, water supply, sewage systems and a fuel supply. Any such camp(s) will not be located within the Bay du Nord Wilderness Reserve, and would be established and operated in compliance with regulations and approvals, including with regard to its location, design and associated water and sewer systems.

Construction of the lines and associated structures will require materials for fill and aggregates. Existing quarries and borrow pits will be used where possible, with additional fill being obtained as required from within the new or existing rights of way. Any new quarries and borrow pits that may be required for Project construction will be identified, permitted, established and decommissioned in accordance with applicable regulatory requirements.

As noted previously, the transmission towers will include galvanized steel grillage foundations with supporting guy wires connected to anchors in the ground. Rock foundations / anchors will be used in the presence of sound bedrock, for which a minimal amount of concrete is required for leveling. This concrete is typically mixed on-site (in a truck mounted mixer), but can be sourced from existing local suppliers depending on location and availability. No on-site concrete batch plants will be required or developed for the Project, and any associated water use will be minimal. Any and all cement production and use will be conducted in accordance with applicable regulatory requirements.

2.4.2 Construction Activities and Sequence

Due to the linear nature of transmission lines, their associated construction activities are typically conducted in succession and concurrently. The start of each activity is often staggered to allow crews to move along the transmission line route completing each phase of construction ahead of the next. Work programs can begin and proceed separately in different segments of the line. An overview of planned construction activities is provided in the section that follows.

Electrical equipment at the existing Bay d'Espoir terminal station site will be modified and upgraded as required to support the operation of TL 267, with all required work being contained within the existing yard. Activities that could occur at the Western Avalon terminal station will include standard site preparation work involving clearing, leveling, excavating, installation of concrete foundations and supporting structures, building and access road modifications, as well as the installation and testing of the associated electrical equipment. These will be undertaken using standard construction practices and in accordance with applicable regulatory requirements.

Preparation of access trails and any required installations of temporary culverts or bridges or required work at ford sites and on wetlands will be completed in advance of equipment use and clearing operations.

The detailed delineation and eventual clearing of the 40 m wide right of way for the Project will then follow. Right of way preparation will be carried out in accordance with standard utility practices and procedures and will involve the removal of all vegetation that exceeds 1-2 m at maturity, with the exception of vegetated buffer zones that will remain at watercourse crossings and other sensitive areas, as described below. Clearing will consist of cutting tree trunks parallel to and within 15 cm of the ground or lower and properly disposing of all standing trees, as well as the removal of all shrubs, debris and other such materials. Clearing methods will include both mechanical and manual means, with most vegetation being cleared using mechanical harvesters to

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remove the timber but with chainsaws being used for small scale clearings (such as tree removal adjacent to a watercourse), as required. Brush and slash will be neatly piled along the right of way, with regular breaks in slash windrows to allow surface water flow and wildlife passage. Any merchantable timber that is not used for Project related reasons (such as crossing sites) will be salvaged, limbed and stacked. The merchantable timber is the property of the provincial government and is managed by the provincial Department of Natural Resources, and it will therefore be that Department's decision as to whether the stacked timber will be made available for public use.

At watercourse and road crossings, the width of the cleared right of way will be reduced to approximately five metres for a distance of 20 m on either side of the crossing, and selective cutting may also be completed in these areas to remove danger trees. If danger trees outside of the right of way are identified and could be a hazard to safe operation, these trees will also be removed. All woody debris generated at these crossings will be removed from the stream banks and placed in a location within the right of way where it will not enter the watercourse or impede natural drainage. Grubbing and soil excavation will occur at tower foundation locations only.

Following right of way clearing, field survey crews will physically mark (stake) the specific locations of the transmission towers, foundations and anchors using GPS technology and the detailed mapping and spatial imagery acquired by Hydro.

As the right of way for the transmission line is cleared, the next phase of construction involves the distribution of foundation steel to the selected and surveyed tower locations. Materials will be distributed to work areas by rubber tired vehicles, such as flatbed trailers and boom trucks as dictated by the terrain or other environmental considerations and via the routes identified previously. At each tower location, the steel foundations and anchors will then be assembled and installed.

Tower foundation and anchor installation will require the excavation of material at each of the tower locations, and the installation of the grillage structure as required. The size of each grillage foundation and associated depth will vary with tower characteristics and soil strength. Tower foundations and anchors may also be on bedrock, which may involve blasting and will typically require rock anchors. In order to prepare the foundations and anchors, borrow materials may be required which will be acquired from within the right(s) of way when possible. In wetland areas, bog material will be removed prior to foundation installation, and untreated wood or steel cribs will be backfilled with borrow material and installed to provide stability to the foundations.

Once the tower foundations are in place, lattice steel will be distributed to each tower location, after which the assembly and erection of tower structures will be completed in stages. The steel components will be bolted together on the ground adjacent to the tower location to form the lattice structure. Off-road equipment and cranes will then be used to attach the tower sections and to lift the tower into place, at which time it will be bolted to the foundations. As required, guy wires will be attached to the tower, anchored to the ground using drilled soil / rock anchors, and tensioned to keep the tower in place. Hardware such as insulators will then be attached to the towers in preparation for the installation of the conductor. Typically, it will take a six to eight member crew between one to three days to assemble and erect a tower, and tower assembly will generally occur at the site where the tower is to be erected.

The next stage in transmission line construction is distribution of conductor reels to specific locations. Stringing of conductor and attaching it to the tower structures can be accomplished with tracked equipment or by helicopter, with sections of up to 20 transmission towers being strung at a time. The conductor will be rolled onto the line using travelers, which are pullies or stringing blocks used to facilitate stringing from structure to structure, and attached by line crews. The conductor is then tensioned and sagged to ensure that the correct design tension is applied and the necessary ground clearance is maintained. A tensioner holds the wire to set the sag, and the wire is then marked, cut, equipped with hardware and installed.

Once the above described installations are completed, transmission line crews from Hydro will conduct an inspection of each tower. Towers are individually climbed and inspected for any deficiencies and these are corrected as required. Upon completion of these inspections the line will be commissioned and energized.

At the end of construction activity, final clean up and restoration of the right of way and other work sites will occur. This could include grading and back-blading of any heavily disturbed areas, removal of any temporary structures such as culverts and bridges, and revegetation of any erodible or unstable soils. Any infrastructure that is not required for Project operation and maintenance will be decommissioned upon completion of construction, which include the removal of the temporary camp, some access trails and watercourse crossings, borrow pits, temporary lay down areas and others. Borrow pits excavated along the right of way will be rehabilitated as work is completed in that area. Full time environmental monitoring will occur through all phases of the construction of TL 267.

2.4.3 Construction Workforce

Project construction will be carried out on a contractual basis, with workers hired at the discretion of the Contractor and in accordance with its own hiring practices and policies. Once construction is completed, the facility will continue to be operated using Hydro's existing workforce. Hydro supports employment and gender equity in its hiring and contracting practices.

An initial estimate of the Project's required construction labor force, by number, occupation and National Occupational Classification (NOC) code, is provided in Table 2.1.

Component / Activity/ Occupation	Estimated Number (Preliminary)	NOC Code		
TRANSMISSION LINE CONSTRUCTION				
Clearing (5 work units)				
Heavy Equipment Operator	50	7421		
Foreman	5	7205		
Mechanic	5	7312		
Labourer	5	7611		
Chainsaw Operator	4	8421		
Engineering				
Civil Engineer	1	2131		
Project Manager	1	711		

Table 2.1Occupations Likely to be Represented by the Construction Work Force

Component / Activity/ Occupation	Estimated Number (Preliminary)	NOC Code
Land Surveyor	1	2154
Geo Technician	1	2144
CAD	1	2253
Field Survey (2 crews)		
Land Surveyor	4	2154
Labourers	2	7611
Foundations (4 crews)		
Land Surveyor	2	2154
Equipment Operator	8	7421
Labourer	12	7611
Foreman	4	7421
Steel Assembly (4 crews)		
Heavy Equipment Operator	4	7421
Labourer	28	7611
Foreman	4	8421
Soil/Rock Anchors (2 crews)		
Drill Operator	2	7372
Labourer	4	7611
Foreman	1	8421
Tower Erection (1 crew)		
Heavy Equipment Operator	2	7421
Foreman	1	7421
Linemen	6	7244
Stringing (1 crew)		
Heavy Equipment Operator	8	7421
Linemen	15	7244
Labourer	5	7611
Foreman	5	8421
Support		
Safety Officer	2	2263
Environmental Inspector	2	2263
QA / QC Tech	4	2233
Cost Control	1	1411
Labourer	3	7611
Heavy Equipment Operator	3	7421
Scheduling	1	1474
Construction Manager	4	7205
TERMINAL STATION UPGRADES	i i	
Steel Erection and Buswork		
Heavy Equipment Operator	1	7421
Labourer	2	7611
Linemen	2	7244
Foreman	1	7205

Component / Activity/ Occupation	Estimated Number (Preliminary)	NOC Code
Equipment Installation		
Heavy Equipment Operator	1	7421
Electrician	6	7241
Foreman	2	7205
Commissioning		
Technicians	3	7246
Foreman	1	7205
Engineering/Support		
Civil Engineer	1	2131
Electrical Engineer	2	2133
CAD Operator	1	2253
QA / QC Tech	1	2233
Superintendent	1	7205
Safety Officer	1	2263
TOTAL (Approximate)	237	

2.5 Operation and Maintenance

Once construction is completed and following Project commissioning, TL 267 will be operated on a continuous basis. Transmission line maintenance activities will include regular inspection, repair of the system as required and the management of vegetation along the right of way. Activities associated with the operation of TL 267 will be integrated into Hydro's overall inspection and maintenance program for its transmission system, including the existing transmission line infrastructure that TL 267 will parallel.

The transmission line will be inspected on an annual rotational basis, with a portion of the line being inspected each year. The inspections for the line will be completed primarily from the air, with some sections being accessed from the ground on all-terrain vehicles during summer or snowmobiles in the winter as possible and practical.

Vegetation management will commence eight to ten years after construction is completed, and be conducted every eight to ten years thereafter during Project operations. These activities will be directed towards removing trees which may threaten the security of the system by growing into or falling onto the transmission line, and the control of fast growing shrubs which impede access by ground or air. Hydro will incorporate the transmission line into its integrated vegetation management program for its transmission and distribution system, which uses several methods including manual cutting as well as the selective use of herbicides for long term vegetation control. Certified crews will use herbicides in accordance with the company's current standard operating practices and applicable regulations. The management schedule will vary with the type of vegetation, the extent of ground disturbance during construction and terrain. Recognizing the proximity of TL 267 to the Bay du Nord Wilderness Reserve, Hydro will not utilize herbicides as part of the vegetation management program along that 13 km long section. This is consistent with the current vegetation management practice Hydro uses within the Bay du Nord Wilderness Reserve for TL 202 and TL 206.

The Project will be operated for an indeterminate time period, and decommissioning is not contemplated. Should decommissioning activities eventually be considered for some or all of the transmission system, these will be planned and conducted in accordance with the relevant standards and regulatory requirements of the day.

2.6 Project Schedule and Cost Estimate

The anticipated TL 267 schedule is summarized in Table 2.2, and is based on the current stage of planning, and coinciding with the availability of power from Muskrat Falls and the L-ITL.

Commencing in 2015 with detailed engineering and the procurement and manufacture of key long-lead components, the current Project schedule would see construction activity in the field beginning in the spring of 2016 and continuing year-round, concluding in early 2018 followed by commissioning of the Project and the commencement of operations.

Table 2.2 Proposed Project Schedule (Preliminary)

Activity	Anticipated Start	Anticipated End
Engineering and Procurement	February 2015	December 2016
Right of Way Clearing	March 2016	January 2017
Transmission Line Construction	June 2016	Feb 2018
Terminal Stations Upgrades and Modifications	June 2017	January 2018
Completions, Commissioning and Site Restoration	March 2018	May 2018
Planned In Service Date	May 2018	-

The estimated capital cost of the Project, based on the current stage of engineering design and planning, is approximately \$291 million, which includes engineering, construction activities (labour and materials) and other components and activities.

2.7 Project Documents

Apart from this EA Registration, no other EA-related documents have been produced by Hydro in relation to this Project.

2.8 Potential Environmental Emissions and Discharges

Potential sources of pollutants during construction will be those associated with a typical construction project. During operation, there is limited potential for unplanned emissions and discharges.

2.8.1 Construction

Potential emissions and discharges during Project construction would result mainly from:

• construction access;

- clearing and excavation (including blasting);
- quarries and borrow pits;
- work in and near the aquatic environment;
- the use and storage of fuel and other hydrocarbons;
- air emissions from vehicles and heavy equipment; and
- construction-related waste generation

A Project-specific Environmental Protection Plan (EPP) has been developed and is included as Appendix E. Project-specific Safety, Health and Environmental Emergency Response Plans (SHERPs) will also be developed and implemented to manage all Project-related components and activities. All staff and contractors will comply with provisions of the EPPs and SHERPs, as described in the next section.

Watercourse crossings including fording and the installation of bridges and culverts during any required upgrades to existing access roads and trails will be undertaken in accordance with the EPP, applicable permits and regulatory guidance to reduce the potential for sedimentation of watercourses. New access requirements will be determined and designed as part of ongoing Project engineering, and will be minimized to the degree possible. Winter access will be used where possible and practical to minimize disturbance.

Site clearing, excavations for tower foundations and borrow operations can result in the generation of fine (silt) material, which can enter watercourses. Construction site drainage will be controlled to reduce sedimentation, appropriate buffer zones will be maintained around construction areas and at watercourse crossings, and sediment control measures such as silt curtains will be used where appropriate. Any new quarries and borrow pits will be identified, established and decommissioned in accordance with applicable regulatory requirements.

The handling and use of fuels, oil and lubricants will be carefully controlled. These substances will be stored, handled, delivered, and wastes disposed of according to applicable regulations and corporate policies and procedures.

Engine exhausts will generate air emissions, whose makeup will depend on the type of emission control devices and nature of the fuel. Both diesel and gasoline powered equipment and vehicles will be used on site. Project emissions will include particulate matter, the by-products of combustion of hydrocarbon fuel, and noise. The use of such equipment and their associated emissions, will be in accordance with applicable regulations

Construction activity and the work force will produce waste and garbage, which will be sorted prior to disposal on a daily basis. Waste will be transported to and disposed in approved landfill sites and recycled wherever possible. Mitigations will include awareness education as well as measures to ensure the proper handling, storage and disposal of all food wastes. Sanitary waste will be managed in accordance with applicable legislation.
2.8.2 Operation and Maintenance

Projects and activities that involve the generation, transmission and/or use of large amounts of electricity are often the subject of public questions, concerns and uncertainty around their potential emissions. These include possible noise, electromagnetic fields (EMFs) and radio interference, as well as any associated human health and safety or environmental implications.

Technical analyses have been undertaken and are on-going to understand and estimate the potential audible noise, EMFs and radio interference that may be associated with the proposed transmission system, in order to incorporate and appropriately address these considerations in Project planning and design. Specifically, these analyses consider aspects such as conductor design, and voltage and current specifications, in order to help ensure that any such emissions are well within established standards.

As is the case with the existing high voltage transmission lines throughout the province, there will be a degree of audible noise produced by the proposed transmission system. This noise results from ionization reactions known as "Corona", which occur as small portions of the electrical energy of the conductor interact with the air surrounding the conductor surface. Typically, this can resemble a crackling or sizzling sound. These reactions are very dependent on ambient conditions such as temperature, humidity, wind speed, and wind direction. Noise level limits for transmission lines are specified at the edge of their right of way, and are measured using standard units known as A-weighted decibels (dB(A)). The Project is being designed, constructed and operated to ensure that any such audible noise levels are well within established standards and acceptable limits.

EMFs are invisible forces that surround electrical equipment and wires that carry electricity, including power lines and associated infrastructure, which decrease at a rate relative to the distance from the source. Since the transmission and use of electric power is widespread, humans are constantly being exposed to EMFs. Recent years have, however, seen public interest around EMFs and any potential adverse human health effects that may be associated with them. Indeed, there has been considerable research and discussion of this issue over more than 30 years. National and international health agencies and scientific institutions have concluded that the scientific research does not demonstrate that there is a public health risk from EMFs associated with the transmission and use of electricity.

Hydro recognizes, however, that there is a degree of public interest and concern around EMFs, and is committed to monitoring and evaluating scientific research and regulatory requirements as these evolve, and to ensuring that its development and operational activities and associated environmental, health and safety practices consider updated and reliable scientific evidence. The company will also continue to provide its customers, employees and the public with information on EMFs. Further analyses and modeling of these potential fields for the proposed transmission system is planned, the results of which will be incorporated into detailed Project design.

The proposed transmission system will be designed and implemented to comply with CSA Standard CAN3-C108.3.1-M84, which limits worst-case radio interference levels to 69 dB at a distance of 15 m from the high voltage conductors. Analyses conducted as part of Project engineering work to date has indicated that at an

operating voltage of 230 kV, emissions from the conductors specified for the proposed Project would be lower than this limit.

Hydro will incorporate the Project into its integrated vegetation management program for its transmission and distribution systems. Vegetation will be controlled manually, or by application of vegetation-control agents or a combination of the two. All vegetation management activities will be undertaken subject to approval from the NL Department of Environment and Conservation and in compliance with the *Pesticides Control Regulations*. As is standard practice, there will be a public notification and an evaluation of any environmental sensitivity wherever herbicides are to be used. Vegetation control personnel will be appropriately trained and qualified. The Project will be designed, constructed and operated in accordance with applicable industry and regulatory standards.

Potential resource conflicts and other environmental considerations and interactions which may be associated with the Project are outlined and discussed further in Chapter 5.

2.9 Environmental Management and Protection

The number and diversity of environmental challenges facing large companies and development projects require a structured and consistent management approach. Hydro has chosen the ISO 14001 Environmental Management System (EMS) standard developed by the International Organization for Standardization (ISO) to manage environmental aspects. This decision has resulted in continual improvement of environmental performance, while fulfilling the corporation's mandate to provide customers with cost-effective and reliable power. Existing Hydro facilities have been individually registered by an external auditor (Quality Management Institute, QMI) as compliant with the ISO 14001 standard.

2.9.1 Environmental Protection Planning

Environmental protection planning is an integral part of Hydro's construction, operation and maintenance programs.

As noted previously, Hydro currently operates an extensive electricity transmission system in Newfoundland and Labrador. This includes interconnected electrical power systems throughout Newfoundland and Labrador, as well as isolated distribution systems throughout rural areas of the province. As a corporation with significant experience in constructing and maintaining transmission infrastructure in Newfoundland and Labrador, the corporation has state-of-the-art and proven policies and procedures related to environmental protection and management which will be implemented during the construction and operation of this proposed Project.

An Environmental Protection Plan (EPP) is an important tool for consolidating environmental information in a format that provides sufficient detail for the implementation of environmental protection measures in the field during construction. An EPP provides concise instructions to personnel regarding protection procedures and descriptions of techniques to reduce potential environmental effects associated with any construction activity. The main objectives are to:

- consolidate information for planning;
- ensure environmental standards are current and complied with;
- provide details of corporate commitments to environmental protection and planning; and
- provide guidelines for field activities and decision-making on environmental issues relevant to construction, operation and maintenance activities.

As noted previously, a Project-specific EPP has been prepared for the Project's construction phase (Appendix E). The EPP is a field-useable document, addressing provisions that will avoid or reduce environmental effects which may be associated with construction. The EPP includes items relating to vegetation clearing, grubbing and grading, storage and handling of fuel, blasting, quarrying, dust control, waste disposal, work in and near water, contingency plans for unplanned events such as spills, rehabilitation and compliance monitoring.

2.9.2 Safety, Health and Environmental Emergency Response Plan

In the construction, operation and maintenance of a large transmission infrastructure project, an accidental release or other unplanned event is an unlikely, but possible, event. Hydro proactively identifies potential emergency situations and develops response procedures, including Safety, Health and Environmental Emergency Response Plans (SHERPs).

The purpose of a SHERP is to identify responsibilities in the event of an unplanned incident, including the accidental release of oil or other hazardous material, on-site or during transportation, and to provide the information required for the effective response and reporting of such an incident. Hydro will conform to both provincial and federal legislation with the intent of meeting both its legal and corporate responsibilities. The establishment and maintenance of emergency response procedures addresses the:

- protection and maintenance of human health and safety;
- identification of the potential for accidents and emergency situations;
- planned response to accidents and emergency situations; and
- prevention of and response to potential accidents and emergency situations and their effects.

Depending on construction sequencing, one or several site/activity-specific SHERPs will be prepared and implemented for the Project. The Project-specific SHERP 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, animal encounters, emergency response communications, spill response, personnel injury response, search and rescue, fire and explosion response, and vehicle / equipment accidents.

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2.10 Environmental Permits and Approvals

In addition to approval under the provincial EA process, the Project will also require a number of other provincial and federal permits and authorizations. Hydro is committed to obtaining, and complying with the conditions of, these required permits and approvals during Project construction and operations, and will require the same of any and all contractors that are involved in this Project.

Some of the key environmental permits and approvals that may be required in relation to the Project include those listed in Appendix C.

3.0 ENVIRONMENTAL SETTING AND CONTEXT

This Chapter provides a general description of the existing natural and human environments in the area within which the Project will be located, in order to present an overview of the overall environmental setting and context for the Project. Additional and more detailed information on relevant aspects of the existing environment can be found in the various environmental baseline studies that have been prepared in support of this EA Registration, which are included as Appendices F to M.

3.1 The Natural Environment

The following sections describe the existing natural environment in and around the proposed Project Area, including relevant aspects of its physical (climate, geology, hydrology) and biological (vegetation, wildlife, fish) environments. Where the information below is a summary of that included in the supporting environmental studies (Appendices F to M), those reports provide the applicable information sources and references. The text below also uses common species names only, with scientific names for all identified species being provided in the relevant environmental study reports (Appendices F to K).

3.1.1 Climate

The proposed transmission line crosses over two Köppen-Geiger Climate zones (Peel et al. 2007), with the south coast of Newfoundland being characterized as having a boreal or taiga climate (Köppen-Geiger Dfc) while most of the remaining portion of the Island of Newfoundland is considered to be hemiboreal (Köppen-Geiger Dfb). The proposed Project Area is located within the South and Southeast Coasts and Intermediate Hinterlands Climate Zone as defined by Banfield (1983), which is characterized as having mild winters and cool summers, with the majority of the annual precipitation occurring as rain (Table 3.1). The area's climate is heavily influenced by the marine environment, with foggy conditions in the summer and freezing rain in late winter.

A climagraph for the region based on 30 year climate normals (1981-2010) is presented in Figure 3.1, which includes data for Bay d'Espoir in the western portion of the Project Area and Holyrood near its eastern end. As illustrated, July and August are the warmest months of the year in each location, while precipitation is the highest in the fall to early winter period. The mean annual temperature at Bay d'Espoir is 4.9°C and ranges from -6.6 (February) to 16.5°C (August), while temperatures in Holyrood average 6.3°C and range from -3.6 °C (February) to 17.2 °C (August). August is the driest month in each location, while January is the wettest (Table 3.1).

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Bay d'Espoir													
Mean Temperature (°C)	-6.4	-6.6	-2.9	2.7	8.0	12.1	16.0	16.5	12.5	7.3	2.4	-2.6	4.9
Precipitation (mm)	161	145	133	108	105	112	124	103	132	149	153	146	1,569
Rainfall (mm)	92	85	88	94	103	112	124	103	132	148	137	99	1,318
Snowfall (cm)	75	69	46	14	2	0	0	0	0	1	16	52	275
Holyrood													
Mean Temperature (°C)	-3.1	-3.6	-1.1	3.3	7.7	11.8	16.5	17.2	13.5	9.0	4.1	0.1	6.3
Precipitation (mm)	118	90	92	98	82	86	90	76	116	117	109	116	1,189

 Table 3.1
 Climate Normals (1981-2010, Bay d'Espoir and Holyrood)

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rainfall (mm)	61	53	68	87	81	86	90	76	116	116	103	78	1,015
Snowfall (cm)	57	37	24	11	1	0	0	0	0	1	6	38	174
Source: Environment Canada (2	2015)												



Figure 3.1 Climagraph: Bay d'Espoir and Hol	lyrood
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Source: Environment Canada (2015)

3.1.2 Geology

The physiography of the Island of Newfoundland is largely controlled by the underlying geology, and has been sub-divided into 12 overall physiographic regions (Roberts 1983), three of which are crossed by the proposed Project: 1) Central Plateau, 2) South Coast Highlands and 3) the Eastern Upland. The majority of the proposed transmission line right of way extends over the Island's Central Plateau physiographic zone, which is dominated by rolling topography with an average elevation of 250 m over a wide variety of bedrock types. The South Coast Highlands area is characterized by deep fiords, shallow till and numerous rock outcrops. In the east, a small portion of the proposed Project crosses over the Eastern Uplands area, which is generally comprised of a rolling plain of low relief (Roberts 1983). Elevations along the proposed transmission line right of way range from approximately 15 m above sea level (masl) in areas near Milltown – Head of Bay d'Espoir, Swift Current and Chapel Arm, to 247 masl near Swift Current.

The surficial geology of the Island of Newfoundland is dominated by the effects of the last glaciation (the late Wisconsinian) which occurred between 25,000 and 10,000 years ago. The geology of the Project Area itself is generally comprised of till, bedrock and organic deposits (NL DEL 1992). The till, a depositional product of retreating glaciers, is a poorly sorted and generally well compacted sediment containing a mixture of grain sizes ranging from clays to boulders. This deposit is represented throughout the region in the form of extensive

blanket deposits (more than 1.5 m thick) and also as thin veneer cover over bedrock. The composition of the tills closely reflects the lithology of the underlying bedrock. The local bedrock unit is found mainly in and around the Avalon Isthmus, and includes exposed outcrops as well as bedrock that is concealed by vegetation including scrub and peat bog. It is characterized by a glacially scoured surface with a rugged hummocky to hilly topography. A small portion of the Project Area is comprised of organic deposits, which generally consist of aggraded and degraded organic matter from one to 10 m in thickness.

In terms of bedrock geology, the Island of Newfoundland is the northeast extremity of a chain of deformed and elevated rocks called the Appalachian Orogen, which evolved through a cycle of ocean opening and closing followed by continental collision. The geologic divisions of Newfoundland reflect the development of the margins and oceanic tract of this ocean (called lapetus) and from west to east these are referred to as the Humber Zone, Dunnage Zone, Gander Zone and Avalon Zone (Williams 2004). Within the Project Area and surrounding landscape, the Dunnage Zone is dominated by volcanic and sedimentary rocks which are of variable thicknesses and are commonly discontinuous. The boundary between the Dunnage and Gander Zones is the Gander River Ultrabasic Belt, and the majority of rocks encountered within the Gander Zone itself are granitic and gabbroic intrusions. The Avalon Zone lies to the east and is separated from adjacent zones by a major fault running from Dover to Hermitage Bay, with this zone being characterized by mildly deformed late Precambrian volcanic and sedimentary rocks (Williams 2004).

3.1.3 Water Resources

The proposed Project will cross or be located adjacent to a number of waterbodies and watercourses in southcentral and eastern Newfoundland, which range from small intermittent streams to relatively large rivers, and from various small bodies of water to large lakes and ponds (Figure 3.2).

In planning and preparing this EA Registration, Hydro has undertaken a detailed identification and analysis of all watercourses and waterbodies that are located within, and crossed by, the proposed transmission line right of way and a surrounding (one kilometre wide) Study Area (Appendix I). This involved a review of existing and available information (maps, air photos, LiDAR imagery and literature) to gather information on their key physical and biological characteristics. Through that review, a total of 359 potential watercourse and waterbody crossings were identified between Bay d'Espoir and Come By Chance, of which 212 water crossings were identified along the proposed transmission line right of way itself (88 watercourses and 124 waterbodies) and an additional 147 watercourses and waterbodies were identified and assessed along Hydro's existing access trail network in that area. The remaining 44 km of the TL 267 right of way, between Come By Chance and the Western Avalon Terminal Station near Chapel Arm, was the focus of a previous, similar study (AMEC 2010), which identified and assessed 22 water crossing along that section of the proposed right of way. The 2015 Freshwater Study Report (Appendix I) provides detailed information and mapping for each such water crossing, including its location, watershed size category, type, width (wetted and channel), flow morphology, slope and substrate category.

The identified water crossings for the Project include several scheduled salmon rivers and a designated Canadian Heritage River (the Bay du Nord River), and several occur within or near a number of protected public water supply areas (Figure 3.2).

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3.1.4 Vegetation

The proposed transmission line extends through south-central and eastern portions of the Island of Newfoundland, and in doing so, will cross through a portion of the Boreal Shield Ecozone of Canada (Wiken 1986). The Boreal Shield Ecozone consists of a base of ancient bedrock covered by gravel, sand and other glacial deposits. Regional topography is comprised of broadly rolling uplands that form poorly drained depressions covered by lakes, ponds and wetlands. The climate of the Ecozone is generally continental in nature, with long cold winters, short warm summers and abundant precipitation. Cool temperatures and a short growing season along with acidic soils influence the resultant vegetation community composition, distribution and abundance. The landscape configuration consists primarily of forested cover dominated by coniferous species intermixed with hardwoods. Bogs, marshes and other wetlands comprise the remaining landscape matrix of vegetation communities.

At the provincial scale, the proposed transmission line will also pass through three of the Ecoregions that have been identified on the Island of Newfoundland (Damman 1983), including (primarily) the large Maritime Barrens Ecoregion (approximately 79 percent of its linear distance), along with smaller portions of the Central Newfoundland Forest Ecoregion (18 percent) and Western Newfoundland Forest Ecoregion (three percent) at its ends (Figure 3.3). Within the Maritime Barrens Ecoregion, the proposed right of way occurs primarily within the Central Barrens Subregion with a smaller portion on the Avalon Peninsula falling within the Southeastern Subregion. The section of the transmission line within the Central Newfoundland Ecoregion crosses two Subregions, Twillick Steady near Bay d'Espoir and Northcentral near the Isthmus of the Avalon Peninsula.

The Maritime Barrens Ecoregion is characterized by cool summers with frequent fog and strong winds. Winters are relatively mild with intermittent snow cover. Consequently, this Ecoregion is dominated by open heathland and peat bog interspersed with patches of stunted balsam fir, black spruce and eastern larch. Heath plants are primarily *Kalmia angustifolia* on protected slopes and *Empetrum nigrum* or *E. easmesii* on windswept ridges and headlands (Meades 1990).

The Central Newfoundland Ecoregion has a more continental climate than the Maritime Barrens Ecoregion, with cooler winter and higher summer temperatures. Forest fires have historically been more frequent in this Ecoregion and have led to a replacement of balsam fir-*hyloconium* forest types over many areas. However, upland areas within the Twillick Steady Subregion remain dominated by balsam fir forest. Ground cover in the Northcentral Subregion is primarily dwarf shrub heath (*K. angustifolia*) with interspersed stands of balsam fir and black spruce. Topography in both subregions is less than 300 m above sea level and the topography is rugged and undulating (Meades 1990).

The Western Newfoundland Forest Ecoregion (Bay d'Espoir Subregion) is characterized by a humid climate with a relatively longer frost-free period. Higher humidity reduces the prevalence of fire as a disturbance mechanism and favours the growth of *dryopteris*-balsam fir forest rather than black spruce as the dominant tree. Rich soils also support the growth of yellow birch in sheltered valleys of this subregion.

The proposed Project will also cross through a portion of the existing boundaries of the Bay du Nord Wilderness Reserve (2,895 km²), which encompasses a vast landscape of ponds, rivers, barrens, bogs and fens, forests, and thickets in south-central Newfoundland. This protected area is described in further detail in Section 3.2.4.





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The proposed transmission line itself will pass through areas of dense coniferous forest, open scrub forest, wetlands, barrens and previously developed lands. These areas support a variety of vegetation communities and associated plant species, which provide habitat for wildlife and which are or may be used by humans for subsistence, recreational and commercial purposes.

As part of its Project planning and associated analysis of the existing (baseline) environment for the Project in support of this EA Registration, Hydro has completed a detailed Ecological Land Classification (ELC) Study (Appendix F), which involved identifying, classifying, delineating and mapping key vegetation communities and other relevant environmental characteristics within the proposed Project Area (40 m wide right of way) and a larger, surrounding Study Area (1 km wide). This 2015 study has again focused primarily on the section of TL 267 between Bay d'Espoir and Come By Chance, as the remaining portion between Come By Chance and the Western Avalon Terminal Station near Chapel Arm was the subject of a previous ELC Study (Stantec 2010a).

Based on the results of the 2015 ELC (Appendix F), Table 3.2 summarizes the various vegetation types (ELC habitat types) and areas located with the proposed transmission line right of way and surrounding Study Area. Table 3.3 presents similar results for the previous ELC for the Come By Chance to Western Avalon segment based on Stantec (2010a).

ELC Habitat Type	Area (ha)	Percent
TL 267 Right of Way (40 m wide)	· · · ·	
Softwood Forest	108.66	19.4%
Hardwood Forest	8.75	1.6%
Mixedwood Forest	67.37	12.0%
Softwood Scrub	66.10	11.8%
Hardwood Scrub	0.74	0.1%
Herbaceous	4.24	0.8%
Barren	85.94	15.3%
Shrub	37.67	6.7%
Wetland	143.78	25.6%
Anthropogenic / Other	37.37	6.7%
Total	560.62	100.0%
ELC Study Area (1 km wide)		
Softwood Forest	2,509.49	17.9%
Hardwood Forest	249.96	1.8%
Mixedwood Forest	1,503.73	10.7%
Softwood Scrub	1,527.65	10.9%
Hardwood Scrub	22.21	0.2%
Herbaceous	197.25	1.4%
Barren	2,259.48	16.1%
Shrub	895.67	6.4%
Wetland	3,807.00	27.1%
Anthropogenic / Other	1,085.51	7.7%
Total	14,057.95	100.0%

 Table 3.2
 ELC Habitat Types - Project Area and Study Area (Bay d'Espoir to Come By Chance)

ELC Habitat Type (Stantec 2010a)	Area (ha)	Percent
TL 267 Right of Way (40 m wide)		
Conifer Forest	11.91	6.4%
Conifer Scrub	0.13	0.1%
Cutover	31.99	17.3%
Exposed Earth / Anthro / Cutblock	0	0.0%
Exposed-Earth / Anthro	8.71	4.7%
Kalmia Lichen / Heathland	10.16	5.5%
Mixedwood Forest	20.53	11.1%
Open Water	3.94	2.1%
Rocky Barrens	10.31	5.6%
Scrub / Heathland / Wetland Complex	87.04	47.1%
Wetland	0.08	0.0%
Total	184.82	100.0%
ELC Study Area (1 km wide)		
Conifer Forest	315.47	6.9%
Conifer Scrub	6.48	0.1%
Cutover	711.14	15.5%
Exposed Earth / Anthro / Cutblock	15.83	0.3%
Exposed-Earth / Anthro	147.72	3.2%
Kalmia Lichen / Heathland	219.02	4.8%
Mixedwood Forest	660.4	14.4%
Open Water	147.61	3.2%
Rocky Barrens	261.29	5.7%
Scrub / Heathland / Wetland Complex	2,084.93	45.4%
Wetland	21.48	0.5%
Total	4,591.37	100.0%

Table 3.3	ELC Habitat Types -	Project Area and Stud	y Area (Come B	y Chance to Western Avalon)
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The attached ELC Study Report (Appendix F) presents the detailed results of the ELC and associated mapping. The ELC is a core environmental study that has formed the basis for several other study components and analyses (see Appendices), as well as Hydro's associated environmental management and mitigation planning for the Project.

As indicated through the above, the proposed TL 267 will also cross through large areas of wetland in southcentral and eastern Newfoundland. As part of the above described ELC, all wetlands that are crossed by the proposed transmission line right of way (40 m wide) and surrounding (1 km wide) Study Area were also identified, delineated, classified and mapped, the detailed results of which are provided in an accompanying Wetlands Inventory and Classification Study (Appendix G).

A total of 143.78 hectares of wetland habitat were identified along the transmission line right of way from Bay d'Espoir to Come By Chance (approximately 144 km), representing approximately one quarter of the total land base within that area. This includes various wetland classes, forms and subforms, as summarized in Table 3.4, and represents less than four percent of the total amount of wetland habitat available within the 1 km wide Study Area.

	Wetland Forms Wetland Sub-Forms			Right of Way (40 n	n wide)	Study Area
Wetland Class	Represented in TL 267 Right of Way	Represented in TL 267 Right of Way	Area (ha)	% Total Wetland Area	% Total Land Area	(1 km wide) (ha)
Bog	Basin Bog Blanket Bog Domed Bog Flat Bog Plateau Bog Riparian Bog Slope Bog String Bog	Northern Plateau Bog Floating Bog Shore Bog	100.30	69.8%	17.9%	2,746.38
Fen	Basin Fen Channel Fen Riparian Fen Slope Fen Spring Fen String Fen	Shore Fen Stream Fen Atlantic Ribbed Fen Ladder Fen Northern Ribbed Fen	16.52	11.5%	2.9%	301.65
Swamp	Riparian Swamp Slope Swamp	Channel Swamp Riverine Swamp Peat Margin Swamp	4.70	3.3%	0.8%	152.61
Marsh	Riparian		0.00	0.0%	0.0%	1.55
Shallow Water	Basin		0.00	0.0%	0.0%	1.04
Complex ¹			22.26	15.5%	4.0%	603.77
Total			143.78	100.0%	25.6%	3,807.00
¹ Complex wetlan	ds are a combinatio	n of two wetland classes a	bove within a	ny one polygon.		

Table 3.4	Wetlands within the Pro	pject Area and Stud	y Area (Bay d'E	spoir to Come B	y Chance)
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As indicated, the remaining section of the Study Area between Come By Chance and the Western Avalon Terminal Station near Chapel Arm were the subject of a previous Wetlands Study (Stantec 2010b). That study identified approximately 10.40 ha of wetland within that segment of the proposed TL 267 right of way and 227.44 ha within the 1 km wide Study Area, all of which were classified as "bog". The proposed right of way also crosses through a portion of the Come By Chance Wetland Stewardship Area (Appendices G and M).

The Newfoundland and Labrador *Endangered Species Act* (*NL ESA*) provides protection for indigenous species, sub-species and populations considered to be Endangered, Threatened, or Vulnerable within the province. Designations are based on recommendations from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and/or the provincial Species Status Advisory Committee (SSAC). The Canadian *Species at Risk Act* (*SARA*) provides protection to species at the national level to prevent extinction and extirpation, facilitate the recovery of endangered and threatened species, and to promote the management of other species to prevent them from becoming at risk in the future. Designations under the Act also follow the recommendations and advice provided by the COSEWIC. There are currently various schedules associated with the *SARA*, with species having formal protection being listed on Schedule 1 which includes the following potential designations: Extirpated, Endangered, Threatened, or of Special Concern.

As many areas of Newfoundland and Labrador have not been surveyed, the presence and distribution of many of these plants in any specific part of the province is largely unknown, however, including the Project Area. As a result, Hydro has completed a Flora: Listed and Rare Plants Study (Appendix H) for the Project, the purpose of

which was to summarize the known and potential occurrence of listed (legally protected) plant species in or near the proposed Project Area (40 m wide right of way) and a surrounding Study Area (1 km wide), as well as any other plant species which are considered to be rare (regionally uncommon). This analysis was undertaken through background research on the known presence, distribution and habitat preferences of such plant species and the use of the ELC Study (Appendix F) and associated mapping to create two habitat potential models: 1) one based on proximity of known locations for these species and 2) a species-specific habitat suitability analysis.

Two listed plant species have been identified to occur within five kilometers of the proposed TL 267 centerline – the Boreal Felt Lichen and the Blue Felt Lichen. Based on the available ACCDC (2015) data, there have been no reported occurrences of the protected Water Pygmyweed in the Project Area. However, additional sources identify occurrences of this species at the head of Placentia Bay, which is located within approximately 500 m of the TL 267 centerline.

The first habitat potential model is based on the proximity of known listed / rare species occurrences to the Project Area, and delineates areas of low (greater than 500 m), medium (250 - 500 m), and high (0 - 250 m) listed / rare plant habitat potential. Over 98 percent of the habitat within the Study Area from Bay d'Espoir to Chapel Arm was classified as being of low potential based on proximity to known occurrences. The remaining approximately two percent of the Study Area is comprised of medium and high potential areas.

Species-specific modeling was also completed using the known habitat requirements of Boreal Felt Lichen, Blue Felt Lichen and Water Pygmyweed, and was carried out using the ELC Study results for the section of the proposed transmission line from Bay d'Espoir to Come By Chance. A total of approximately 517 and 21 ha of suitable habitat for Boreal Felt Lichen were identified in the Study Area and Project Area (right of way), respectively. A total of approximately 110 and five ha of suitable habitat for Blue Felt Lichen were identified within the Study Area and Project Area, respectively. The only suitable habitat for Water Pygmyweed within the Study Area is 1.3 km of shoreline near Placentia Bay. A previous regionally uncommon plant study for the section of the Study Area from Come By Chance to Chapel Arm (Stantec 2010c) did not identify any high or very high potential habitats for listed or rare plant species in that area.

3.1.5 Wildlife

The interior of south-central and eastern Newfoundland, with its open, stunted forests and extensive wetlands, provides habitats for a variety of wildlife that are typical of boreal ecosystems. Wildlife that are known or likely to occur in the general region include various species of large and small mammals and avifauna.

Woodland caribou are native to both Newfoundland and Labrador and are part of the Boreal Population of caribou, which is sub-divided into two ecotypes: 1) the migratory forest-tundra ecotype and 2) the more sedentary forest-dwelling ecotype (Environment Canada 2012). Boreal caribou occur on the landscape in small groups or individually in the boreal forest across Canada, with ecotypes being distinguished primarily by different predator avoidance behavioural strategies during calving and post-calving seasons (Bergerud 1996; Bergerud et al. 2008). Although caribou in Newfoundland are considered to be of the forest-dwelling ecotype, some herds or aggregations have traditionally exhibited behaviour that is typically associated with barren ground or forest-tundra ecotypes (NLDEC 2011). The proposed transmission line crosses through the southern portion of Middle Ridge Caribou Management Area (# 64), which is largely occupied by animals associated with

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the Middle Ridge Wildlife and Bay du Nord Wilderness Reserves. The largest single caribou aggregation on the Island is the Middle Ridge Caribou Herd, which peaked in abundance during the mid-1990s at approximately 20,000 individuals.

All caribou populations in Newfoundland have experienced considerable increases and declines in their numbers over the last 40 years, a pattern that has been highly synchronous across the entire Island (NLDEC 2009). In the early 1900s, caribou were abundant, but then declined rapidly between 1915 and 1930 (NLDEC 2009). These populations remained relatively low in abundance until the 1970s, and then increased to approximately 90,000 caribou by the late 1990s (NLDEC 2009). By the mid to late 1990s, population declines were again being detected in most populations, but the scale of these declines was unknown. Recent estimates suggest that caribou populations have now declined to an estimated 32,000 animals (NLDEC 2009) an approximately 65 percent decline over the past two decades (Soulliere et al. 2010). In 2008, the Government of Newfoundland and Labrador announced a comprehensive five-year Caribou Strategy that would expand on the findings of earlier efforts to form an ecosystem-based analysis of local caribou population factors, and human dimensions (NLDEC 2009). By 2012, all populations had been re-surveyed thereby providing an updated assessment of caribou abundance and distribution throughout the Island (NLDEC 2013).

Caribou populations have broad, landscape-level habitat requirements (Arsenault and Manseau 2011), and the concept of space use resides at the heart of caribou ecology (Bergman et al. 2000, Schaefer and Mahoney 2013). Newfoundland caribou use a mixture of boreal and taiga forests, shrub lands, peatlands and barrens (Environment Canada 2012). They feed predominantly on lichens in suitable lichen-rich habitats, although they prefer fungi, the green leaves of deciduous shrubs and forbs, and new spring growth of sedges when available (Bergerud 1972). Habitat selection occurs at multiple spatial scales, with selection processes influenced by factors including habitat configuration, caribou disturbance thresholds, predator-prey dynamics, and amount and connectivity of high quality habitat patches within the landscape matrix (Arsenault and Manseau 2011).

The NL Wildlife Division recently delineated caribou occurrence and habitat use in Newfoundland using caribou telemetry data (1979 to 2014) and kernel analyses to determine relative utilization and distributions for each season. Seasons were defined as winter (December 1 – April 30), spring (May 1 to June 30, associated with calving), summer (July 1 to September 30, the post-calving period) and fall (October 1 to November 31, associated with the rutting / mating period). Figure 3.4 summarizes these results by showing the "pooled" mapping data for all seasons in and around the proposed Project Area.

A detailed overview of the presence, distribution, habitat use and seasonal movement patterns of woodland caribou in this area of south-central and eastern Newfoundland and in relation to the proposed Project is provided in the associated Caribou Study completed in support of this EA Registration (Appendix J). As indicated in that study, the proposed Project will potentially interact with seasonal core use and occupancy areas for caribou throughout the year, although the nature and degree of such overlap varies considerably by location, time and type. The Project directly intersects with small portions of primary and secondary core areas for caribou during the over wintering, summer post calving and/or fall rutting periods (Table 3.5). Although it does not directly intersect with any identified core areas for the spring calving period, it does occur within several kilometers of a number of identified primary areas (Appendix J).





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Seasonal Ranges	Pooled (km)	Winter (km)	Spring (km)	Summer (km)	Fall (km)
Occupancy Area (99.9% kernel)	96.5	75.4	31.9	76.6	71.1
Secondary Core Use Area (80% kernel)	24.2	15.6	0.0	6.8	26.1
Primary Core Use Area (66% kernel)	1.8	0.4	0.0	2.5	19.4
Primary Core Use Area (50% kernel)*	-	0.0	-	-	-
*Analysis of primary core wintering ranges inc	ludes a 50% ar	nd 66% kernel,	the remaining	seasons are bas	ed on 66%
kernels only.					

Table 3.5 Summary of Seasonal Caribou Core Use Areas Crossed by the Proposed Transmission Line

In terms of other wildlife species, the proposed transmission line will pass through a diverse range of terrestrial and aquatic habitat types, resulting in a range of wildlife species and functional groups being present in the overall region. Previous avifauna and mammal studies within the Project Area itself have been relatively limited, and no key wildlife concentrations or habitats have been identified in the immediate area to date. The general literature and previous studies from nearby areas and common habitat types do, however, give an indication of the species that do or may occur in the area, including their relative abundance, seasonal presence and key activities. The Wildlife (Avifauna and Mammals) Study completed in support of this EA Registration (Appendix K) provides an overview of those species that are known or likely to occur in the area based on existing and available information, a brief summary of which is provided below.

A number of taxonomic and functional groups of avifauna are likely to be represented in the region including waterfowl, shorebirds, wood warblers, birds of prey, sparrows and finches. Collectively, these species inhabit all terrestrial and riparian habitats including dense coniferous and mixed-wood forest, open spruce woodland, barrens, bog, and both inland and coastal shorelines. Common species that are known to breed in the area include American black duck, Canada goose, greater yellowlegs, spotted sandpiper, yellow-rumped warbler, blackpoll warbler, yellow-bellied flycatcher, osprey, white-throated sparrow and pine grosbeak. Overall, the assemblage of bird species found in the area is reflective of community composition that has been more extensively described for this region of Newfoundland. There are also 14 designated species at risk that either breed in insular Newfoundland or occur there occasionally during migration. Of this group, seven species have been documented to occur within the general vicinity of the proposed Project, including harlequin duck, Barrow's goldeneye, red knot, gray-cheeked thrush, olive-sided flycatcher, rusty blackbird and red crossbill. Other species at risk that may occur in this region include short-eared owl, but the specific presence, locations and densities of such listed species are not currently known based on existing and available information (Appendix K).

Mammal species that are known or likely to occur in the region include small mammals (such as meadow voles and red squirrels), furbearers and mid-trophic level carnivores (including short-tailed weasels and American mink), ungulate browsers (moose, and upper-trophic level predators (such as black bear). In total, 14 out of a possible 22 mammals that occur in natural habitats on the Island of Newfoundland have been identified in the general region through which the proposed transmission line will extend. Individual species that are expected to be the most common and widely distributed in the area include snowshoe hare, red squirrel, meadow vole, beaver, red fox and eastern coyote. Listed mammal species include Newfoundland marten, little brown bat and northern long-eared bat, although the occurrence or prevalence of these species in the Project Area is not likely (Appendix K).

3.1.6 Fish

The literature review completed as part of the previously described Freshwater Environment Study (Appendix I) indicated that at least five fish species are known or likely to occur in the watersheds that will be crossed by the proposed Project. These include brook trout (both anadromous and landlocked), Atlantic salmon or ouananiche (landlocked salmon), American eel, rainbow smelt and threespine stickleback. Of these, only two species are typically considered to be of recreational and/or subsistence fishery value (brook trout and Atlantic salmon / ouananiche), although the remaining species (American eel, rainbow smelt and threespine stickleback) do play an ecological role in the aquatic food chain.

Within Newfoundland and Labrador, there are four fish species that are listed and protected under one or both of the *NL ESA* or the *SARA*. Banded killifish and fourhorn sculpin are listed as species of "Special Concern" under the *SARA*, and banded killifish and American eel are also listed as "Vulnerable" under the *NL ESA*. Based on available literature and the results of past studies, the only fish species of conservation concern that could potentially occur within the Project Area is American eel. The proposed Project will also cross over a number of scheduled salmon rivers (Section 3.2.4). There are currently no known commercial fisheries within the Study Area.

3.2 The Human Environment

The following sections provide an overview of the existing socioeconomic environment within and around the proposed Project Area, including a number of anthropogenic components and activities that occur in the region and which may potentially interact with the proposed Project.

3.2.1 Historic and Heritage Resources

Historic and heritage resources include sites and objects of historic and archaeological, cultural, spiritual and paleontological importance, which are protected under the NL *Historic Resources Act* (1985) administered by the Provincial Archaeology Office (PAO) of the Department of Business, Tourism, Culture and Rural Development.

As part of its review and analysis of the existing environment in support of this EA Registration, Hydro has also completed an Historic and Heritage Resources Study (Appendix L), the purpose of which has been to identify and describe any known archaeological resources within or near the proposed Project, as well as any areas with the potential to contain such resources. This study included background research to identify and map known historic resources in the region and to understand and describe its general human and natural histories, as well as an archaeological potential mapping exercise along the proposed right of way for consideration in Project planning and design and/or for possible further study, as required. This 2015 study has again focused primarily on the section of TL 267 between Bay d'Espoir and Come By Chance (approximately 144 km), as the remaining 44 km between Come By Chance and the Western Avalon Terminal Station near Chapel Arm was the subject of a previous archaeological study (Stantec 2010d).

As indicated in the 2015 study report (Appendix L), the level of past archaeological research and investigation within and adjacent to the Project Area varies greatly from west to east. Based on those previous field

investigations, there is only one known PAO registered archeological site within approximately 500 m of the proposed TL 267 right of way (ClAm-01), and another which is either within or very close to it (ClAm-02). There are, however, no known sites within the proposed Project Area (40 m wide right of way) itself.

Notwithstanding the lack of known archaeological sites identified through past research, particular segments of the proposed transmission line route and surrounding area have varying degrees of potential to contain as yet undiscovered historic resources, as evaluated through the above described archeological potential mapping. Based on this analysis of the available information and mapping and the application of established criteria to identify and evaluate particular areas of interest, there are 35 locales with some degree of identified potential along the proposed right of way between Bay d'Espoir and Come By Chance, of which only eight locations are considered to be of high potential. An additional high potential area was also identified between Come By Chance and the Western Avalon Terminal Station near Chapel Arm (Stantec 2010d) (Figure 3.5, Appendix L).

3.2.2 People and Communities

The Project will be located in southcentral and eastern Newfoundland, with much of the proposed transmission line extending through a remote and largely uninhabited area. There are, however, several communities located at and along its western and eastern ends, as well as other human infrastructure and activities throughout the region. The environmental baseline information that follows focuses on a number of relevant socioeconomic components and indicators, including population, community infrastructure and services, economy and land use, which are described using the most current and relevant data and information available for various geographic divisions, including at the municipal and Regional Economic Zone levels (Figure 3.6).

Specifically, the proposed Project will extend through parts of Regional Economic Zones 13, 15 and 16 (a small portion of the latter) which generally encompass communities on the Connaigre Peninsula, Burin Peninsula, Bonavista Peninsula and Isthmus of the Avalon Peninsula. Within these various regions, the specific communities that are located within or near the proposed transmission line right of way are located at the head of Bay d'Espoir, top of the Burin Peninsula and along the Isthmus. These three regions had a combined population of 55,945 persons in 2011, representing a decrease of more than three percent over the previous five years (Table 3.6). Population decline is less evident in Zone 15 than in Zone 13 and Zone 16, owing to the inclusion of the Clarenville area in that region (NLSA 2014a). Many small communities throughout Newfoundland and Labrador are experiencing similar population declines, whereas some mid-sized towns and regional service centres and the province as a whole have experienced some growth (Statistics Canada 2011).

Geographic Area	2006	2011	Difference	% Change
Economic Zone 13	7,905	7,280	-625	-7.9%
Economic Zone 15	28,355	27,950	-405	-1.4%
Economic Zone 16	21,600	20,715	-885	-4.1%
Total	57,860	55,945	-1,915	-3.3%
Newfoundland and Labrador	505,469	514,536	9,067	1.8%
Source: NLSA (2014a)				

Table 3.6 Population





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Quebec Zone 14 Zone 12 Newfoundland Zone 13 Zone 15 St. Joseph's Cove St. Veronica's Milltown - Head of Bay d'Espoir Sunnyside Come by Chance Conne River Arnold's Cove Zone 16 Chapel Arm Legend Zone 17 Proposed TL267 **Existing Transmission Lines** Zone 18 20 10 Kilometres



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Municipalities in the region provide a range of services and infrastructure to their residents, including water supplies, sewage collection and treatment, road maintenance, snow clearing, fire protection, waste collection and disposal, recreation facilities, economic development and development control. Other provincial and federal agencies also provide infrastructure and services including health care, emergency response, policing, education, and others, a number of which are described in the following paragraphs.

In Newfoundland and Labrador, regional health boards provide acute, long term care and community based services in hospitals, health centres, medical clinics and at other sites. Central Health provides health and community services to approximately 94,000 people in 177 communities from Baie Verte in the west, Fogo Island in the north, Harbour Breton in the south to Charlottetown in the east. The proposed transmission line begins in the Coast of Bays Health Service Area, which covers the Connaigre Peninsula and other areas (Central Health 2008). Eastern Health delivers health and community services to a population of more than 300,000 from Port Blandford to St. John's including all communities on the Burin, Bonavista and Avalon Peninsulas. Along with its regional responsibilities, Eastern Health also has a provincial mandate to deliver services such as cancer care, cardiac and critical care, child and women's health, diagnostic imaging, laboratory services, mental health and addictions, rehabilitation and surgery (EH 2014).

Various local, regional and provincial systems are used to deliver emergency response throughout Newfoundland and Labrador. As of early March 2015, Fire and Emergency Services-Newfoundland and Labrador now provides a province-wide 911 system to link individuals with police, fire and ambulance services (NLJPS 2015). Fire protection is generally supplied by a municipality to one or more communities. Ambulance services are available through regional health care boards or private companies. The Royal Canadian Mounted Police (RCMP) provides policing and crime prevention services in the region through detachments in Milltown, Marystown, Grand Bank, Placentia and Whitbourne. The RCMP also works with other agencies (such as DFO, provincial conservation officers and the Miawpukek First Nation) to address crime and public safety issues (RCMP 2014).

Since the introduction of the provincial Waste Management Strategy in 2002, the waste management system in central and eastern Newfoundland has evolved considerably. Most communities in this region are now included in the service area of Eastern Waste Management. Outside of major centres on the Northeast Avalon, this organization provides waste collection for 163 communities from Clarenville eastward, with all waste being delivered to the Robin Hood Bay facility in St. John's. The provincial Department of Municipal and Intergovernmental Affairs is working with communities of the Connaigre Peninsula area to develop a regional waste management plan for that region (EWM 2009; GNL 2014).

3.2.3 Economy, Employment and Business

Recent economic prosperity and forecasted growth in Newfoundland and Labrador are attributed primarily to activity in the natural resources sectors and associated major capital developments in the oil and gas, mining and hydroelectric power generation and transmission industries. Traditional harvesting industries such as fishing and forestry have seen overall declines but are still strong economic drivers in small communities, with tourism and aquaculture also being important contributors, particularly in more rural areas.

As indicated, the proposed Project Area crosses parts of Regional Economic Zones 13, 15 and 16 which encompass the Connaigre Peninsula, the top of the Burin Peninsula and the Isthmus of the Avalon Peninsula. The economy of the Connaigre Peninsula has been traditionally rural in nature and largely reliant upon the fishing industry, including having the largest concentration of aquaculture sites in the province (NLDFA 2015). The eastern end of the Project Area includes the top of the Burin Peninsula zone, the head of Placentia Bay and the Isthmus of the Avalon. This region has a strong history in the fishery and other industries, but more recently the economy has also diversified into industrial and manufacturing activities. North Atlantic Refining Limited's refinery facility is located at Come By Chance, the Newfoundland Transshipment Limited is located at Whiffen Head, Nalcor Energy's Bull Arm Fabrication site is near Sunnyside and the Vale NL Long Harbour Processing Plant also is located in this region (NARL 2006; Nalcor Energy 2015a; NTL 2015; Vale 2015).

Labour force participation rates and employment rates in these three Regional Economic Zones are only slightly lower than those of the province as a whole. Per capita gross income is somewhat lower than that of the province, but increases somewhat in the eastern portions of the area (Table 3.7).

Indicator	Zone 13	Zone 15	Zone 16	Province
Average Gross Income from Employment (2011)	\$26,800	\$32,500	\$34,200	\$38,700
5 Year Change in Employment (2011)	2.9%	3.6%	1.8%	5.2%
Annual Employment Rate (2005)*	76.4%	74.8%	74.0%	76.7%
Participation Rate During Reference Week	69.7%	69.3%	68.0%	72.0%
(2006)*				
Percentage of Persons Receiving Income Support	5.9%	7.0%	7.9%	8.4%
at Some point During the Year (2013)				
*For Persons Aged 18 to 64				
Source: NLSA (2014a)				

Table 3.7Employment and Labour

Regional Economic Zone 15 has a higher number of businesses than the other two zones, which is likely due to the presence of the Town of Clarenville which is a regional service centre for commercial and public services (Table 3.8). Clarenville has also experienced population growth as a result of a regionalization of population from small communities to regional service centres and its location near various industrial facilities.

Table 3.8 Number of Businesses

Indicator	Zone 13	Zone 15	Zone 16	Province
Number of Businesses in Zone	202	953	552	16,596
Percentage of Total Businesses in Province	1.2%	5.7%	3.3%	100%
Source: NLSA (2014b)				

A further analysis of businesses by type shows that the most common types of businesses in the three Regional Economic Zones are generally similar to those of the province in general (Table 3.9), with several exceptions related to the relative importance of the "agriculture, forestry, fishing and hunting classification". This is likely due to the relatively large and active aquaculture industry in coastal areas of the Connaigre Peninsula.

Industry Classification	Zone 13	Zone 15	Zone 16	Province
Retail Trade	21.8%	17.7%	16.1%	15.1%
Construction	4.0%	17.7%	13.4%	14.3%
Other Services (except public administration)	18.3%	13.4%	19.4%	13.2%
Health Care and Social Assistance	11.9%	7.5%	13.0%	10.8%
Accommodation and Food Services	7.4%	9.4%	6.3%	7.8%
Professional; Scientific and Technical Services	NA (S)	4.4%	4.2%	7.2%
Transportation and Warehousing	5.0%	6.6%	3.8%	4.5%
Wholesale Trade	3.5%	3.4%	2.2%	4.0%
Real Estate and Rental and Leasing	2.5%	3.3%	3.6%	4.0%
Administrative and Support, Waste Management	2.0%	2.5%	2.2%	3.5%
and Remediation Services				
Agriculture, Forestry, Fishing and Hunting	7.4%	4.4%	2.0%	3.0%
Public Administration	6.4%	2.3%	4.7%	2.6%
Manufacturing	3.5%	2.7%	1.4%	2.6%
Finance and Insurance	2.0%	1.6%	2.7%	2.1%
Arts, Entertainment and Recreation	NA (S)	1.8%	2.5%	2.0%
Educational Services	NA (S)	0.5%	0.7%	0.9%
Information and Cultural Industries	NA (S)	NA (S)	NA (S)	0.8%
Management of Companies and Enterprises	Ν	NA (S)	NA (S)	0.7%
Mining, Quarrying, and Oil and Gas Extraction	Ν	NA (S)	NA (S)	0.5%
Utilities	NA (S)	NA (N)	NA (N)	0.2%
Unknown	NA (N)	NA (N)	NA (N)	0.1%
Total	202	953	552	15.1%
NA (S) = Suppressed to meet the confidentially requirements of the Statistics Act				
NA (N) = Nil or zero				
Source: NLSA (2014c)				

Table 3.9 Proportion of Businesses by Industry Classification

3.2.4 Land and Resource Use

As described earlier, the proposed transmission line extends through an area that runs from the Connaigre Peninsula to the Isthmus of Avalon. The following sections summarize existing land and resource uses in the area crossed by the proposed Project, including with regard to communities and related infrastructure, transportation, utilities and communications infrastructure, protected and special areas, recreational land and resource use and commercial and other land uses.

Further detail is provided in the accompanying Land Use and Infrastructure Study which has been prepared in support of this EA Registration (Appendix M).

Communities and Related Infrastructure

Communities and related infrastructure are generally located within and along the first 20 km and the last 75 km of the proposed transmission line and its surrounding (1 km wide) Study Area, which crosses through a number of municipal boundaries, municipal planning areas, crown issued titles, protected roads and their buffers, protected water supplies and waste disposal site buffers (Table 3.10, Appendix M).

Features	Elements in Study Area (1 km wide)		
Municipal Boundaries	Town of Come By Chance		
	Town of Chapel Arm		
Municipal Planning Areas	Town of Come By Chance		
	Town of Arnold's Cove		
	Town of Southern Harbour		
	Town of Chapel Arm		
Crown Issued Titles	Crown Issued Easement Town of Southern Harbour		
	Crown Grant Residential in Come By Chance		
Protected Roads / Protected Road Buffers	Route 361 St. Alban's Road		
	Route 360 Bay d'Espoir Highway		
	Route 210 Burin Peninsula Highway		
	Route 1 Trans-Canada Highway		
Protected Water Supplies	Black Duck Pond (Swift Current)		
	Butchers Brook (Come By Chance)		
	Steve's Pond (Arnold's Cove)		
	Brigades Pond (Southern Harbour)		
	John Newhook's Pond (Norman's Cove-Long Cove)		
Waste Disposal Site Buffers	Swift Current		
	Norman's Cove		
Sources: NLDMIA (2015): NLDEC (2015b)			

Table 3.10 Communities and Related Infrastructure

Transportation, Utility and Communication Infrastructure

The Island of Newfoundland is served by various road, air and marine transportation networks. The TCH and a number of other roads as well as utilities and communications infrastructure are located within or near the proposed right of way and surrounding area (Table 3.11, Appendix M).

Table 3.11	Transportation,	Utility and	Communication	Infrastructure
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Features	Elements in Study Area (1 km wide)
Roads and Highways	Route 361 St. Alban's Road
	Route 360 Bay d'Espoir Highway
	Route 210 Burin Peninsula Highway
	Route 1 Trans-Canada Highway
	Route 210-13 Garden Cove
	Route 210-11 North Harbour
	Route 2-1-1 Little Harbour
	• Road to Come By Chance, Bull Arm, Jacks Pond, Southern Harbour,
	Bellevue, Chapel Arm and Other
Utilities and Communications	Crown Issued Titles Hydro
	Crown Issued Titles Bell Aliant
	• Crown Issued Titles New York, Newfoundland and London Telegraph
	Company
Sources: Industry Canada (2015); Nalcor Energ	y (2015b); NRCan (2015)

Protected and Special Areas

In paralleling existing transmission lines in south-central Newfoundland, an approximately 13 km long segment of the proposed TL 267 will likewise be required to cross through a portion of the existing boundaries of the Bay du Nord Wilderness Reserve (2,895 km²). This area was designated as a provincial reserve in 1986 under the NL *Wilderness and Ecological Reserve Act (WER Act*) and in 1990 it was fully designated as a Wilderness Reserve. This area encompasses a vast landscape of ponds, rivers, barrens, bogs and fens, forests and thickets in the region, with the main conservation objective for its establishment being the protection of habitat (primarily winter) for the Middle Ridge woodland caribou herd, as well as protecting a representative portion of the Maritime Barrens Subregion of the Maritime Barrens Ecoregion.

The proposed transmission line will also cross the Newfoundland T'Railway Provincial Park at several locations, including near Come By Chance, Jack's Pond and Chance Cove (Figure 3.7). It will also cross a Canadian Heritage River (the Bay du Nord River) and will occur within or in proximity to the boundaries of the former provincial parks at Jipujij'kuei Kuespem, Piper's Hole and Jack's Pond. The proposed right of way also crosses through a portion of the Come By Chance Wetland Stewardship Area (Appendices G and M).

Recreational Land and Resource Use

Local residents and visitors have a long tradition of participating in a wide range of other outdoor pursuits throughout the region, including recreational activities for which detailed information and mapping is not available such as hunting, fishing, wood cutting, berry picking, snowmobiling and ATV use, boating, skiing and hiking. Large and small game can be found throughout the region, and residents also harvest the area's forest resources for firewood and lumber. Angling is also an important recreational and subsistence activity, with various species found in rivers and ponds in the region. Cabins are located throughout the larger area, and are used in association with various recreational and subsistence pursuits. Snowmobiling is also a very popular activity in the winter months with ATVs being used in the other seasons, and there are extensive local trail networks that are used by residents for these purposes and for various associated recreational and subsidence activities at particular times of the year.

General insights on the nature, distribution and timing of such activities by local residents was obtained by Hydro during its recent public and stakeholder consultations (Chapter 4), including the current use of the existing transmission lines and other local trail networks for snowmobiling, cabin developments and their use and possible future expansion, and the occurrence of hunting, trapping and commercial outfitting activities in the region.



Figure 3.7 Protected and Special Areas

Recreational land and resource use activities and associated management areas that are known to occur in the region are illustrated and described in detail in the accompanying Land Use and Infrastructure Study (Appendix M). Some key elements of these uses and activities are summarized in Table 3.12 below.

Land Use	Elements in Study Area (1 km wide)
Hunting	 Moose Management Areas 25 Bay d'Espoir, 26 Jubilee Lake, 28 Black River, 30 Burin Peninsula Knee and 44 Bellevue Black Bear Management Areas 25 Bay d'Espoir, 26 Jubilee Lake, 28 Black River, 30 Burin Peninsula Knee and 44 Bellevue (closed) Caribou Management Areas 64, 67 and 73 (closed) Swift Current, Burin, Avalon and Remainder of Island Small Game Management Areas for willow and rock ptarmigan Island of Newfoundland management area for ruffed and spruce grouse Remainder of Island management area for snowshoe hare
Salmon Angling (scheduled salmon rivers)	 Southern Inland and the Avalon-Burin Inland Waterfowl and Snipe Hunting Zones 116 Conne River and Tributaries including Bernard's Brook and Twillick Brook 110 Long Harbour River and Tributary Streams, Fortune Bay 95 Piper's Hole River 94 Black River, Placentia Bay (below falls) 93 Northeast River, Placentia Bay 92 Watson's Brook, Placentia Bay 91 Come By Chance River 71 Bellevue River, Trinity Bay
Cabins and Cottage Developments Campgrounds and	 Cottage Planning Area around Big Gull Pond, Isthmus of Avalon 40 cottages and remote cottages Jack's Pond Park & Campgrounds
Recreational Vehicle Parks Trails	 Crown Issued Title Snook's Creek Trailer Park Association T'Railway Provincial Park Mount Sylvester Snowmobile Trails system Crown Issued Titles for Art Shack Trail Association, Head of Bay d'Espoir ATV Association, Bay L'Argent ATV Association, Dunn's Brook ATV Association and Grand Le Pierre ATV Association
Canoeing and Kayak Routes	 Bay du Nord River Salmon River North East River North West River North East Brook
Sources: EC (2014); Mussio Ven (2015a); Nalcor Energy (2015b)	ures Ltd. (2014); DFO (2014); NLDMIA (2015); NLDB (2015); NLDNR (2015b); NLDEC

Table 3.12 Recreational Land and Resource Use

Commercial and Other Land Uses

There are also a variety of commercial land use activities that occur in the region, including quarrying, mineral exploration, agriculture, aquaculture, forestry, trapping and others (Table 3.13), which are again described and mapped in detail in Appendix M.

Table 3.13 Commercial and Other Land Uses

Land Use	Elements in Study Area (1 km wide)
Mining and Quarrying	Quarries
	Staked Claims for Mineral Exploration
Agriculture and Aquaculture	Bay d'Espoir Agriculture Development Area
	Bay d'Espoir Agriculture Area of Interest
	Cold Ocean Salmon Inc. (smolt nursery)
	• Other agricultural land uses near Swift Current, Come By Chance, Southern Harbour and Chapel Arm
Forestry	Forest Management District 1: Avalon Peninsula
	Forest Management District 2: Bonavista Peninsula
	Forest Management District 3: Burin Peninsula
	 Forest Management District 7: Bay d'Espoir
	Forestry Access Roads
Trapping	Island of Newfoundland Fur Management Zone
	Zone A and Zone B (closed) Lynx Trapping Zone
Other Land Use	Nalcor Energy's Bull Arm Fabrication Facility
	• Crown Issued Titles (grants, leases, licences and permission to occupy) for unknown
	uses
Source: NLDNR (2015a, 2015b);	Nalcor Energy (2015b); NLDMIA (2015); NLDEC (2015a)

4.0 CONSULTATION

Consultation is an important and integral component of the EA process, and a key aspect of Hydro's approach to project planning and development. The Newfoundland and Labrador EA process provides considerable opportunity for interested parties to bring forward their views and to identify issues and ask questions about a project for consideration in its review and in eventual decision-making. This includes consultation by the Proponent and by Government at various stages of an EA review.

Hydro is committed to full and open consultation, and to ensuring and facilitating meaningful dialogue with people and groups that have an interest in the proposed Project. This has included meeting with stakeholders and the interested public in advance of preparing and submitting this EA Registration Document through a number of consultation initiatives. These have been designed and implemented to provide accurate, timely and meaningful information to interested and potentially affected people, communities and organizations. They have also given participants an opportunity to ask questions, identify issues and concerns, and share local knowledge and perspectives about the Project and its surrounding environment for consideration in on-going Project planning, this EA review, and during eventual Project implementation.

In doing so, Hydro has utilized a variety of consultation approaches and methods to help ensure that all interested parties have full opportunities to participate. The nature and key outcomes of these consultations are summarized in this chapter along with an indication of where and how the various questions and issues raised are addressed in the EA Registration.

4.1 Stakeholder Consultations

Hydro recognizes that the communities of Milltown - Head of Bay d'Espoir, Come By Chance and Chapel Arm are located in relatively close proximity to the proposed Project, and these municipalities were therefore contacted directly about the proposed development and planned public information sessions (as described below), as well as being invited to meet with the Hydro team for a Project overview presentation. All of these municipalities decided and responded that their Councils and staff would attend the open house sessions rather than have a separate meeting with Hydro, and representatives from each community did participate in the open houses in their respective locations.

The Miawpukek (Conne River) First Nation was also notified directly about the public open house in the Bay d'Espoir region, and was likewise offered a meeting to discuss the Project. That meeting took place on June 15, 2015, at which time the Hydro team met with members of the Band Council and its staff.

In addition, any hunting and fishing outfitters that are located within several (up to five) kilometers of the proposed Project right of way were notified by letter about the proposed Project and the upcoming public information sessions, and a follow-up phone call was also made to each of the identified outfitters to discuss the Project and to identify any associated questions or concerns.

4.2 Public Consultations

Hydro conducted a series of public meetings in adjacent communities in mid June 2015 to provide information on the Project and to identify any associated questions or concerns that local residents and other interested members of the general public may have. An overview summary of these public information sessions is provided in Table 4.1.

Table 4.1	Public	Consultation	Sessions

Community	Venue	Date	Time	Number of Participants
Milltown – Head of Bay	Milltown Lions Club	June 16, 2015	4:00 - 7:00 pm	14
d'Espoir				
Come By Chance	Come By Chance	June 17, 2015	4:00 - 7:00 pm	9
	Lions Club			
Chapel Arm	St. John the Baptist	June 18, 2015	4:00 - 7:00 pm	5
	Parish Hall			

4.2.1 Notifications and Advertisements

Public notifications were issued in advance of these information sessions, which included advertisements in local newspapers (Table 4.2) and through other means.

Table 4.2 Newspaper Advertisements

Newspaper	Insertion Dates
Advertiser	June 4, 8 and 15, 2015
The Packet	June 5 and 12, 2015

The public notice (Appendix D) was also sent by email to the Town Offices at Milltown-Head of Bay d'Espoir, Come By Chance and Chapel Arm, as well as to the Miawpukek First Nation and to all Hydro employees in the region. It was also posted in public locations throughout these communities.

Press releases were issued by Hydro on June 1 and 24, 2015 and this information was also posted to the company's website. A social media campaign was also initiated on June 1, 2015 which included Facebook and Twitter posts before, during and after each of the open houses. A Project webpage was also created (*http://www.nlhydro.com/new-transmission-line*), and a Project-related email address and toll-free telephone number have been established and advertised. If people were unable to attend the open houses, they were encouraged to contact Hydro directly with any questions or input, and all public notices and advertisements included the feedback email address and toll free telephone number.

4.2.2 Format and Information Materials

The public information sessions took the form of a number of "drop in" open house sessions, held at the communities and venues identified above. This format allowed all interested parties to come to the sessions on their own time, and to receive information, ask questions and provide input at their own pace and in whatever manner and format that they felt most comfortable. By adopting this open house format, the Hydro Team attempted to establish a relatively informal and relaxed environment, where participants could provide input

and ask questions through one-on-one conversations, and/or in small groups as they preferred. Hydro representatives were present at each session to provide information, answer questions and to record any and all questions, issues and perspectives raised.

Upon arrival, participants were greeted by a Hydro representative at a sign-in table, who provided an overview of the open house purpose and information "circuit" type format. The session included six theme-specific information stations arranged throughout the open house venue, consisting of large information panels (Figure 4.1) that focused on the following topics: 1) the existing transmission system, 2) the proposed TL 267 Project, 3) the environmental assessment process, 4) the environmental setting for the Project, 5) environmental management and protection, and 6) protected areas.







The purpose of these information panels was to provide general background information, and to serve as a basis for prompting dialogue and the sharing of information and input by consultation participants. At the public open houses, Hydro personnel were clearly identified and were positioned at the stations to discuss the Project and answer questions. Plain language information sheets were also available, and before leaving, participants were encouraged to complete a feedback form.

A key focus of the information sessions and associated discussions was on obtaining and recording information and input related to:

• Questions, issues or concerns regarding Project and its potential environmental or socioeconomic effects;

- Local knowledge regarding the existing biophysical or socioeconomic environment in or near the Project Area; and
- Suggestions for any mitigation measures or other means through which any identified issues could be addressed in future Project planning and decisions / actions.

The consultation team members continuously took notes and recorded any and all input received throughout the sessions, and also met as a group to debrief, record and compile all information and input received.

4.2.3 Written Feedback Received from Consultation Participants

A total of 28 participants attended the three public open house sessions. In addition to verbal comments that were received and recorded by team members, 14 feedback forms were completed and returned, a summary of which is provided in Table 4.3.

 Table 4.3
 General Feedback Received at the Public Open Houses

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Sufficient information was provided				6	8
Information was relevant				7	7
Information was easy to understand				7	7
Project team members were able to address my questions				4	10
Open house format was effective		1	2	4	7
I would attend a future consultation event for				8	6
Newfoundland and Labrador Hydro					

When asked about potential environmental issues that may be associated with the development of TL 267, participants raised the following perspectives through the feedback forms:

- The extent to which the proposed transmission line might permanently alter the ecosystem;
- Caribou migrations and the potential effects of development projects on these; and
- Ground water flows resulting from any change in the landscape or associated activity (dug wells).

When asked about views and suggestions regarding the location and routing of the proposed transmission line right of way, respondents noted that the plan to parallel the existing transmission lines was the right approach and it was important to take the least expensive option.

When asked to share any perspectives or knowledge they had about the proposed transmission line area that may be important during Project design and EA, participants responded that:

• The presence of the existing transmission lines and the plan to follow these with the new line would be important to help reduce costs and help protect the environment;

Table 4.4

- It will be important to keep environmental protection and conservation in mind when doing the work, and the overall need to be environmentally minded in this day and age; and
- An observation that the proposed TL 267 will cross through the Norman's Cove watershed.

4.3 Overview of Consultation Results (Written and Verbal Feedback)

A number of topics and themes were identified and noted during the above described consultation activities, including the verbal discussions with participants during the various sessions. These are summarized in Table 4.4, along with a general indication of where each is addressed in this EA Registration document.

Summary of Environmental Questions and Considerations Raised During EA Consultations

Question / Issue Raised	Where Addressed in
Ducient Decemintion and Alternatives	EA Registration
Project Description and Alternatives	Castian 2.C
	Section 2.6
The grant of construction	Section 2.6
The proposed route is preferred, it makes the most sense environmentally	Section 2.2
North route alternative is not considered practical	Section 2.2
The terrain along the southern route alternative is challenging	Section 2.2
Alternative routes are longer and will increase costs	Section 2.2
Natural Environment	
Vegetation	I
Boreal felt lichen occurrences in the area	Section 3.1.4, Appendix H
White pine are found in the Project Area	Section 3.1.4
Herbicide use on transmission line right of way	Section 2.5, 5.2
Transmission line crosses the Conne River Forest Management Area	Section 3.2.4, Appendix M
Wildlife	
Caribou migration south of the proposed transmission line	Section 3.1.5, 5.2, Appendix J
Potential effect of noise from transmission lines on caribou	Section 5.2
Construction activities may cause moose to move from the area	Section 5.2
Parks / Protected Areas	
Concern about construction in the Bay du Nord Wilderness Reserve	Section 3.2.4, 5.4
Human Environment	
Archaeology	
Historic resources are important to the people of Conne River	Section 3.2.1, 5.4
Processes to be followed in the event of a burial site discovery	Section 5.4
Land and Resource Use	
Current right of way from Swift Current to Bay d'Espoir is used for snowmobiling	Section 3.2.4, 5.4
Potential effects on hunting and trapping in the area	Section 3.2.4, 5.4
Possible effects on hunting lodge and client hunting experience	Section 3.2.4, 5.4
Potential effects on expansion of cottages in the Lake Medogonnix area	Section 3.2.4, 5.4
Potential effects on expansion of the Jipujij'kuei Kuespem Park	Section 3.2.4, 5.4
Communities	
Potential traffic issues in communities associated with construction activities	Section 3.2.2, 5.4
Potential effects on public water supplies located in the vicinity of the Project	Section 3.2.2, 5.3, 5.4
Concern about erosion near the terminal station in Chapel Arm	Section 2.3, 2.4
EMFs and audible noise from transmission lines and perceived health issues,	Section 2.5, 5.4.2

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Question / Issue Raised	Where Addressed in	
	EA Registration	
especially near communities		
Property owners may be affected by the Project	Section 3.2.4, 5.4	
Fall is busiest time for outfitting camps	Section 3.2.4, 5.4	
Employment and Business		
Number of jobs associated with the Project	Section 2.4.3	
Will local people have hiring priority	Section 5.4	
Good to see economic activity considering economic downturn	Section 2.1, 5.4	

5.0 ENVIRONMENTAL CONSIDERATIONS AND PLANNED MITIGATION

Hydro has well over four decades of experience in planning, designing, assessing, building and operating transmission infrastructure projects, and currently maintains an extensive electricity transmission and distribution system throughout Newfoundland and Labrador. This, along with the fact that the environmental effects of transmission lines are usually considered to be well understood and generally manageable, means that there is good information available on the potential environmental issues that may be associated with the proposed Project, as well as appropriate and effective measures for avoiding or reducing any such effects.

The following sections provide an environmental effects analysis for the proposed Project, including each of its associated components and activities. The analysis focuses upon, and is organized according to, the following themes:

- 1) Atmospheric Environment;
- 2) Terrestrial Environment;
- 3) Aquatic Environment; and
- 4) Socioeconomic Environment

The environmental effects analysis that follows considers a number of relevant spatial boundaries, including:

Project Area: This area encompasses all Project related components and activities, including the construction and presence of the cleared right of way for the transmission line, and the "footprints" of other associated infrastructure (see Chapter 2).

Study Area: The area over which the Project and any potential disturbances and other environmental interactions may extend (namely, its likely environmental zone of influence). For EA purposes, this has been conservatively defined as a 1 km wide area that encompasses the Project Area and surrounding environments.

Regional Areas: In addition to the Project Area and Study Area described above, the environmental effects assessment also considers the particular characteristics (and larger spatial and temporal distributions) of the individual environmental components under consideration. This includes the overall ranges and movement patterns of any potentially affected wildlife or fish, as well as the locations and distribution of human components and activities in the region.

The temporal boundaries include and encompass the overall timing and duration of Project related activities, as well as the likely duration of any resulting environmental effects. Particular consideration is given to the relevant temporal characteristics of the affected environment, including any particularly important or sensitive periods, likely environmental response and recovery times to potential effects, and any natural (without-Project) variation in the environment.
The environmental analysis for each component includes a discussion and description of the likely environmental issues and interactions (both adverse and positive) that may be associated with the Project, with separate subsections for the Construction and Operation and Maintenance phases. Environmental planning and mitigation measures to avoid or reduce environmental effects are identified and considered integrally within the analyses. The assessment also includes possible accidental events and malfunctions that could potentially occur during each phase of the Project.

This is followed by a summary and evaluation of the likely residual (with mitigation) environmental effects of the Project. In keeping with standard EA practice in Newfoundland and Labrador and elsewhere, significant adverse environmental effects are defined as those that will cause a change in one or more environmental components that will alter its status or integrity beyond an acceptable and sustainable level. These include those effects that would likely result in: 1) detectable changes in environmental conditions as a result of Project-related emissions or other activities that results in measurable, repeated and prolonged exceedances of applicable regulatory standards and guidelines; 2) mortality or life-threatening injury to one or more individuals of a designated (protected) species at risk, or disturbances to any biota or their habitats such that the size, health, ecological function and/or sustainability of a population would be measurably and adversely affected; or 3) adverse effects to the health, safety, well-being or land use activities of affected individuals or communities such that there are associated, detectable and sustained decreases in the intensity, quality or value of one or more of these components for a population.

The environmental analysis concludes with an overview of any environmental monitoring and follow-up which may be required during one or both phases of Project implementation.

5.1 Atmospheric Environment

The environmental effects analysis for the atmospheric environment includes consideration of any likely implications of the Project on air quality and noise levels within and around the Project Area and the surrounding region and for associated greenhouse gas (GHG) emissions. In addition to the importance and function of the atmospheric environment in and of itself, there are clear inter-relationships and pathways between air quality and the acoustic environment and other aspects of the natural and socioeconomic environments.

An overview of the main possible (and material) interactions between each of the Project's components and activities and the various key indicators and parameters that have been identified for this environmental component is presented in Table 5.1, in order to help focus and frame the assessment.

Project Component / Activity	Key Indicators and Parameters		
	Air Quality GHG Emissions N		
Construction Phase	•		
Access development / maintenance and use	•	•	٠
Construction camp and other infrastructure	•	•	•
Movement and presence of personnel, equipment and materials	•	•	•
Waste production and management	•	•	•

 Table 5.1
 Atmospheric Environment: Potential Project-Environment Interactions

Project Component / Activity	Key Indicators and Parameters			
	Air Quality	GHG Emissions	Noise	
Right of way clearing and preparation	•	•	•	
Transmission tower foundations (excavation, blasting, installation)	•	•	•	
Transmission tower assembly and installation	•	•	•	
Installation of conductor and other components	•	•	•	
Terminal station upgrades and expansion	•	•	•	
Employment and expenditures				
Possible accidental events and malfunctions	•	•	•	
Operation and Maintenance Phase				
Presence and operation of the transmission line			•	
Routine line inspections and repair	•	•	•	
Vegetation management	•	•	•	
Potential major system repairs	•	•	•	
Possible accidental events and malfunctions	•	•	•	

5.1.1 Construction

The main potential interactions between the Project and the atmospheric environment during Project construction relate to the use of heavy equipment and the noise, dust and engine emissions that may be associated with these activities. Construction will include various activities associated with equipment mobilization and set-up, right of way clearing and site preparation, the movement and placement of construction materials, excavation and blasting, tower installation and other activities, which will result in some minor, temporary and localized air emissions due to Project-related dust and exhaust emissions from vehicles and equipment.

Project construction will, however, be characterized by fairly standard and routine activities and practices, and at any one location the presence of construction personnel and equipment use will occur in a small and localized area over a relatively short period, as crews and their associated equipment move progressively along the right of way. Furthermore, most of the proposed transmission line routing is also located in a relatively remote area, far removed from communities, residences and other anthropogenic components and activities and thus, any potentially sensitive receptors in the human environment. Any potential emissions or interactions with the atmospheric environment during Project construction are therefore likely to be negligible (and within existing regulations or standards), localized and short-term (intermittent over the construction period), as outlined further in the following sections.

Air Quality

The main potential sources of air pollutants are exhaust gases from fuel combustion in equipment engines, which are used in all aspects of the Project's construction phase. The principle contaminants include particulate matter (PM), particulate matter less than 10 microns (PM_{10}), particulate matter less than 2.5 microns ($PM_{2.5}$), sulfur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO) and volatile organic compounds (VOCs).

Table 5.2 shows the estimated pollutant emissions from the construction of TL 267 based on recent EA-related analysis for similar transmission line construction in Newfoundland and Labrador, namely the Labrador-Island Transmission Link (L-ITL) that will bring power from Muskrat Falls to the Island of Newfoundland (approximately 1,100 km of new, high voltage transmission line). The information and analysis below reflects the expectation that the emissions from TL 267 construction will be approximately 10 times lower than those from the construction of the L-ITL, although this estimate is likely conservative because the L-ITL includes a wider right of way, larger towers, the construction of several converter stations and access roads and other components. The estimates of air contaminant emissions are based on standard emission factors for on-road and off-road vehicle diesel engines (Nalcor Energy 2012, US EPA 1996).

Air Contaminant (tonnes)	Construction of L-ITL ¹	Construction of TL 267			
Particulate matter	351	35			
PM ₁₀	351	35			
PM _{2.5}	351	35			
SO ₂	500	50			
NO _x	5,931	593			
СО	1,301	130			
Total Polycyclic Aromatic	0.16	0.02			
Hydrocarbons (PAHs)					
Total Volatile Organic Compounds	401	40			
(VOCs)					
¹ L-ITL Environmental Assessment (EIS, Chapter 11) (Nalcor Energy 2012)					

 Table 5.2
 Estimated Air Emissions during Transmission Line Construction

The air contaminant levels reported in Table 5.2 are estimated emissions over the entire TL 267 construction period. Although the ambient concentrations are expected to be highest near the construction activities themselves, these effects will be short-term because the air contaminants will quickly disperse, and ambient levels are expected to remain below applicable regulatory standards and guidelines.

To minimize air quality effects from equipment emissions, all equipment will be inspected regularly and appropriately maintained to ensure that emission control components are functioning properly. A lesser source of air pollution is fugitive emissions associated with vents, leaking pipes and tubings, valves, connections, pump seals, compressor seals and pressure relief valves. These emissions can also be prevented by ensuring that equipment is well maintained and serviced, and periodically inspected.

Fugitive dust emissions during construction can also affect air quality and may be generated during activities such as clearing, grubbing, blasting, excavation and the movement of equipment and vehicles on unpaved roadways and trails. Dust generation and dispersion depends on a number of site and time specific conditions, such as soil moisture, meteorological conditions (wind, precipitation), location (exposed or sheltered), terrain (rocky or sandy), and the type and level of activity at the time. Fugitive dust emissions will be mitigated by using water or calcium chloride as a dust control agent, as required. Due to the temporary and localized nature of any such dust generation during construction, no overall effects on air quality are anticipated.

GHG Emissions

Any GHGs produced during construction will primarily be from the combustion of fossil fuels. The clearing of trees and vegetation for the right of way also contributes to overall GHG emissions because the loss of CO_2 -fixing vegetation means less of the CO_2 produced will be sequestered by vegetation. It is expected that order of magnitude estimates of GHG and air contaminant emissions will be similar on a per km basis to other transmission line construction projects that Nalcor Energy has undertaken in the province (Nalcor Energy 2012, 2014).

As a general yet conservative estimate, the estimated GHG and air contaminant emissions from the construction of the L-ITL (approximately 1,100 km in length), are again used here to make an order of magnitude calculation of air emissions from the construction of TL 267 (which is approximately 188 km in length) (Table 5.3). GHG emissions are reported in carbon dioxide equivalents (CO_2e), which is a measure of how much heat a GHG traps in the atmosphere relative to carbon dioxide. In the calculations for the L-ITL, the equivalent carbon dioxide (CO_2e) quantities of GHGs were calculated for CO_2 , CH_4 and N_2O , which is a component of NO_x .

Project	Construction of L-ITL ¹	Construction of TL 267		
Transmission Line Length (km)	1,100	188		
GHG emissions (tonnes CO₂e/yr.)				
Construction	267,131	26,700		
Vegetation Clearing for ROW	393,822	39,400		
Total GHG emissions (t)	660,953	66,095		
Project Construction Period (years)	4	2		
Average annual GHG emissions (t)	165,238	33,048		
¹ L-ITL Environmental Assessment (EIS, Chapter 11) (Nalcor 2012)				

Table 5.3 Estimated GHG Emissions during Transmission Line Construction

By comparison, the total GHG emissions reported by facilities in Newfoundland and Labrador in 2013 were 4.5 megatonnes (Mt) CO₂e (Environment Canada 2014c), and the total GHG emissions reported in Canada in 2013 were 261 Mt CO₂e (Environment Canada 2014d). Although the effects of GHG emissions in the atmosphere are cumulative, the levels expected to be generated by the construction of TL 267 are negligible relative to provincial or national levels.

Noise

Noise will be generated during Project construction by the movement and use of equipment and vehicles and by blasting activities, the resulting effects of which on the atmospheric environment would be nuisance effects or possible disturbance to nearby receptors. For the most part, the construction of TL 267 is through remote, sparsely populated areas where wildlife would be the most likely noise receptors. From Swift Current to Chapel Arm, the transmission line right of way passes near to several communities and roadways.

Table 5.4 lists the types of construction equipment and activities that may be used in the clearing of the right of way and the assembly and installation of towers and other infrastructure along with typical noise levels generated by these pieces of equipment and activities at 15 m and at 500 m distance, which would encompass

residences and towns in the vicinity of the transmission line. By comparison, conversational speech has a sound level of approximately 60 dBA at 1 m and the sound level in a quiet room at night is around 30 dBA. Since this machinery will be used intermittently, during daytime hours, for relatively short periods of time, and mostly in remote locations, the potential for adverse noise effects on nearby residential properties or other environmental receptors is likely to be negligible. Noise from these types of equipment and activities will be further mitigated by ensuring that engines and mufflers are well-maintained and in good working order, and through on-going discussions and communications with local communities and stakeholders throughout Project construction (see Section 5.4).

Equipment / Activity Description	Noise Level at 15 m (dBA) ¹	Estimated Noise Level at 500 m (dBA) ²
Blasting	94	64
Chainsaw	84	54
Compressor (air)	78	48
Concrete Mixer Truck	79	49
Crane	81	51
Dozer	82	52
Dump Truck	76	46
Excavator	81	51
Flat Bed Truck	84	54
Front End Loader	79	49
Generator	82	52
Generator (<25 kVA)	73	43
Grader	85	55
Impact Pile Driver	100	70
Jackhammer	89	59
Man Lift	80	50
Pickup Truck	75	45
Pneumatic Tools	85	55
Pump	81	51
Roller	80	50
Scraper	85	55

Table 5.4	Typical Construction Equipment	Activity Noise Levels
10010 3.4	Typical construction Equipment	Activity NOISC LEVEIS

¹ Source: US Department of Transportation, Federal Highway Administration Construction Noise Handbook. Available at *http://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm*. Accessed June 2015. ² Calculation based on the fact that sound levels generally drop by 6 dBA for every doubling in distance

The following summarizes some of the key mitigation measures (some of which have been described in the above analysis) that will be implemented to help avoid or reduce any potential effect of Project construction on the atmospheric environment.

- Only trained and licensed individuals will operate equipment. Equipment will be kept in good repair -- exhaust filters and mufflers shall be maintained to minimize particulate and VOC emissions and noise levels.
- Emissions ratings will be included as a factor in equipment selection.

- Clearing of vegetation will be limited to only those areas where it is necessary, with limits of clearing being delineated and adhered to.
- Dust control for open soil areas or dry, unsealed roads will be provided by using fresh water, calcium chloride, or other agents as necessary and as approved by relevant regulatory authorities.
- Dry material, such as soil or aggregate stockpiles, will be covered to prevent blowing dust and material stockpiles and will be located taking into consideration the prevailing wind directions, locations of trees and shrubs to act as windbreaks and locations of any sensitive receptors.
- Weather conditions where high dust level episodes are probable (such as strong winds in dry weather) will be taken into account. If high winds are forecast, dust suppression measures and/or control of activities will be implemented to mitigate dust generation.
- Transport of workers to and from construction sites will be in multi-passenger vehicles as much as possible.
- For any required blasting activity, consideration will be given to the size of the blasts and atmospheric conditions (wind directions and inversion) to minimize noise and vibrations experienced.

As a result of the above, any potential emissions or interactions with the atmospheric environment during Project construction are therefore likely to be negligible (and within existing regulations or standards), localized and short-term (intermittent over the construction period).

5.1.2 Operation and Maintenance

During Project operations, the nature and degree of on-site activity will be considerably less than that during the construction phase, and will be characterized primarily by the continued operation of the system and periodic inspection and maintenance activities. As described in Section 2.5, once commissioned and operational the proposed transmission line will not be noisy, and the system is being designed in accordance with applicable engineering standards and guidelines related to audible noise and other such considerations. The on-going presence and continuous operation of the Project will not involve air emissions or other planned environmental discharges, so no material, adverse effects upon the atmospheric environment are likely to occur during its planned and on-going operation.

5.1.3 Potential Accidental Events or Malfunctions

During the various phases and activities that will be associated with this (or any) development project, an accidental or unplanned event is an unlikely, but unfortunately possible, outcome. Some of the potential accidental events or malfunctions that may be associated with this Project and which are relevant to the atmospheric environment include a fire (which may potentially extend into adjacent areas and communities), and an accidental spill of chemicals, fuels or other deleterious substance into the environment. Either of these

events could potentially occur during any phase the Project, the potential environmental effects of which would clearly depend upon the nature, magnitude, location and duration of the event.

A major fire originating at the Project site could pose a health and safety concern, as well as resulting in a temporary reduction of air quality in the surrounding area. As indicated, the Project will be developed and operated in accordance with Hydro's Environmental Protection Plans and Emergency Response Plans and procedures (Section 2.9), which address fire prevention and response. In the unlikely event of a fire, priorities for fire response will be to protect human health and to ensure that the fire does not spread, with all work ceasing and the emergency response plan being immediately implemented.

The use, storage, handing and transportation of fuel and other such materials will be undertaken by trained personnel in accordance with applicable regulations, guidelines and environmental protection procedures. All fuel and oils will be stored in approved storage containers, and fuel transfer and use operations will comply with all regulatory requirements and Hydro procedures for such activities. Personnel responsible for the transport, storage and handling of all such products will be appropriately trained in the requirements associated with their use and the response and reporting requirements of an incident prior to commencing work at the site. Refueling and maintenance activities will be undertaken on level terrain, away any surface water, on a prepared impermeable surface with a collection system to ensure oil, gasoline and hydraulic fluids do not enter waterbodies. A supply of spill response equipment and materials will be maintained at all work locations. Given the relatively small volumes of volatile chemicals that will be stored and used at any one location during the Project, the potential air pollutants from a fire or spill of volatile chemicals to the atmospheric environment are relatively small.

5.1.4 Environmental Effects Summary and Evaluation

A summary of potential environmental interactions, identified mitigation measures, and the residual environmental effects of the Project on the atmospheric environment is provided in Table 5.5 below.

Environmental	Proje	ect Phase / Po	tential Interaction	Key Considerations and
Component	Construction	Operations	Issues / Interactions	Environmental Mitigation
Air Quality / GHG Emissions	•		 Construction works (noise, dust) Equipment use (vabialos, fuel 	 Localized and short-term construction activity. Project engineering design in accordance with applicable
Noise Levels	•		 (vehicles, fuel consumption, exhausts) Possible accidental event (fire, others) 	 accordance with applicable guidelines and standards. Project location within relatively remote areas. Standard construction and operational practices. Regular inspection and maintenance of equipment. Accidental event prevention and response plans and procedures

 Table 5.5
 Environmental Effects Summary: Atmospheric Environment

The proposed Project is not likely to result in significant adverse environmental effects on any aspect of the atmospheric environment.

5.1.5 Cumulative Environmental Effects

Any Project-related air or noise emissions (particularly during construction activities) will be negligible and occur within a small area over a relatively short time period, and will decrease quickly with distance from the source. Most Project components and activities will be located in a remote area with a low level of past and current industrial activity, and its air and noise emissions are therefore not likely to interact or overlap with any others in the region.

The Project is therefore not likely to result in significant, adverse cumulative environmental effects to the atmospheric environment in combination with other projects or activities that have been or will be carried out.

5.2 Terrestrial Environment

The terrestrial environment is comprised of relevant components of the "on-land" biophysical environment which may interact with the Project, including vegetation, soils and landforms and wildlife.

An overview of the main possible (and material) interactions between each of the Project's components and activities and the various key indicators and parameters that have been identified for this environmental component is presented in Table 5.6.

Project Component / Activity	Key Indicators and Parameters			
	Vegetation	Soils and	Wildlife	Wildlife
		Landforms	(Mammals)	(Avifauna)
Construction Phase				
Access development / maintenance and use	•	•	•	•
Construction camp and other infrastructure	•	•	•	•
Movement and presence of personnel, equipment and materials			•	•
Waste production and management			•	•
Right of way clearing and preparation	•	•	•	•
Transmission tower foundations (excavation, blasting, installation)	•	•	•	•
Transmission tower assembly and installation		•	•	•
Installation of conductor and other components			•	•
Terminal station upgrades and expansion		•		
Employment and expenditures				
Possible accidental events and malfunctions	•	•	•	•
Operation and Maintenance Phase				
Presence and operation of the transmission line			•	•
Routine line inspections and repair				
Vegetation management	•		•	•
Potential major system repairs			•	•
Possible accidental events and malfunctions	•	•	•	•

 Table 5.6
 Terrestrial Environment: Potential Project-Environment Interactions

5.2.1 Construction

Project construction will include clearing along the transmission line right of way and at the sites of the other associated infrastructure. Ground disturbance will also occur as a result of any excavation for tower foundations and at the sites for other temporary and permanent infrastructure, and there will be noise, dust, human presence and other potential environmental disturbances associated with this phase of the Project.

Vegetation and Wetlands

The proposed transmission line will pass through areas of dense coniferous forest, open scrub forest, wetlands, barrens and previously developed lands (see Section 3.1). These areas support a variety of vegetation communities and associated plant species, which provide habitat for wildlife and which are or may be used by humans for subsistence, recreational and commercial purposes. As described previously, as part of its Project

planning and associated analysis of the existing (baseline) environment for the Project in support of this EA Registration, Hydro has completed a detailed ELC Study (Appendix F), which involved identifying, classifying, delineating and mapping key vegetation communities and other relevant environmental characteristics within the proposed Project Area (right of way) and a larger, surrounding Study Area (1 km wide).

Based on the results of that ELC, Table 5.7 summarizes the various vegetation types and areas that will be directly affected by the clearing of the proposed right of way, itself, and compares these types and areas to the occurrence and availability of each of these habitats in the larger surrounding region (1 km wide Study Area). There are no regionally unique or particularly sensitive habitat types within either the Project Area or the larger surrounding Study Area.

ELC Habitat Type	TL 267 Right of Way	Study Area (1 km wide)	Percent				
	(40 m wide)	Area (na)	(Area in Right of Way vs.				
Row d'Espeix to Come Ry Change (201)			Availability in Study Area)				
Softwood Forest	108.66	2,509.49	4.3%				
Hardwood Forest	8.75	249.96	3.5%				
Mixedwood Forest	67.37	1,503.73	4.5%				
Softwood Scrub	66.10	1,527.65	4.3%				
Hardwood Scrub	0.74	22.21	3.3%				
Herbaceous	4.24	197.25	2.2%				
Barren	85.94	2,259.48	3.8%				
Shrub	37.67	895.67	4.2%				
Wetland	143.78	3,807.00	3.8%				
Anthropogenic / Other	37.37	1,085.51	3.4%				
Total	560.62	14,057.95	4.0%				
Come By Chance to Sunnyside (2010 E	LC Study, Stantec 2010a)						
Conifer Forest	11.91	315.47	3.8%				
Conifer Scrub	0.13	6.48	2.1%				
Cutover	31.99	711.14	4.5%				
Exposed Earth / Anthro / Cutblock	0.00	15.83	0.0%				
Exposed-Earth / Anthro	8.71	147.72	5.9%				
Kalmia Lichen / Heathland	10.16	219.02	4.6%				
Mixedwood Forest	20.53	660.40	3.1%				
Open Water	3.94	147.61	2.7%				
Rocky Barrens	10.31	261.29	4.0%				
Scrub / Heathland / Wetland	87.04	2,084.93	4.2%				
Complex							
Wetland	0.08	21.48	0.4%				
Total	184.82	4,591.37	4.0%				

Table 5.7 Area and Proportion of ELC Habitat Types within the Project Area and Study Area

Wetlands are generally widespread across much of south-central and eastern Newfoundland and throughout the province as a whole, and may be particularly important and valued because of their hydrologic, ecological and/or anthropogenic functions. This includes their potential role in the natural purification and storage of water, in runoff and flood control, and as habitat for birds, fish and other wildlife resources and well as for associated recreational and educational activities. The protection of wetlands is also the subject of various federal, provincial and municipal policies, agreements and legislation.

Development activities have the potential to affect the quantity and/or quality of wetland habitat through, for example, the alteration or loss of wetland habitat (quantity) resulting from direct vegetation clearing and other ground disturbance, or through associated changes in wetland characteristics and quality due to alternations in surface water flows, vegetation communities or associated emissions and other disturbances including dust, sedimentation, siltation, spills or other disturbances.

The proposed TL 267 Project will inevitably cross through extensive areas of wetland in south-central and eastern Newfoundland. As part of the above described ELC study, all wetlands that are located within (crossed by) the proposed transmission line right of way and surrounding (1 km wide) Study Area were identified, delineated, classified and mapped (Appendix G). Table 5.8 summarizes these various wetland types and areas as well as their overall occurrence and availability in the larger surrounding region (Study Area).

Wetland Habitat Type	TL 267 Right of Way (40 m wide) Area (ha)	Study Area (1 km wide) Area (ha)	Percent (Area in Right of Way vs. Availability in Study Area)
Bay d'Espoir to Come By Chance (2015 W	etlands Study, Appendix O	i)	
Bog	100.30	2,746.38	3.7%
Complex	22.26	603.77	3.7%
Fen	16.52	301.65	5.5%
Marsh	0.00	1.55	0.0%
Shallow Water	0.00	1.04	0.0%
Swamp	4.70	152.61	3.1%
Total	143.78	3,807.00	3.8%
Come By Chance to Sunnyside (2010 Wet	land Study, Stantec 2010b)	
Bog	10.4	227.44	4.6%

Table 5.8Area and Proportion of Wetland within the Project Area and Study Area

Transmission line design, including tower placement and the specific siting of other Project infrastructure and activities, will play a key role in addressing any potential effects on wetlands. This will involve identifying and attempting to avoid certain areas such as wetlands and any other particularly important or sensitive habitats, for both practical and environmental reasons. Given the overall number and extent of wetland areas throughout this part of insular Newfoundland, however, it is inevitable that the Project will result in some degree of interaction with wetlands.

Through its standard construction and operating procedures, including its EPP (Appendix E) and integrated vegetation management program, Hydro currently has in place established and effective processes and proven procedures to minimize the effects of its activities on vegetation and wetlands, some examples of which include the following measures:

- Identifying and avoiding sensitive areas and habitats where possible and feasible in Project design, including wetlands, riparian zones, and areas where protected species are known or likely to occur;
- Minimizing the extent of required vegetation clearing, and ensuring that planned clearing limits are clearly identified and adhered to;

- Completing any required activities in or through wetland areas during the winter months where possible and practical;
- Defined work areas and access trails within wetlands will be clearly delineated and adhered to, with corduroy or skids used as required;
- Clearing and disposing of cleared vegetation in accordance with applicable regulations and permits, with any merchantable timber being salvaged and stored properly; and
- Taking all necessary precautions to prevent accidental fires, with adequate firefighting equipment being maintained at the work sites and appropriate emergency response and reporting procedures in place should an incident occur.

As described in Section 3.1.4, a number of plant species at risk are known to occur on the Island of Newfoundland, including species that have varying degrees of formal protection under provincial (*NL ESA*) and/or federal (*SARA*) legislation, as well as others that have been otherwise identified as being of conservation concern and/or regionally rare by relevant organizations and processes. The majority of these are known to occur only in very specific areas and habitat types, often close to the coast where climatic conditions provide suitable habitat conditions. The proposed Project Area is located in a more interior environment and as such likely provides low habitat potential for many of these species.

Given that Project construction will involve the clearing of vegetation along the right of way and other ground disturbance, and because plants that are listed under the *NL ESA* and/or *SARA* have key ecological importance and legal protection, taking appropriate planning and mitigative measures to avoid adverse effects upon these species has been a key environmental consideration for Project planning and design by Hydro to date. As many areas of Newfoundland and Labrador have not been surveyed, the presence and distribution of many of these plants in any specific part of the province is largely unknown, however, including the Project Area and surrounding region. As a result, Hydro has completed a Flora: Listed and Rare Plants Study (Appendix H) for the Project, the purpose of which has been to identify and map potential habitats for protected and otherwise regionally rare plant species within and adjacent to the proposed Project Area.

As indicated previously, two listed plant species have been identified to occur within five kilometers of the proposed TL 267 centerline: 1) the Boreal Felt Lichen, and 2) the Blue Felt Lichen. In addition, the protected Water Pygmyweed has also been observed at the head of Placentia Bay which is within approximately 500 m of the TL 267 centerline.

The habitat potential modeling completed as part of the above referenced study indicates that over 98 percent of the Study Area from Bay d'Espoir to Chapel Arm is of low potential based on proximity to known occurrences, with the remaining approximately two percent of the area being comprised of medium and high potential areas. Species-specific modeling was also completed based on the known habitat requirements of the three species listed above, which resulted in a total of approximately 517 and 21 ha of suitable habitat for Boreal Felt Lichen being identified in the Study Area and Project Area (right of way), respectively. A total of approximately 110 and five ha of suitable habitat for Blue Felt Lichen were identified within the Study Area and Project Area, respectively. The only suitable habitat for Water Pygmyweed within the Study Area is 1.3 km of shoreline near Placentia Bay. A previous regionally uncommon plant study for the section of the Study Area from Come By Chance to Chapel Arm (Stantec 2010c) did not identify any high or very high potential habitats for listed or rare plant species in that area.

Given the legal protection of such species under *NL ESA* and *SARA*, and in order to ensure appropriate due diligence and effective mitigation during the Project, Hydro will be undertaking focused plant surveys in select portions of the Project Area in the late summer of 2015. This will include, in particular, any identified locations where planned Project components and construction activities (such as the cleared transmission line right of way) would occur in and interact with areas of high potential to contain listed plants as identified through the above described study. These plant surveys will be carried out in accordance with standard plant survey methodologies utilized on similar studies and projects, and will be planned and completed in consultation with the NL Wildlife Division.

The resulting information will be considered in on-going and detailed Project design and infrastructure siting, to attempt to proactively avoid or attempt to reduce direct interaction with these locations, where possible and feasible. Many of the above described general mitigations related to vegetation and wetlands, such as minimizing and clearly marking areas to be cleared and other measures, will also help to avoid possible effects upon any listed or rare plants that may occur in the region.

Soils and Landforms

An overview of the geology (bedrock and surficial) and topography of the Project Area was provided earlier in Section 3.1.2. The construction and eventual operation of the Project will not require or result in the excavation or removal of large volumes of soil or rock, or in the loss of any large or unique landforms. Dust during Project activities will be controlled as required, and adverse effects to soil quality due to accidental spills will be prevented through the planned implementation of Hydro's established spill prevention and response plans and procedures.

Caribou

Woodland caribou are native to Newfoundland and Labrador, and are distributed throughout the Island in various herds or aggregations that exhibit degrees of seasonal range overlap. The proposed transmission line crosses through the southern portion of Middle Ridge Caribou Management Area (# 64), which is largely occupied by animals associated with the Middle Ridge Wildlife and Bay du Nord Wilderness Reserves. The Middle Ridge Caribou Herd is the largest single caribou aggregation on the Island, which peaked in abundance during the mid-1990s at approximately 20,000 individuals. All caribou populations in Newfoundland have experienced considerable fluctuations over the past 40 years, and recent estimates suggest that abundance has now declined by 65 percent over the last two decades. The NL Wildlife Division recently delineated caribou occurrence in Newfoundland using caribou telemetry data and kernel analyses to determine relative utilization and distributions for each season.

An overview of the presence, distribution, habitat use and seasonal movement patterns of woodland caribou in this area of south-central and eastern Newfoundland and in relation to the proposed Project is provided in the associated Caribou Study completed in support of this EA Registration (Appendix J). As indicated in that study, the proposed Project would potentially interact with seasonal core use and occupancy areas for caribou throughout the year, although the nature and degree of such overlap varies considerably by location, time and type. The Project directly intersects with small portions of primary and secondary core areas for caribou during the over wintering, summer post calving and/or fall rutting periods. Although it does not directly intersect with any identified core areas for the spring calving period, it does occur within several kilometers of a number of identified primary areas.

Linear developments such as transmission lines have the potential to affect caribou in a number of ways, such as through the noise, human presence, clearing and ground disturbance associated with construction. Caribou and other ungulate species are known to be particularly sensitive to disturbance during the calving season from May to June (Bradshaw et al. 1998, Bowyer et al. 1999, Vistnes and Nelleman 2008, Lykkja et al. 2009). Adult female caribou have also been found to be highly sensitive to human and habitat disturbance from forestry, mining and other effects (Schaefer and Mahoney 2007, Weir et al. 2007, Vors et al. 2007, Boulanger et al. 2012), particularly during calving and calf-rearing (Chubbs and Keith 1992, Harrington and Veitch 1992; Nellemann and Cameron 1998, Courtois et al. 2007, 2008).

As described above, a considerable amount of research has been conducted on caribou populations in Newfoundland and Labrador in recent years and is on-going. The identification and analysis of caribou habitats and distributions has been a key aspect of the planning process for this Project. Hydro will continue to work cooperatively with relevant government departments and other organizations to ensure that it has access to the best and most current caribou data available, and will collaborate with these agencies to obtain and incorporate such information into its planning and design processes and in the eventual implementation of this Project.

Mitigation to avoid or reduce potential effects on caribou and their habitats are integrated into Hydro's existing plans and procedures, and will be adapted and implemented for the construction and operation of this Project. These include minimizing areas of clearing and any new access, scheduling high disturbance activities to occur outside of sensitive periods when caribou are present in the vicinity of construction and/or reconnaissance and shut-down procedures, prohibitions on hunting, harassing or feeding wildlife by Project personnel, standard procedures for wildlife encounters, and others.

The specific mitigation measures that Hydro will implement to avoid or reduce possible effects on caribou will be reflected in its Caribou Protection and Environmental Effects Monitoring Plan for the TL 267 Project, an initial overview of which is provided below:

- Where access roads and trails require the installation of permanent watercourse crossing structures (bridges, culverts), the protection of riparian shoreline(s) will include regular inspection and maintenance of those structures;
- Biodegradable lubricants and hydraulic fluids will be used where practical, when working near waterbodies;

- Vegetation buffer zones, established at environmentally sensitive areas during construction, will be maintained. Only danger trees will be removed from these areas;
- Upon completion of construction, all disturbed areas (e.g., exposed mineral soils) and construction staging areas that are not required for operations and maintenance or access will be regraded to reestablish drainage patterns, blend with the natural terrain and allowed to revegetate naturally. Temporary access will be assessed to determine if it will be needed; where access is to be decommissioned, the disturbed area will be returned to a comparable land use capability, depending on the condition of the road or trail;
- Hydro will decommission those access roads and trails used during construction that are not required for the operations and maintenance activities;
- Disturbances related to inspection, maintenance and vegetation management will, for the most part, be contained within the existing right of way already cleared during construction;
- Access control measures (e.g., signage, gates) to address off highway vehicle use of access roads and trails required for Project operations and maintenance will be examined and discussed with the NL Wildlife Division and applied as applicable, and these will be described in the EPP;
- Hydro will use non-residual herbicides and mechanical methods for vegetation removal, where practical. The requirements of the applicable regulations will be met or exceeded. All herbicide applications will be conducted by qualified, trained personnel in a careful manner, following the manufacturers' instructions and as per the *Pesticides Control Regulations* (1996, plus amendments) under the NL *Environmental Protection Act*;
- Ground travel for maintenance of the transmission line will be restricted to existing approved travel routes, which will be used and maintained in accordance with applicable regulations;
- Transmission line maintenance and repair personnel will adhere to appropriate speed limits applicable to the size and class of the access roads to reduce the potential for vehicle-wildlife collisions;
- Hydro 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;
- Only essential vehicular activity, including helicopter flights, will be permitted along the transmission line to minimize disturbance to wildlife;
- Hydro will avoid conducting non-essential activity in Primary Core area in Newfoundland during the sensitive calving and post-calving season, to the extent feasible;

- Effective scheduling and logistics for maintenance work will be completed to minimize the number of vehicle trips per maintenance task, and any inspections, maintenance and/or repairs will be completed as quickly and efficiently as safety allows;
- Spill kits and trained personnel will be present on-site at all times, allowing for prompt containment of hazardous products;
- Well maintained equipment with quality mufflers will be used and equipment maintenance schedules will be followed;
- Engine idling will be minimized and environmental awareness training with key maintenance and repair personnel will be conducted on this topic;
- Prior to blasting, the Hydro On-site Environmental Monitor (OSEM) will conduct a visual survey. If caribou are within three kilometres of the site, blasting will be delayed until caribou have left the area;
 - Methods to encourage caribou to leave the area may be implemented in consultation with the NL Wildlife Division;
 - If it can be demonstrated that the planned blasting activity will not likely result in a behavioural response by caribou, this three kilometre radius may be reduced.
- As some Project activities (such as grubbing, vehicle and heavy equipment use, tower erection, conductor stringing) would not be audible beyond a short distance, if caribou are observed within 500 m of such an activity, the OSEM will determine if the activity will be delayed or curtailed;
- Caribou will be permitted to cross work areas, and access roads with traffic yielding to the animals when crossing a road:
- If human-mediated caribou mortality occurs, the Wildlife Division will be contacted immediately;
- Garbage control measures will be used to prevent bears and other animals from accessing garbage and prevent attraction of animals to garbage storage areas; and
- The Project footprint will be minimized to the extent possible, including access and other disturbances on the landscape being kept within existing areas of disturbance where possible. Where possible the Project is being designed to minimize the creation of new access; for example, the TL 267 follows existing transmission lines along its entire length.

In terms of monitoring, the most likely potential effects that could result from Project related components and activities would be possible changes in caribou movement and habitat usage patterns during certain Project activities. Environmental effects monitoring plans are understood to be required elements of environmental strategy, and consistent with Hydro's understanding, key elements of the plan are described herein.

Hydro will monitor caribou movements and usage patterns through the use of GPS telemetry collars and visual monitoring (through annual aerial surveys). This monitoring will be designed to complement or extend upon routine work conducted by the NL Wildlife Division.

Specifically, changes in movement patterns and usage will be monitored by comparing caribou telemetry baseline patterns and usage to those observed during construction and post construction. Monitoring will focus on caribou movement and usage within an identified caribou core area. An area will be selected through an exploratory analysis of existing telemetry data and in consultation with the NL Wildlife Division to focus the monitoring program. As part of this initiative, Hydro will contribute to the deployment and maintenance of a number of GPS telemetry collars to be deployed and maintained in the study site by provincial staff using their standard operating procedures. Additionally, to study and monitor group size and composition, visual monitoring will be conducted annually via aerial surveys of the same area. The appropriate number, timing and location of aerial surveys will be determined through an exploratory analysis of existing telemetry data and in consultation with the NL Wildlife Division. Group size and composition will enable the results of the telemetry data to be generalized to the herd level. Caribou monitoring results will be submitted through regular reporting by Hydro to the NL Wildlife Division.

Avifauna and Small Mammals

The proposed transmission line will pass through a variety of terrestrial and aquatic habitat types, resulting in a range of wildlife species and functional groups being present in the region. Previous avifauna and mammal studies within the Project Area itself have been relatively limited, and no key wildlife concentrations or habitats have been identified in the immediate area to date. The general literature and previous studies from nearby areas and common habitat types do, however, give an indication of the species that do or may occur in the Study Area, including their relative abundance, seasonal presence and key activities. The Wildlife (Avifauna and Mammals) Study completed in support of this EA Registration (Appendix K) provides an overview of those species that are known or likely to occur in the area based on existing and available information.

Although most of the terrestrial and aquatic habitats in the region may be used by one or more wildlife species at particular times of the year, wetland and riparian habitats are considered to be most ecologically important and sensitive areas for wildlife (especially birds). These habitats are generally food-rich and structurally complex, which results in their use by a range of species for a variety of purposes, including as nesting sites for birds and foraging habitat for furbearers. With respect to biologically important time periods, the breeding season is the most sensitive time for birds, with the period between mid-May to mid-August generally encompassing the courtship, egg-laying and chick rearing phases of most migrant species in Newfoundland.

Wildlife may be affected by transmission line developments through habitat alteration or loss due to right of way clearing, potential bird collisions with tower structures and wires and disturbance from the presence of people and machinery. Transmission line planning and design activities have and will include the continued consideration of information on wildlife presence and habitats in the Project Area, in order to attempt to avoid particularly important areas and times where possible.

As a result of its history of designing and maintaining transmission lines throughout the province, Hydro has considerable experience and expertise in carrying out these activities so as to minimize any environmental effects on avifauna and other wildlife, including long-standing and effective procedures in place through its EPPs and other mechanisms. Some of these measures are briefly outlined and summarized below, for information and general illustrative purposes:

- Minimization of Project footprint and clear delimitation of clearing limits and work areas;
- Avoiding ecologically sensitive areas such as hardwoods and aquatic habitats where feasible;
- Maintaining natural buffers around wetlands and riparian areas, and preservation of natural drainage patterns;
- Erosion, sediment and dust control procedures and practices;
- Implementation of fuel use / storage plans and procedures by trained personnel;
- Avoiding wildlife-vehicle collisions by ensuring safe driving practices including speed limits;
- Prohibiting the hunting or harassment of wildlife species by on-site Project personnel;
- Appropriately disposing of all waste to avoid attracting wildlife to work areas;
- Implementation of Environmental Protection Plan(s) and Emergency Response Plans and procedures; and
- Implementation of progressive rehabilitation measures for temporary (construction) infrastructure;

In keeping with recent development projects and practice in Newfoundland and Labrador, Hydro will implement a number of measures and procedures designed to avoid or reduce potential adverse environmental effects upon avifauna, including those which are protected under the *NL ESA* and/or *SARA* and the *Migratory Birds Convention Act* (*MBCA*). In particular, and prior to the start of relevant construction (clearing) activities at specific locations during the breeding season (May to mid-August) site-specific (nest) surveys for migratory birds and raptors will be carried out, in accordance with relevant regulatory requirements and guidelines. These surveys and any associated management measures will be developed by Hydro in accordance with applicable regulatory guidance and in consultation with relevant federal and provincial regulatory authorities. Should an active nest be found during such surveys, all associated activities within an established buffer will be avoided until the birds have left the nest.

These procedures will be documented in an Avifauna Management Plan for the Project, which will be submitted to the Canadian Wildlife Service prior to the start of construction, and will incorporate the various issues and measures identified and finalized through the EA review process. Although the specific structure and content of

the Avifauna Management Plan will be developed and evolve as the EA, Project planning and associated regulatory discussions move forward, it is expected that it will include the following general contents (Table 5.9).

Table 5.9 TL 267 Avifauna Management Plan (Preliminary Outline, for Illustration)

1.0 INTRODUCTION

- 1.1 Project Overview and Location
- 1.2 Key Components and Activities
- 1.3 Construction and Operations Schedule
- 1.4 Regulatory Context and Key Requirements
 - 1.4.1 Migratory Birds Convention Act (MBCA) and Migratory Bird Regulations (MBRs)
 - 1.4.2 Canadian Species at Risk Act (SARA)
 - 1.4.3 Newfoundland and Labrador Endangered Species Act (NL ESA)
- 2.0 AVIFAUNA SPECIES AND THEIR PRESENCE, DISTRIBUTION AND TIMING
 - 2.1 Key Avifauna Species
 - 2.2 Activities and Habitat Preferences
 - 2.3 Known and Potential Habitat in the Project Area
 - 2.4 Habitat Preferences and Associations by Species

3.0 PLANNING AND MITIGATION MEASURES

- 3.1 Project Planning and Avoidance of Interactions
- 3.2 Mitigation Measures During Construction and Operations
- 3.3 Planned Avifauna Surveys (Purpose, Methods, Reporting, Use)
- 4.0 SUMMARY AND CONCLUSIONS

5.2.2 Operation and Maintenance

Once the construction phase of the Project is completed, there will be little or no additional vegetation (habitat) or soil disturbance, and therefore, no further effects to these aspects of the terrestrial environment. During Project operations, the nature and degree of on-site activity will be considerably less than that during the construction phase, and will be characterized primarily by the continued operation of the facility and periodic inspection and maintenance, which are not characterized by emissions or other negative interactions with the terrestrial environment.

The location of the proposed transmission line immediately adjacent to existing linear infrastructure, and thus its proximity to previously altered habitats, will serve to minimize any additional fragmentation of the landscape or effects on previously undisturbed wildlife populations. The existing high voltage transmission lines through this area are a long-standing and likely by now well integrated component of the local environment, and wildlife using the region have likely habituated to it and integrated its presence into their life history activities and movements. Some avifauna species, such as raptors, are also known to benefit from transmission line infrastructure, as the towers themselves are often used as nesting structures. In addition, given the presence of existing, adjacent transmission lines along the full extent of the proposed TL 267, the development of this Project will not result in any new or increased access to previously remote areas, which will prevent any

associated environmental issues related to increased hunting or other resource harvesting activities (legal or illegal) in the region.

During Project operation and maintenance, vegetation management along the right of way will commence 8 to 10 years after construction is completed, and occur at set intervals thereafter. This will include manual cutting as well as the selective use of herbicides for long term vegetation control. As described in Chapter 2, the application of herbicides for vegetation management along the transmission line right of way will take place in full compliance with regulatory requirements and associated approvals, including through the application of approved substances by trained personnel only. As also noted, vegetation management along the 13 km of the proposed TL 267 within the current boundaries of the Bay du Nord Wilderness Reserve will be via manual cutting only which is in keeping with the current Hydro standard for environmental protection within the Reserve.

5.2.3 Potential Accidental Events or Malfunctions

Potential accidental events resulting from planned Project activities that could affect wildlife and their habitats include a spill of fuel, oil or other materials or a fire. The resulting environmental effects of such an incident would again clearly depend upon the nature, magnitude, location and timing of the event.

A localized fuel or chemical spill could have implications for exposed habitats and any birds or mammals that utilize it, although the likely effect on overall habitat availability and function and on the health of any wildlife populations in the area would likely be negligible. Hydro's planned measures (equipment and procedures) to help prevent any such spills and to respond to one in the unlikely event of its occurrence were described previously (Section 5.1) and are equally applicable to preventing or reducing potential effects on this environmental component. These measures will be applied throughout the various phases of this Project, and further reinforced through the various provincial and/ federal government permits, other authorizations and regulations and compliance standards that will be relevant to the Project. A large scale fire originating from the Project could alter terrestrial or aquatic habitat availability, quality and composition across some area and extent, as well as directly affecting wildlife through direct injury or mortality, although most wildlife would have the ability to avoid or move out of areas affected which would reduce the potential for effects.

Project-specific environmental and emergency response plans will be prepared and implemented for the various phases of the Project, which will include identifying and establishing measures to respond to any potential accidental events or emergency situations, such as a fire or the accidental release of fuel or other materials.

5.2.4 Environmental Effects Summary and Evaluation

A summary of potential environmental interactions, identified mitigation measures, and the residual environmental effects of the Project on the terrestrial environment is provided in Table 5.10 below.

Environmental	ntal Project Phase / Potential Interaction		Key Considerations	
Component	Construction	Operations	Issues / Interactions	and Environmental Mitigation
Vegetation	•		 Clearing and excavation Possible fuel or 	 Project location adjacent to existing transmission line developments. Localized and clearly delineated
Soils and Landforms	•		chemical spillsVegetation management	 work areas. Conduct of nest searches in advance of vegetation clearing during the
Wildlife (Mammals and Avifauna)	•	•	 Habitat loss / alteration (clearing) Noise, human presence, vehicle and equipment use, other disturbances during construction Long term presence of Project infrastructure 	 breeding season. Establish suitable buffer zones around any identified active nests. Compliance with applicable regulations and permits. No harvesting or harassment of wildlife by Project personnel. Waste and other materials management (facilities and procedures). Accidental event prevention and response.

Table 5.10 Environmental Effects Assessment Summary: Terrestrial Environment

The proposed Project is not likely to result in significant adverse environmental effects on the terrestrial environment.

5.2.5 Cumulative Environmental Effects

The distribution, abundance and health of wildlife populations are influenced by both natural phenomena (such as weather, food and habitat availability) as well as human activities and their associated disturbances including development projects and activities, consumptive uses (such as hunting) and pollution. These and other influences have, to varying degrees, affected wildlife (individuals and populations) in the Study Area, including the past construction and on-going presence of the existing transmission lines and other infrastructure in the region. In addition to local disturbances, some species may also be affected by a variety of activities and associated effects within their often very extensive ranges, and so the widespread and migratory nature of many species therefore increases their potential to be affected by multiple perturbations, and therefore, for cumulative environmental effects to occur. The effects of previous and on-going projects and activities within the Study Area (and elsewhere) are reflected in, and considered as part of, the existing (baseline) environmental conditions for this component of the environment (Chapter 3).

Potential interactions with wildlife and their habitats as a result of Project construction relate primarily to the noise, human presence and other activities and disturbances that will be associated with the use of heavy equipment during right of way clearing and other site preparation (habitat alteration), ground excavation and blasting, tower placement and other activities. These will, however, entail small scale and very localized and short-term disturbances at any one location and point in time, which reduces the potential for particular

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individuals and populations to be affected repeatedly through multiple interactions with this Project, as well as the potential for, and degree and duration of, any overlap between the effects of this Project and other activities in the region. Although there are examples of past and current human developments and activities within and around the Project Area and surrounding locations, including the existing transmission lines and various land and resources use activities throughout the area, much of the Study Area itself is a fairly remote and undeveloped one that has not been (or is currently proposed to be) subject to large scale industrial development to date.

As a result, the proposed Project is not likely to result in significant adverse cumulative environmental effects on any aspect of the terrestrial environment in combination with other projects and activities that have been or will be carried out.

5.3 Aquatic Environment

The aquatic environment includes surface water (quality and quantity) and fish and fish habitat which may interact with the Project.

An overview of the main possible (and material) interactions between each of the Project's components and activities and the various key indicators and parameters that have been identified for this environmental component is presented in Table 5.11.

Project Component / Activity	Key In	Key Indicators and Parameters			
	Water	Water	Fish and Fish		
	(Quality)	(Quantity)	Habitat		
Construction Phase					
Access development / maintenance and use	•		•		
Construction camp and other infrastructure	•	•	•		
Movement and presence of personnel, equipment and materials	•		•		
Waste production and management	•		•		
Right of way clearing and preparation	•		•		
Transmission tower foundations (excavation, blasting, installation)	•	•	•		
Transmission tower assembly and installation	•		•		
Installation of conductor and other components					
Terminal station upgrades and expansion	•		•		
Employment and expenditures					
Possible accidental events and malfunctions	•		•		
Operation and Maintenance Phase					
Presence and operation of the transmission line					
Routine line inspections and repair	•		•		
Vegetation management	•		•		
Potential major system repairs	•		•		
Possible accidental events and malfunctions	•		•		

 Table 5.11
 Aquatic Environment: Potential Project-Environment Interactions

5.3.1 Construction

In the aquatic environment, construction work associated with vegetation clearing and ground excavation, watercourse crossings, water use, fuel use and storage and other activities have the potential to affect water resources and fish and fish habitat. Some of the key potential interactions between transmission line construction and the aquatic environment include:

- Sedimentation resulting from vegetation clearing and other site preparation activities, resulting in possible effects on water quality and fish (health, habitat availability or quality);
- Direct habitat alteration or destruction due to in water structures and activities, such as watercourse crossings;

- Solid and liquid waste generation and disposal and their possible interaction with aquatic resources;
- The requirements for and use of water during Project construction activities (such as for concrete production and at the temporary construction camp); and
- Potential spills of fuel or other deleterious substances during their planned use, transportation and storage, and associated potential interactions with the aquatic environment (including water, riparian vegetation, fish and their habitats).

For this Project, any such effects can and will be managed through the use of sound planning and design, including the use of standard and proven construction practices. Project construction will be undertaken in accordance with applicable legislation, permits and other regulatory requirements and guidance, as well as Hydro's own policies, plans and procedures.

In planning and preparing this EA Registration, Hydro has undertaken a detailed identification and analysis of all watercourses and waterbodies that are located within, and crossed by, the proposed transmission line right of way and surrounding one kilometre wide Study Area (Appendix I). This information will continue to be used in detailed Project planning and design and in the development and implementation of environmental protection measures during and following construction. Again, through its EPPs and other standard construction and operating procedures, Hydro has in place various measures to avoid and minimize the effects of its activities on the aquatic environment, some overall and illustrative examples of which are provided below:

- Permits will be obtained for watercourse crossings (fording, culvert or bridge installation), water use, and other Project components and activities as required, the conditions of which will be strictly adhered to;
- Existing and approved fording sites and access trails will be used where available. During watercourse fording activities, crossings will be limited to a single location and will cross at right angles to the waterbody where possible, with the number of individual crossings minimized to reduce disturbance;
- Attempts will be made to select watercourse crossing sites at locations where the banks and substrate are not sensitive to erosion, or alternatively, the bank will be modified or stabilized through drainage modifications, other erosion control techniques (such as riprap, filter fabric, and placement of gravel or vegetation mats) and/or revegetation, as appropriate;
- No material will be deposited within watercourses, and temporary timber bridges may be used as appropriate. Approaches to fording sites will be stabilized to avoid rutting and associated water build up and run-off;
- An adequate and clearly marked buffer zone will be maintained between any areas of ground disturbance and watercourses. At watercourse crossings along the right of way, manual vegetation clearing methods will be used and the width of the cleared right of way will be reduced to five meters for a minimum 20 m distance away from the shoreline. Where practical, the reduced right of way width

will apply for the entire buffer zone if greater than 20 m. This could include selective cutting in these areas. A no grub zone of 30 m of undisturbed ground vegetation will be maintained around any watercourse crossing;

- To the extent practical, activities in or near waterbodies or watercourses will be scheduled to occur during low flow or frozen conditions, to avoid sensitive periods / habitat for fish, and will be avoided during heavy precipitation events;
- Appropriate erosion control measures will be implemented where soil and terrain conditions require measures to protect aquatic habitats. These may include, for example: spreading a layer of brush or slash to reduce ground disturbance, site drainage control structures and systems, stabilization of exposed soils with fabric or other materials, the timing of project activities and others. Any silt-laden water will be discharged to a vegetated area or a settling basin prior to release into a watercourse or waterbody;
- Conducting field investigations of select watercourse crossing locations for use in detailed environmental protection planning and eventual Project permitting;
- Handling, use (including refueling) and storage of bulk fuels (over 2,000 L) will be located at least 100 m from any waterbody or wetland, with equipment repairs occurring at least 100 m from any surface water. Project-related vehicles and equipment will be maintained in good repair and inspected regularly;
- Adequate spill response equipment will be maintained at the work sites and appropriate emergency response and reporting procedures will be in place should an incident occur; and
- The Proponent and its contractors will establish and enforce a strict no hunting and fishing policy for all on-site Project personnel.

5.3.2 Operation and Maintenance

Once the construction phase of the Project is completed, there will be little or no additional ground disturbance or direct interaction with the aquatic environment, and a number of existing and approved access trails and crossing sites will be maintained and used for inspection and maintenance activities only. Vegetation management along the right of way will occur at regular intervals (every 8 to 10 years) and include manual cutting and the selective use of herbicides. This latter activity will involve the application of approved substances by trained personnel, in full compliance with regulatory requirements and associated approvals. As noted in Chapter 2, vegetation management along the 13 km of the proposed TL267 within the current boundaries of the Bay du Nord Wilderness Reserve will be via manual cutting only which is in keeping with the current Hydro standard for environmental protection within the Reserve.

Again, given the presence of existing, adjacent transmission lines along the full extent of the proposed TL 267, the development of this Project will not result in any new or increased access to previously remote areas, and

thus, no associated environmental concerns related to increased fishing or other consumptive land and resource use activities (legal or illegal) in the region.

5.3.3 Potential Accidental Events or Malfunctions

Potential accidental events or malfunctions during any phase of the Project could affect aspects of the aquatic environment in or around the Project Area and possibly beyond. This would include a possible accidental release of fuel or other deleterious substances into nearby surface water through spills or equipment malfunctions, which can negatively affect water quality and cause acute and chronic toxic effects to fish. A forest fire may also increase water temperature directly as well as through alterations to adjacent riparian habitats, and can otherwise affect other key aspects of water quality, which may in turn affect fish resources (habitats and health).

Hydro's planned measures and approaches for preventing accidental spills or fires during planned Project activities were described previously. The implementation of these and other measures through the Proponent's comprehensive Environment Protection and Emergency Response Plans is expected to reduce the likelihood of any such incidents and their effects, as well as allow for effective and timely response to any such accidental events and malfunctions throughout the life of the Project.

5.3.4 Environmental Effects Summary and Evaluation

A summary of potential environmental interactions, identified mitigation measures, and the residual environmental effects of the Project on the aquatic environment is provided in Table 5.12 below.

Environmental Component	Project Phase / Potential Interaction			Key Considerations and Environmental Mitigation		
	Construction	Operations	Issues / Interactions			
Surface Water (Quantity and Quality)	•		 Watercourse crossings and other in / near water work Vegetation clearing Drainage / sedimentation Water use during construction (concrete, camp) Vegetation management / herbicide use Potential accidental spills 	 Compliance with relevant environmental legislation, regulations and permits. Erosion, sediment and dust control measures. Use of existing access routes and trails. Field investigations of select watercourse crossing sites as part of Project permitting. Implementation of Environmental Protection Plan(s) and procedures. Waste management and fuel use / storage plans and procedures. Project location adjacent to existing transmission line developments. No harvesting by Project personnel. Accidental event prevention and response. 		

Table 5.12 Environmental Effects Assessment Summary: Aquatic Environment

Environmental Component	Project Phase / Potential Interaction		
	Construction	Operations	Issues / Interactions
			Watercourse
Fish and Fish	•	•	crossings and
Habitat			other in / near
			water work
			 Vegetation
			clearing
			Drainage /
			sedimentation
			Vegetation
			management /
			herbicide use
			Potential
			accidental spills

The proposed Project is not likely to result in significant adverse environmental effects on the aquatic environment.

5.3.5 Cumulative Environmental Effects

In this EA, the assessment and evaluation of potential cumulative environmental effects is based upon an approach of determining whether and how the likely residual effects of the Project will accumulate or interact with those of other projects and activities in the region, either through direct geographic and temporal overlap or other mechanisms, and/or through their respective contribution to regional environmental change. Current (baseline) environmental conditions for the aquatic environment in and around the Project Area (Section 3.1 and Appendix I) reflect the effects and influences of other natural conditions and processes and past and ongoing human developments and activities in the area and elsewhere.

Although there are some examples of past and on-going human developments and activities within and around certain parts of the Project Area and surrounding locations, including the existing transmission lines and various land and resource use activities throughout the region, much of the Study Area itself is a fairly remote and undeveloped one that has not been (nor is currently proposed to be) subject to large scale industrial development to date. Moreover, as described above, the proposed Project is not expected to adversely or materially affect water or fish resources in the area.

The Project is therefore not likely to result in or contribute to significant, adverse cumulative environmental effects on the aquatic environment in combination with other projects or activities that have been or will be carried out.

5.4 Socioeconomic Environment

The socioeconomic environment includes relevant components of the Project's human and cultural setting, such as historic and heritage resources, land and resource use (commercial, municipal, recreational), protected areas, communities and economy.

An overview of the main possible interactions between each of the Project's components and activities and the various key indicators and parameters that have been identified for this environmental component is presented in Table 5.13.

Project Component / Activity	Key Indicators and Parameters				
	Historic and	Land and	Protected	Communities	Economy
	Heritage	Resource	Areas		
	Resources	Use			
Construction Phase					
Access development / maintenance and use	•	•	•		
Construction camp and other infrastructure	•	•		•	
Movement and presence of personnel, equipment and					
materials		•	•	•	
Waste production and management		•		•	
Right of way clearing and preparation	•	•	•		
Transmission tower foundations (excavation, blasting,					
installation)	•	•	•	•	
Transmission tower assembly and installation	•	•	•		
Installation of conductor and other components		•	•		
Terminal station upgrades and expansion				•	
Employment and expenditures				•	•
Possible accidental events and malfunctions	•	•	•	•	•
Operation and Maintenance Phase					
Presence and operation of the transmission line		•	•		•
Routine line inspections and repair			•		
Vegetation management		•	•		
Potential major system repairs		•	•	•	•
Possible accidental events and malfunctions	•	•	•	•	•

 Table 5.13
 Socioeconomic Environment: Potential Project-Environment Interactions

5.4.1 Construction

The various activities and components that will be associated with the construction phase of the Project have the potential to both directly and indirectly affect various aspects of the socioeconomic environment, an analysis and evaluation of which is provided below along with Hydro's planned mitigation approaches to avoid or reduce any such effects and optimize benefits.

Historic and Heritage Resources

Construction activities and associated ground disturbance during development projects and activities have the potential to disturb or destroy archaeological sites and other such resources if they are present within the project "footprint". As described in Section 3.2.1, Hydro has completed an Historic and Heritage Resources Study (Appendix L), the purpose of which has been to identify and describe any known archaeological resources within or near the proposed Project Area, as well as any areas with the potential to contain such resources. Although there are no known sites within the proposed Project Area (40 m wide right of way) itself, a number of locations have been identified and considered to have archeological potential (Appendix L).

As part of its on-going and pre-construction environmental initiatives for the Project, Hydro will develop and implement an archaeological field survey program in the late summer or early fall of 2015 to investigate these areas of high archaeological potential within the proposed right of way, in order to confirm the presence or absence of historic and heritage resources at these locations. This fieldwork will be designed and conducted in consultation and cooperation with the NL PAO and in accordance with applicable standards and requirements. The information gathered through the previous desk-top study and this future field survey will continue to be used in Project design and planning to avoid potential interactions where possible, and to develop and implement measures in the event that an archaeological site is accidentally discovered during Project construction activities.

Hydro has procedures in place to address such issues in the field, including standard precautionary and reporting procedures for Project construction and maintenance as reflected in its EPPs and otherwise. Should an incidental discovery of historic resources occur, all work within 50 m would cease in the immediate area of the discovery until authorization is given for the resumption of the work. Any archaeological materials encountered will be immediately reported to the PAO, including information on the nature of the material discovered and the location and date of the find.

Land and Resource Use

Transmission line construction has the potential to affect other land and resource uses and users in adjacent areas, as a result of noise, dust, the presence of workers and machinery and other such disturbances in particular locations at certain times. In addition to potential direct interactions, visual and aesthetic issues are also often key considerations in the design and construction of transmission infrastructure in certain areas. Linear projects and other developments may also render tracts of land unsuitable or unavailable for other existing or potential land uses, such as cabins, forestry operations, mining, agriculture and others.

A variety of land and resource use activities occur within and adjacent to the Project Area and overall region, including recreational and subsistence pursuits such as hunting, trapping, fishing, cabins, wood cutting, boating and berry-picking, as well as tourism, forestry, mineral exploration and other commercial and municipal activities (Section 3.2). Hydro's detailed analysis of existing and available information and mapping on current land uses and infrastructure in the region (Appendix M) indicates that the proposed TL 267 right of way will cross over or be located somewhat near a number of such activities and components, including, for example:

- Several municipal boundaries, planning areas and other development control areas;
- Public water supplies and a wetland stewardship area;
- Highways / roads and other easements;
- Communications towers and utility easements;
- Mineral exploration licenses;
- Quarries;
- Agricultural facilities, development areas and areas of interest;
- Outfitting operations (and particularly, their associated activities);
- Wildlife management (hunting and trapping) zones;
- Cabins, a large cottage planning area and campgrounds;
- Other Crown issued titles for personal and commercial use;
- Snowmobile and ATV trails;
- Forest management areas and forestry access roads;
- Scheduled salmon rivers and trout angling areas;
- Canoe and kayaking routes, including a Canadian Heritage River; and
- The T'Railway and other multi-use and hiking trails.

Local residents and visitors also have a long tradition of participating in a wide range of other outdoor pursuits throughout the region, including recreational activities for which detailed information and mapping is not available such as hunting, fishing, wood cutting, berry picking, snowmobiling and ATV use, boating, skiing, hiking and other activities.

As indicated, the proposed transmission line will cross through or occur within or near the municipal boundaries and/or planning areas of several communities. On-going planning and engineering design of the Project, including tower placement and other infrastructure siting and scheduling, will seek to avoid any negative interactions with community lands or infrastructure. Hydro 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 on-going and planned activities, identify and address any questions or concerns, and to seek to mitigate any potential issues through design, scheduling, coordination and communication. Hydro and its contractors will identify, obtain and comply with all required authorizations from relevant municipalities for any Project-related activities within their boundaries. Any construction or maintenance activities occurring within protected water supply areas will be subject to special and specific environmental protection and regulatory requirements, as outlined in the EPP (Appendix E). The proposed transmission line will also cross over or along several public roadways and other infrastructure, and these crossings will be designed and built to relevant standards and in accordance with required approvals and permits from applicable government agencies.

The proposed transmission line right of way will similarly overlap or be in the general vicinity of various other commercial land and resource use activities in the region, including existing quarries, mineral exploration licenses, agricultural areas, crown titles and others. For the most part, no direct interaction or land use conflicts are anticipated, which will be further mitigated through detailed design and siting for the transmission line components. Hydro will consult with land owners and other interest holders 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 help optimize associated planning and scheduling. The permitting process for the Project will serve to further highlight and address any such potential land uses and requirements. The existing transmission lines through this area (TL 202, 203 and 206) were cleared and constructed within the boundaries of the easement granted to Hydro by Government at the time of their development, as will the proposed TL 267.

It is anticipated that potential land use issues and interactions associated with the Project can and will be addressed through sound planning and consultation measures. However, it is inevitable that a 188 km long transmission line project 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 Hydro to acquire property or other assets through an approved acquisition process. When seeking to acquire property rights that are required for the Project, Hydro's goal is to treat all property owners with respect and in a fair, transparent and consistent manner. Hydro's Property Acquisition Policy seeks to provide a fair balance between the needs of property owners, Hydro and the ratepayers of the province. The objective is to secure voluntary property settlements in a timely manner and at a cost that is fair and reasonable for both Hydro and the property owner. Where a need to acquire property is identified, Hydro will seek to identify, contact and communicate with the property owner in a timely manner. Hydro will conduct negotiations for the purchase of necessary property rights and provide the property owner with an offer based on fair market value as stipulated in a property valuation prepared by an independent accredited appraiser. Hydro does not always have to purchase an entire property in order to facilitate its project requirements, as quite often only easement rights are required. Upon reaching a negotiated agreement, the property owner will be required to execute either a deed transferring title of their property to Hydro or an easement document that provides Hydro with the necessary rights to use a portion of an owner's property. Hydro will register all such title documents at the Registry of Deeds Office on the date of closing. While most negotiations are settled amicably, there may be instances where Hydro will have to acquire its necessary property rights through the legislative process of expropriation. This option is only used when negotiations with a property owner are not successful and an agreement cannot be reached. Expropriation will follow specific procedures as set out in provincial legislation and will compensate a property owner for their property being expropriated. Hydro will continue to negotiate

with the property owner to try and reach an amicable agreement. If such an agreement is not possible, the property owner will be compensated in accordance with the findings of an arbitration panel.

Project construction activity will also occur in areas that are used for a variety of recreational land and resource use activities as highlighted above, many of which are focused in particular locations (such as near the communities and along existing access routes, particular on either end of the right of way) and times of the year. During the construction phase of the Project, the presence of personnel and the use of heavy equipment in such areas, including during vegetation clearing and the installation of towers, will create noise, dust and a visual human presence in such areas. For some recreational users, this may detract from the experience of going into the country, causing them to reduce or stop using certain areas near Project work sites during periods of construction activity. In addition, access to some active work areas will be restricted at certain times for safety reasons.

As described in the Project Description section of this EA Registration (Chapter 2), construction work will progress as a sequence of activities at each location, with crews involved in clearing the right of way passing through, followed by those involved in tower installation, conductor stringing and so on. As a result, the intensity and duration of activity at any one location will be relatively low, and these construction practices will occur in defined, localized areas that represent a very small portion of the total land area available for such recreational pursuits in any given location. Any 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. The location of the proposed transmission line immediately adjacent to existing linear infrastructure will help to further minimize the potential for any such disturbances. Indeed, the existing high voltage transmission lines through this area are a long-standing (since the 1960s) and therefore likely by now well integrated component of the local landscape for local residents and resource users.

Hydro will provide information and updates to communities, relevant organizations and the general public as required on on-going and planned construction activities, so as to facilitate good communication and planning and to proactively avoid any issues. Therefore, while construction-related activities may slightly and temporarily alter the specific geographic distribution of some land and resource use activities in a region at specific times, no overall decreases in participation levels for such recreational pursuits or their enjoyment or value is anticipated.

Protected and Special Areas

Some land areas across Newfoundland and Labrador that 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.

In paralleling existing transmission lines in south-central Newfoundland, an approximately 13 km long segment of the proposed TL 267 will likewise be required to cross through a portion of the existing boundaries of the Bay du Nord Wilderness Reserve (2,895 km²). Section 24 of the NL *Wilderness and Ecological Reserve Act (WER Act)* outlines various prohibited activities within such a Reserve, including but not limited to constructing a structure or reconstructing or adding a structure to build a road, path or track, or engaging in the cutting of trees or using motorized vehicles or equipment. Under the authority of Sections 25 and 29 of the *WER Act*, the LieutenantGovernor in Council has issued the *Wilderness Reserve Regulations* (1997), of which Section 23 (hydroelectric facilities and maintenance) outlines the approval process for the maintenance work on any transmission line, rights of way or existing infrastructure related to it, including bridges and roads.

Again, an approximately 13 km section of the proposed TL 267 right of way (out of its total length of 188 km) will be located within the current boundaries of the Bay du Nord Reserve. As described earlier in Section 2.2, the proposed paralleling of the existing transmission lines through this region is considered to be the preferred option for the Project for technical, economic and environmental reasons. Section 21(2) of the *WER Act* states that the Lieutenant-Governor in Council may decrease the area of a Reserve, with Sections 15 to 18 outlining the process to be followed for same. In May 2015, Hydro made a submission to the NL Wilderness and Ecological Reserves Advisory Council (WERAC) to begin the required review process under the *WER Act* to amend the current Bay du Nord Wilderness Reserve boundary to remove this section of the proposed TL 267 right of way from the Reserve. Hydro recognizes that this amendment is required before the construction of the Project in this area can be completed.

The proposed transmission line will also cross the Newfoundland T'Railway Provincial Park at several locations, including near Come By Chance, Jack's Pond and Chance Cove. In these instances, the T'Railway can be easily and completely spanned and no direct interactions or issues are anticipated. It will also occur within or in proximity to the boundaries of several former provincial parks / reserves in the region, including Jipujij'kuei Kuespem, Piper's Hole and Jack's Pond, as well as the Come By Chance Wetland Stewardship Area (Appendix M). No adverse interactions with or effects upon these areas and their users are anticipated as a result of Project construction.

Communities

The construction of large development projects may interact with and affect nearby communities and their residents in a number of ways, including possible disturbances due to worker presence, noise and dust, traffic, visual intrusions or other nuisance effects. It is also important to ensure that such activities do not have negative implications for human health and safety, as a result of any potential for injuries or accidents, possible sources of environmental contaminants and exposure pathways that may affect human health, or associated changes in residents' overall perceptions of their quality of life and well-being due to project-related activities and disturbances.

As described previously in Chapter 2, Project construction will be characterized by fairly standard and nonintrusive activities and practices, and will occur within a relatively remote region and in localized areas at any one point in time. Throughout the various phases of the Project, public safety will be a paramount consideration, and will be protected through required access restrictions to active work areas and the associated communication of same. Hydro and its contractors will also coordinate, schedule and communicate the planned transportation of any large equipment and other loads to the Project Area in order to address potential traffic and/or safety concerns. Overall, Project construction activities are not expected to interact negatively with any community, either directly or indirectly, as most Project activities will not likely be seen or heard by local residents or others, and there are no planned environmental emissions that would have potential health effects. The Project is therefore not expected to have any negative implications for human health and well-being in local communities or elsewhere.

A construction project can also interact with local municipalities and their residents through the presence of Project personnel within these communities, as well as through project-related demands for local and regional services and infrastructure. This may include both direct project-related requirements, such as the planned use of local transportation infrastructure, accommodations or waste disposal facilities, as well as indirect demands from project workers and their families. This can vary in nature and magnitude among different communities and situations, depending upon their proximity to the project, existing services and infrastructure, and current levels of use and capacities.

As described in Chapter 2, the construction work force will be housed primarily in existing and available accommodations in communities near the western and eastern ends of the proposed transmission line, with construction personnel being transported to and from the work sites each day. Given the location and overall extent of the transmission line, at least one temporary (remote) construction camp will also be established along the right of way. Given the relatively small size of the Project's construction workforce (Section 2.4) and the short-term duration of any such requirements, no adverse effects related to the availability or quality of community services and infrastructure are anticipated. Hydro and its contractors will continue to consult with the local communities and other stakeholders regarding Project related activities, schedules and requirements including, for example, the use of local roads and other transportation networks, accommodations and any Project-related waste disposal requirements and other issues and activities. Any such potential requirements and issues will continue to be identified and evaluated through these ongoing consultations, and efforts will be made to address these in Project design and in the scheduling and coordination of construction activities.

Economy, Employment and Business

Project construction will result in positive economic effects through the creation of employment opportunities in a variety of occupations (Chapter 2). In addition, the requirement for goods and services during Project construction, which will see estimated capital expenditures of approximately \$290 million, will provide opportunities for local and provincial businesses. These direct economic benefits will be supplemented by indirect and induced "spin-off" effects through, for example, spending by Project employees and contractors. The Project will therefore contribute to local and provincial economies as a result of this employment and business activity, and by helping provide a continued, reliable source of electricity on the Island to help facilitate future development and economic growth.

Project construction will be carried out by one or more qualified and experienced contractors selected by Hydro through a competitive bid process. Hydro supports employment equity and diversity in their hiring and contracting procedures. The development of employment and contracting policies and procedures for the Project is an ongoing process, and will continue to evolve based on stakeholder input. The results and findings of the EA process and associated discussions and consultations will be a key source of information and input into this process.

5.4.2 Operation and Maintenance

Once the construction of the transmission system is completed, levels of activity along the Project Area will decrease significantly, and temporary infrastructure such as the construction camp, work sites and storage areas and some access infrastructure will be removed. Following Project commissioning, the Project will be operated on a continuous basis, and Project maintenance activities will include regular inspection of Project components, repairs to the system as required, and periodic vegetation management along the cleared right of way (Chapter 2), which will be fully integrated into Hydro's overall transmission line maintenance programs.

Once the construction phase of the Project is completed, there will be little or no additional environmental disturbance. As described in Section 2.5, the application of herbicides for vegetation management along the transmission line right of way will take place in full compliance with regulatory requirements and associated approvals, including through the application of approved substances by trained personnel only. As previously noted, vegetation management within the current boundaries of the Bay du Nord Wilderness Reserve will not include the use of herbicides. The Project is also being designed to meet or exceed applicable requirements and standards related to EMF, audible noise and other factors.

The location of the proposed transmission line immediately adjacent to existing linear infrastructure will likely mean that its eventual (and long-term) presence will quickly become viewed and perceived as an integral component of the local landscape. Moreover, the presence of existing, adjacent transmission lines along the full extent of the TL 267 means that this Project will not result in any new or increased access to previously remote areas, and thus, no environmental issues related to increased land and resource harvesting activities in the area.

5.4.3 Potential Accidental Events or Malfunctions

Potential accidental events or malfunctions such as a fire or a spill of fuel other materials could affect the socioeconomic environment in or around the Project Area and possibly beyond, either directly or indirectly through any resulting biophysical effects and associated pathways. Although either of these events could conceivably occur during the Project, they are not likely to do so, and in any case the resulting environmental effects of such an incident would clearly depend upon the nature, magnitude, location and timing of the event.

An accidental spill of chemicals, fuels or other deleterious substances has the potential to adversely affect the presence or quality of water, soils, vegetation, fish and wildlife or other components of the biophysical environment, as well as any users and consumers of same. Similarly, a large scale forest fire that originated within the Project Area could alter vegetation and habitat availability or composition and structure across a particular geographic region, as well as affecting air and water quality, wildlife and other environmental components and resources. A fire within the Project Area spreading into adjacent areas could also adversely affect land areas and resources, rendering then unavailable or unsuitable for certain uses and activities. Any such incident could also potentially pose direct risks to human health and safety and/or the environment, and in doing so, may also place associated demands on local safety and security services, including fire, emergency response and policing, as well as medical facilities and others. An accidental event such as a Project-related fire could also affect infrastructure such as buildings, transportation routes and possibly have associated economic implications.

Hydro's planned measures and procedures to help prevent any such events and to respond to one in the unlikely event of its occurrence were described previously (Section 5.1) and will further help to prevent adverse effects upon the various aspects of the socioeconomic environment that are included in this environmental component.

5.4.4 Environmental Effects Summary and Evaluation

A summary of potential environmental interactions, identified mitigation measures, and the residual environmental effects of the Project on the socioeconomic environment is provided in Table 5.14.

Environmental	Project	: Phase / Poten	tial Interaction	Key Considerations and		
Component	Construction	Operations	Issues / Interactions	Environmental Mitigation		
Historic Resources	•		Any new ground disturbance	 Small, localized and clearly delineated work areas. No known (and low potential for) historic resources in the area. Pre-construction archaeological surveys in identified high potential areas along the planned right of way. Standard precautionary and reporting procedures. 		
Land and Resource Use	•	•	 Potential direct interaction with current uses and other disturbances (noise, dust, visibility, access, etc) 	 Project location adjacent to existing linear developments. Localized and short-term construction activity. On-going notification and consultation processes. Accidental event prevention and response. 		
Protected and Special Areas	•	•	 Potential direct interaction with these areas and/or other disturbances (noise, dust, visibility, access, etc) 	 Initiation and completion of the required review process under the WER Act to amend the current Bay du Nord Wilderness Reserve boundary to remove this section of the proposed TL 267 right of way from the Reserve. 		

 Table 5.14
 Environmental Effects Assessment Summary: Socioeconomic Environment
Environmental	Project Phase / Potential Interaction		tial Interaction	Key Considerations and		
Component	Construction	Operations	Issues / Interactions	Environmental Mitigation		
Communities, including: Human Health and Well-Being Services and Infrastructure	•	•	 Potential implications of Project-related activities and emissions for human health and well-being in local communities or elsewhere Potential Project use of, and demands for, local services and infrastructure 	 Project location adjacent to existing linear developments. Timing and scale of Project activities. Localized, routine and short-term construction activity. Distance from and low potential for interaction with community and residents. Work site access restrictions and associated communications. Accidental event prevention and response. No new operational employees. On-going notification and consultation processes. Approvals for waste disposal. Project design to meet or exceed applicable standards (EMF etc.) 		
Economy, Employment and Business	•	٠	 Employment and business opportunities 	Positive effects (direct and indirect).		

The proposed Project is not likely to result in significant adverse environmental effects on any aspect of the socioeconomic environment.

5.4.5 Cumulative Environmental Effects

The characteristics of the existing (baseline) socioeconomic environment in the region include, and have been shaped and influenced by, the effects (both positive and negative) of past and on-going human activities within the area and elsewhere.

The proposed Project will be characterized by a relatively routine and small scale, localized and short-term activity that will not adversely affect human safety or the health and quality of life of residents, visitors or their associated activities, infrastructure or other aspects of the socioeconomic environment. Although there are examples of past and current human developments and activities around the Study Area (Section 3.2), much of this area has not been (nor is it currently proposed to be) subject to large scale development activity to date, and particularly, any whose environmental and socioeconomic effects would overlap in space and time with any that may result from this Project.

The Project is therefore not likely to result in significant, adverse cumulative environmental effects on the socioeconomic environment in combination with other projects that have been or will be carried out.

5.5 Environmental Monitoring and Follow-up

Hydro is committed to obtaining all required environmental permits, approvals and authorizations for the proposed Project, and the company and its contractors will comply with these and all relevant legislation, regulations and guidelines in constructing and operating the proposed transmission line that is the subject of this EA Registration. This includes applying the various mitigations identified and discussed in the preceding sections, the implementation and effectiveness of which will be planned, managed and tracked in accordance with Hydro's existing plans and procedures.

Following (and pending) release from the EA process, Hydro will also complete a number of environmental field investigations related to particular environmental components and issues, each of which were described in the previous sections of this Chapter. Environmental effects monitoring plans are understood to be required elements of environmental strategy, and consistent with that understanding, key elements of these surveys and monitoring initiatives are summarized below:

- 1) *Listed / Rare Plant Surveys*: Hydro will undertake focused plant surveys in the late summer of 2015 in locations where the cleared transmission line right of way will cross through identified areas of high potential to contain listed (protected) plants. These will be planned and completed in consultation with the NL Wildlife Division.
- 2) Avifauna Nesting Surveys: Prior to the start of right of way clearing activities at relevant locations during the breeding season (May to mid-August), site-specific (nest) surveys for migratory birds and raptors will be carried out, in accordance with relevant regulatory requirements and guidelines. These procedures will be documented in an Avifauna Management Plan for the Project, which will be submitted to the Canadian Wildlife Service prior to the start of Project construction.
- 3) *Historic and Heritage Resources Surveys*: Hydro will develop and implement an archaeological field program in the late summer or early fall of 2015 to investigate identified areas of high archaeological potential along the proposed right of way, in order to confirm the presence or absence of historic and heritage resources at these locations. This fieldwork will be designed and conducted in consultation with the PAO and in accordance with applicable standards and requirements.
- 4) Caribou Monitoring Program: Hydro will monitor caribou movements and usage patterns in and around the Project Area through the use of GPS telemetry collars and visual monitoring via aerial surveys. This monitoring will be designed to complement or extend upon routine work conducted by the NL Wildlife Division, the results of which will be submitted to the Province through regular reporting by Hydro.

Through this EA submission, Hydro has also committed to on-going communication and consultations with local communities and other key stakeholders during Project planning and development. These processes are intended to allow for continued discussion of Project related activities and any issues as they may arise during Project implementation, as well as to cooperatively and collaboratively plan and implement any required (adaptive) management measures that may be required to address these throughout the life of the development.

6.0 SUMMARY AND CONCLUSION

Hydro owns and operates an extensive electrical generation and transmission system on the Island of Newfoundland, which includes a hydroelectric generation station at Bay d'Espoir in the south-central portion of the Island, as well as several transmission lines that extend between it and other electrical infrastructure and load centres across the region.

The proposed development Project that is the subject of this EA Registration includes the construction and operation of a new 230 kV transmission line that will be approximately 188 km long and connect the existing Bay d'Espoir and Western Avalon Terminal Stations. The proposed TL 267 will parallel existing transmission line infrastructure (TL 202 and TL 206) from Bay d'Espoir to Come By Chance and further parallels TL 203 from Come By Chance to the Western Avalon substation in Chapel Arm. The proposed Project will also include upgrades to existing infrastructure at these terminal stations.

This *Environmental Assessment Registration* is intended to initiate the provincial EA process for the Project, which will undergo review in accordance with applicable regulatory requirements.

The Project will be planned, designed and implemented to avoid or reduce potential adverse environmental effects and to optimize benefits. Given the nature, scale and characteristics of the proposed Project, including its location immediately adjacent to existing linear developments on the Island of Newfoundland, it is not likely to have significant environmental issues or effects associated with it. It will be constructed and operated in accordance with Hydro's environmental policies, plans and practices to help ensure that it is undertaken in a safe and environmentally-responsible manner. The Project will contribute to local and provincial economies as a result of the employment and business activity that it will create during its construction phase, as well as over the long-term by helping to ensure a continued secure and reliable electricity supply in the region.

As proponent, Hydro is very encouraged by the benefits that will be realized through the planned development of TL 267, and is also confident that any environmental questions and considerations that may be associated with the proposed Project can be addressed through sound planning, design and implementation, supported by on-going consultation and communications with communities and other key stakeholders.

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APPENDIX A

Order of the Board of Commissioners of Public Utilities (NO. P.U.53 2014)

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NEWFOUNDLAND AND LABRADOR BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

AN ORDER OF THE BOARD

NO. P.U. 53(2014)

1 IN THE MATTER OF the Electrical Power

2 *Control Act*, *1994*, SNL 1994, Chapter E-5.1

3 (the "EPCA") and the Public Utilities Act,

4 RSNL 1990, Chapter P-47 (the "*Act*"), as

5 amended, and regulations thereunder; and

6

7 **IN THE MATTER OF** an application by

8 Newfoundland and Labrador Hydro for approval

9 to proceed with the construction of a 230kV

10 transmission line between the Bay d'Espoir

11 and Western Avalon terminal stations pursuant

12 to section 41 of the Act.

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15 The Application

On April 30, 2014 Newfoundland and Labrador Hydro ("Hydro") filed an application for approval to construct a 230 kV transmission line, approximately 188 km in length, between the Bay d'Espoir and Western Avalon terminal stations (the "Application"). The estimated capital cost of the project is \$291,658,000 with a planned in-service date of May 1, 2018.

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Notice of the Application was published on May 10, 2014 in papers across the province and
 was posted on the Board's website. The following parties filed intervenor submissions:

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- (i) Newfoundland Power Inc. ("Newfoundland Power);
- (ii) the Consumer Advocate, Mr. Thomas Johnson;
- (iii) Corner Brook Pulp and Paper Limited, North Atlantic Refining Limited and Teck Resources Limited (the "Industrial Customer Group");
 - (iv) Vale Newfoundland and Labrador Limited ("Vale");
 - (v) Mr. Danny Dumaresque; and
 - (vi) Anemos Energy Corporation ("Anemos").

On July 17, 2014 the Board, Newfoundland Power, the Consumer Advocate, the Industrial
 Customer Group and Mr. Danny Dumaresque submitted Requests for Information (RFIs) to

35 Hydro. Responses to the RFIs were filed on August 22, 2014. Newfoundland Power filed

submissions on October 31, 2014 and the Consumer Advocate filed submissions on November
5, 2014. The Industrial Customers and Vale advised by letter they had no comments on the
Application. There was no filing from Mr. Dumaresque or Anemos. On November 10, 2014
Hydro filed submissions.

6 Background

Hydro included this project in its 2012 Capital Budget application filed in August 2011 but the project was withdrawn on December 14, 2011.

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On August 5, 2013 Hydro filed its 2014 Capital Budget Application. In Order No. P.U. 42(2013) the Board approved Hydro's 2014 Capital Budget in the amount of \$97,805,300. In Order No. P.U. 16(2014) the Board approved a proposal from Hydro to proceed with the purchase and installation of 100 MW of combustion turbine generation at the Holyrood Thermal Generating Station. The estimated cost of this project was \$119,000,000; however the Board ordered that the issues of costs and cost recovery would be addressed in a future order of the Board.

18 The Board also approved supplemental 2014 capital expenditures in:19

- (i) Order No. P.U. 23(2014) in the amount of \$580,000 to be added to the Allowance for Unforeseen Items related to expenditures for the Holyrood Unit 3 east forced draft fan motor and the Sunnyside and Holyrood breaker overhauls;
- (ii) Order No. P.U. 29(2014) in the amount of \$7,197,800 in 2014 and \$1,266,400 in 2015 for the purchase and replacement of the Sunnyside T1 transformer and associated equipment, modification to the protection relay system and addition of a 230 kV breaker at the Sunnyside Terminal Station; and
- (iii) Order No. P.U. 32(2014) in the amount of \$1,452,500 to replace the tap changer on the T5 transformer at the Western Avalon Terminal Station.

For these approvals the Board ordered that recovery of these expenditures would be addressed in
 a subsequent order of the Board following a further application by Hydro.

- 33 The Board approved further supplemental 2014 capital expenditures in:
 - (i) Order No. P.U. 33(2014) in the amount of \$3,632,200 to replace insulators on transmission lines TL-201 and TL-203;
 - (ii) Order No. P.U. 34(2014) in the amount of \$636,700 in 2014 and \$360,000 in 2015 for the replacement of the excitation transformers at the Bay d'Espoir generating station;
 - (iii) Order No. P.U. 36(2014) in the amount of \$958,800 for the installation of additional transformer capacity at the Wabush Substation;
 - (iv) Order No. P.U. 38(2014) in the amount of \$320,600 to replace an air compressor at the Holyrood Thermal Generating Station;
- 44 (v) Order No. P.U. 45(2014) in the amount of \$608,900 for 2014 and \$1,238,200 for 45 2015 to complete the Labrador City Voltage Conversion; and

(vi) Order No. P.U. 46(2014) in the amount of \$491,753 to purchase critical spares for the Holyrood Thermal Generating Station.

On December 2, 2014 the Board issued Order No. P.U. 50(2014) approving Hydro's 2015
Capital Budget of \$76,832,900.

7 The Application requests approval to proceed with the construction of the new transmission 8 line commencing in 2014 with expenditures each year from 2014 up to the commissioning of 9 the line in 2018. In accordance with the Capital Budget Guidelines the project will be 10 considered a multi-year project to start in 2014.

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Evidence and Submissions

14 Hydro states that a new 230 kV transmission line between the Bay d'Espoir and Western 15 Avalon terminal stations is required to reliably meet customer load growth on the Island 16 Interconnected system. Hydro states that this requirement was identified in studies relating to 17 the least cost long-term generation supply option for the Island Interconnected system. Hydro filed a report, Upgrade Transmission Line Corridor Bay d'Espoir to Western Avalon, dated 18 19 April 28, 2014, with the Application which sets out in detail the required work, project 20 schedule, and project justification. The proposed 230 kV transmission line was required in both 21 the isolated and Muskrat Falls interconnection scenarios; to facilitate new generation off the Avalon Peninsula in the isolated system scenario; and for system stability upon interconnection 22 23 with Labrador. In December 2012 the Government of Newfoundland and Labrador announced 24 sanction of the Muskrat Falls project as the least cost alternative to meet the long-term power 25 and energy requirements of the Province.

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27 The system modifications associated with the Muskrat Falls project will result in significant 28 changes in the overall system loading and dynamic performance on the Island Interconnected 29 system. A system planning study was conducted by Hydro to identify system additions or upgrades required to ensure the compliance with transmission planning criteria on the Island 30 31 Interconnected system and to determine the least-cost alternative. The resulting load flow and 32 transient stability analysis showed that the addition of a new 230 kV transmission line between 33 the Bay d'Espoir and Western Avalon terminal stations is required to meet the transmission 34 planning criteria and to maintain a reliable power system capable of withstanding expected 35 transient events. The projected budget estimate and cost breakdown is set out below:

Projected Budget Estimate¹

<u>2014</u>	2015	<u>2016</u>	<u>2017</u>	2018	<u>Total</u>
\$2,412,600	\$18,964,700	\$77,225,600	\$110,064,100	\$82,991,000	\$291,658,000

¹ Forecast expenditures for 2017 and 2018 were not set out in the Application but were provided upon request to Hydro.

Newfoundland Power submits the Board should approve the Application. Newfoundland Power
 states that evidence filed in support of the Application shows that Hydro has considered a

number of alternatives for addressing the identified capacity and transient stability issues and
 that the proposed 230 kV transmission line between Bay d'Espoir and Western Avalon appears
 to be the least cost alternative of those considered.

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5 The Consumer Advocate supports construction of the 230 kV transision line. The Consumer 6 Advocate submits that the need for the project to ensure system stability following system 7 disturbances has been clearly established and the proposed 230 kV transmission line is the 8 preferred alternative for meeting this system need.

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Hydro notes that the Application is supported by Newfoundland Power and the ConsumerAdvocate and submits that the Application should be approved.

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13 Discussion

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The Board has reviewed the evidence, Hydro's responses to the RFIs and the submissions and is satisfied that the proposed construction of a 230 kV transmission line between the Bay d'Espoir and Western Avalon terminal stations should proceed. Hydro has established the need for this project and has completed the necessary studies and analysis to select the least-cost alternative. The Board is satisfied that the proposed transmission line is necessary to ensure that Hydro can continue to provide service which is safe and adequate and just and reasonable.

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22 The total estimated expenditure for this project, at almost \$292 million, is significant and will be 23 recovered from customers in future rates. The Board notes that just over \$193 million, or over 24 65%, of the capital expenditure is budgeted for 2017 and 2018. Given the time frame over which 25 this project is to be undertaken and the size of the estimated capital expenditures Hydro will be required to file a report in relation to this project with each annual capital budget application 26 filed with the Board until the transmission line is commissioned. This report should set out the 27 28 work progress, expenditure and budget status, and an explanation for any deviations from the 29 project scope and budget. If there are any significant changes in project scope or budget, in accordance with the Capital Budget Guidelines, Hydro will be required to file a further 30 31 application for approval of the changes.

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IT IS THEREFORE ORDERED THAT:

- The capital expenditures of \$2,412,600 in 2014, \$18,964,700 in 2015, \$77,225,600 in 2016, \$110,064,100 in 2017 and \$82,991,000 in 2018 for the construction of the 230 kV transmission line between the Bay d'Espoir and Western Avalon terminal stations are approved.
- 2. Hydro will file, with each capital budget application until the completion of the project, a report on the construction of the 230 kV transmission line addressing the work progress, the expenditure and budget status, and an explanation for any deviations from the project scope and budget.
- 3. Hydro shall pay all expenses of the Board arising from this Application.

DATED at St. John's, Newfoundland and Labrador, this 12th day of December 2014.

Andy Wells Chair

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Darlene Whalen, P.Eng. Vice-Chair

Dwanda Newman, LLB-

Dwanda Newman, LLB Commissioner

es Öxford

Commissioner

Cheryl Blundon

Board Secretary

APPENDIX B

Maps Illustrating the Proposed Transmission Line Right of Way

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PROPOSED BAY D'ESPOIR TO WESTERN AVALON TRANSMISSION LINE (TL 267)

N, 5312000 5308000 Legend Proposed TL267 Existing Fording Sites Terminal Stations (Existing) --- Existing Access Trails Existing Transmission Line 5304000 Existing Road 0.75 1.5 Kilometres



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APPENDIX C

List of Potentially Applicable Permits and Authorizations

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List of Potentially Applicable Permits and Authorizations					
Approval Potentially Required	Legislation / Regulation	Project Component / Activity Requiring Approval or Compliance	Department or Agency	Requirements	
Government of Newfoundland	and Labrador	•			
License to Occupy Crown Land Crown Land Leases / Grants / Easements	Land Act	Any development on Crown Lands	Crown Lands Division, Department of Municipal and Intergovernmental Affairs	Approval is required for Project activities and infrastructure on Crown Land.	
Certificate of Approval for any Alteration to a Body of Water	Water Resources Act	Any activities which may alter a water body	Water Resources Management Division, Department of Environment and Conservation	Permits are required for construction activities which may alter any water body. An application form is required for each alteration.	
Certificates of Approval for any Instream Activity (including Culvert Installation, Bridges and Fording a Watercourse)	Water Resources Act	Any in-stream activity	Water Resources Management Division, Department of Environment and Conservation	Approval is required for any in-stream activity, including culvert installations and fording activities, before undertaking the work.	
Certificate of Approval for Construction Site Drainage	Water Resources Act	Any run-off from the project site being discharged to receiving waters	Water Resources Management Division, Department of Environment and Conservation	Approval is required for any run-off from the project site being discharged to receiving waters.	
Water Use Authorization	Water Resources Act	Water withdrawal for use at temporary camps or during construction and operation activities	Water Resources Management Division, Department of Environment and Conservation	Water use authorization is required for all beneficial uses of water.	
Application for Water Well Drilling Licence	Water Resources Act	Drilling activity for a water well	Water Resources Management Division, Department of Environment and Conservation	A licence is required to carry on the business of water well drilling in Newfoundland and Labrador.	

		Project Component / Activity		
Approval Potentially Required	Legislation / Regulation	Requiring Approval or Compliance	Department or Agency	Requirements
Application for Permit for Constructing a Non-Domestic Well	Water Resources Act	Establishment of a water well	Water Resources Management Division, Department of Environment and Conservation	A licence is required to establish a non- domestic water well in Newfoundland and Labrador.
Policy Directives	Water Resources Act	Project activities	Water Resources Management Division, Department of Environment and Conservation	The Department has a number of potentially applicable policy directives in place, including those related to: Infilling Bodies of Water; Use of Creosote Treated Wood in Fresh Water; Treated Utility Poles in Water Supply Areas; Land and Water Developments in Protected Water Supply Areas; Development in Shore Water Zones; and Development in Wetlands.
Access to Highway Permit	Urban and Rural Planning Act, Works, Services and Transportation Act, Protected Road Zoning Regulations	Construction of access roads and trails	Department of Transportation and Works and/or Service NL	The construction of an access to a highway that is classified as a Protected Road requires approval.
Preliminary Application to Develop Land	Urban and Rural Planning Act, Protected Road Zoning Regulations	Construction activity	Service NL	A development permit is required to build on and develop land, whether Crown or privately owned, within the building control lines of a Protected Road.
Quarry Permit	Quarry Materials Act and Regulations	Extracting borrow material	Mineral Lands Division, Department of Natural Resources	A permit is required to dig for, excavate, remove and dispose of any Crown quarry material.
Cutting Permit Operating Permit	Forestry Act and Cutting of Timber Regulations	Clearing land areas for the right of way, borrow pits, camp sites or laydown areas	Department of Natural Resources	A permit is required for the commercial or domestic cutting of timber on crown land.
Permit to Burn	Forestry Act and Forest Fire Regulations	Any burning required during the Project	Department of Natural Resources	A permit is required to light fires outdoors between April and December. Permits are not issued during forest fire season.

Approval Potentially Required	Legislation / Regulation	Project Component / Activity Requiring Approval or Compliance	Department or Agency	Requirements
				A Contificate of American is required for
Storing and Handling Gasoline	Act, Storage and	and associated products	Division, Service NL	storing and handling gasoline and
	Associated Products Regulations			
Fuel Cache Permit	Environmental Protection Act and Environmental Guidelines for Fuel Cache Operations	Temporary fuel storage	Engineering Services Division, Service NL	A permit is required for any temporary fuel storage in a remote location.
Permit for Storage, Handling,	Fire Prevention Act, and	Storing and handling	Engineering Services	This permit is issued on behalf of the
Use or Sale of Flammable and	Fire Prevention	flammable liquids	Division, Service NL	Office of the Fire Commissioner.
Compustible Liquids	Flammable and Combustible Liquids			Approval is based on information
	Regulations			for Storing and Handling Gasoline and
	5			Associated Products.
Compliance Standard	Dangerous Goods	Storing, handling and	Department of	If the materials are transported, handled
	Transportation Act and	transporting fuel, oil and	Transportation and	and stored fully in compliance with the
	Regulations	lubricants	WORKS	regulations, a permit is not required. A
				required if a variance from the
				regulations is necessary. Transporting
				goods considered dangerous to public
				safety must comply with regulations.
Certificate of Approval for	Sanitation Regulations,	Sewage disposal and treatment	Department of Health	Sewage disposal systems designed,
Installation of a Sewage	under the Health and	at construction camps	and Community Services	constructed or installed to service a
System	Community Services Act			private dwelling or a commercial or
				less than 4 546 L must be approved by an
				inspector before installation.
Certificate of Approval for	Environmental Protection	Sewage disposal and treatment	Engineering Services	A Certificate of Approval is required for
Septic Systems > 4,546 L per	Act	at construction camps	Division, Service NL	commercial septic systems and wells in
day and Well Approval				an unserviced area, not covered by a
				municipality.

Approval Potentially	Legislation / Regulation	Project Component / Activity Requiring Approval or	Department or Agency	Requirements
Kequirea		Compliance		
Certificate of Approval for a Water Withdrawal System of ≥ 4,500 L per day	Water Resources Act	Water supply at temporary camps, and for use in construction activities	Water Resources Management Division, Department of Environment and Conservation	Certificate of Approval is required for any private water withdrawal system of 4,500 L/day or greater.
Certificate of Approval for Installation of Water Supply System	Sanitation Regulations, under the Health and Community Services Act	Water supply at temporary camps and maintenance depots	Department of Health and Community Services	Water supply systems designed, constructed or installed to service a private dwelling or a commercial or other building, including systems not governed by a municipal council, local service district or local water committee, must be approved by an inspector before installation.
Certificate of Approval for a Waste Management System	Environmental Protection Act and Waste Management Regulations	Waste disposal associated with construction and operation	Department of Environment and Conservation, Department of Health and Community Services	Approval is required for waste disposal (e.g., incineration or burying). Used tires must be disposed according to regulations.
Food Establishment Licence – Temporary Facility Permit	Health and Community Services Act, Food and Drug Act and Food Premises Regulations	Establishing and operating a temporary camp and kitchen facility, or using/upgrading existing facilities	Operations Division, Service NL	A licence is required to operate food premises. Where municipal services are unavailable, two copies of plans and specifications for water supply and sewage disposal must be submitted with application for a licence. Food premises are routinely inspected to ensure compliance.
Permit to Destroy Problem Animals	Wildlife Act	Dealing with nuisance wildlife	Department of Natural Resources	The Department provides direction on handling nuisance animals. Details on the situation must be provided for a permit to be issued.
Compliance Standard	Fire Prevention Act, and Fire Prevention Regulations	On-site structures (temporary or permanent)	Engineering Services Division, Service NL	All structures must comply with fire prevention standards.
		Project Component / Activity		
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Approval Potentially Required	Legislation / Regulation	Requiring Approval or Compliance	Department or Agency	Requirements
Compliance Standard	Environmental Control Water and Sewage Regulation under the Water Resources Act	Any waters discharged from the project	Pollution Prevention Division, Department of Environment and Conservation	A person discharging sewage and other materials into a body of water must comply with the standards, conditions and provisions prescribed in these regulations for the constituents, contents or description of the discharged materials.
Compliance Standard	Sanitation Regulations, under the Health and Community Services Act	Sewage and waste disposal	Department of Health and Community Services	Outlines standards for sewage and waste disposal.
Compliance Standard	Occupational Health and Safety Act and Regulations	Project-related occupations	Service NL	Outlines minimum requirements for workplace health and safety. Workers have the right to refuse dangerous work. Proponents must notify Minister of start of construction for any project greater than 30 days in duration.
Compliance Standard	Workplace Hazardous Materials Information System (WHMIS) Regulations, under the Occupational Health and Safety Act	Handling and storage of hazardous materials	Operations Division, Service NL	Outlines procedures for handling hazardous materials and provides details on various hazardous materials.
Compliance Standard	Environmental Protection Act, Air Pollution Control Regulations	Project operations (diesel generators)	Pollution Prevention Division, Department of Environment and Conservation	The Regulations outline specific ambient air quality standards and emission standards, as well as relevant engineering design (e.g., stack height) requirements and other provisions
Government of Canada	·			
Letter of Notification	Fisheries Act	Construction of watercourse crossings, fording sites, water withdrawals, or any other activities in or near water that may support a fishery	Fisheries and Oceans Canada	Where potential for harmful effects to fish habitat can be prevented, a Letter of Notification is issued outlining appropriate mitigation procedures or conditions to be followed.

Project Component / Activity				
Approval Potentially Required	Legislation / Regulation	Requiring Approval or Compliance	Department or Agency	Requirements
Permit for Construction Within Navigable Waters	Navigation Protection Act and Regulations	Construction of watercourse crossings, etc	Transport Canada	Permit required only within scheduled waters. There are no scheduled waters within the Study Area. Any "non- scheduled" waters are subject to the Act if the owner wishes to opt-in.
Radiocommunication Permit	Radiocommunication Act and Regulations	Establishment and use of radio equipment and associated towers	Industry Canada	Approval of the Minister of Industry may be required to approve sites on which radio apparatus, including antenna systems, may be located, and approve the erection of all masts, towers and other antenna-supporting structures.
Temporary Magazine Licence	Explosives Act	Temporary storage of explosives at certain construction areas	Natural Resources Canada	A licence would be required to temporarily store explosives on site.
Explosives Purchase and Possession Permit	Explosives Act	Purchase and possession of explosives	Natural Resources Canada	A permit is required to purchase and possess explosives.
Explosives Transportation Permit	Explosives Act	Transportation of explosives	Natural Resources Canada	A permit is required for transporting explosives.
Compliance Standard	Fisheries Act, Section 36(3), Deleterious Substances	Any run-off from the project site being discharged to receiving waters	Environment Canada, Fisheries and Oceans Canada	Environment Canada is responsible for Section 36(3) of the <i>Fisheries Act</i> . However, DFO is responsible for matters dealing with sedimentation. Discharge must not be deleterious and must be acutely non-lethal.
Compliance Standard	Migratory Birds Convention Act and Regulations	Any activities which could result in the mortality of migratory birds and endangered species and any species under federal authority	Canadian Wildlife Service, Environment Canada	Prohibits disturbing, destroying or taking a nest, egg, nest shelter, eider duck shelter or duck box of a migratory bird, and possessing a live migratory bird, carcass, skin, nest or egg, except when authorized by a permit. The Canadian Wildlife Service should be notified about the mortality of any migratory bird in the project area, including passerine (songbirds) and waterfowl species.

Approval Potentially Required	Legislation / Regulation	Project Component / Activity Requiring Approval or Compliance	Department or Agency	Requirements
Policy	Federal Policy on Wetland Conservation	Any disruption of wetland habitat	Environment Canada	The goals of this policy should be considered where a project could affect wetland habitat.
Compliance standards; permits may be required.	National Fire Code	On-site structures (temporary or permanent)	Service NL	Approval is required for fire prevention systems in all approved buildings.
Compliance standards; permits may be required.	National Building Code	On-site structures (temporary or permanent)	Service NL	Approval is required for all building plans.
Municipalities				
Development or Building Permit	Urban and Rural Planning Act, 2000, and Relevant Municipal Plan and Development Regulations	Development within municipal boundary	Community Council	A permit is required for any development or building within municipal boundaries.
Approval for Waste Disposal	Urban and Rural Planning Act, 2000, and Relevant Municipal Plan and Development Regulations	Waste disposal	Community Council	The use of a community waste disposal site in Newfoundland and Labrador by proponents/contractors to dispose of waste requires municipal approval. Restrictions may be in place as to what items can be disposed of a municipal disposal site.

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APPENDIX D

Advertisement for Public Consultations

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Public Open House Sessions Bay d'Espoir to Western Avalon Transmission Line



Newfoundland and Labrador Hydro

At Newfoundland and Labrador Hydro (Hydro), we are committed to open consultation with communities. As part of the environmental assessment, Hydro is inviting the public to attend open house sessions on the planned Bay d'Espoir to Western Avalon Transmission Line.

Information on the project will be available and project team members will be there to listen to feedback and answer your questions.

Town	Location	Time
Milltown-Head of Bay d'Espoir	Milltown Lions Club	June 16 4-7p.m.
Come by Chance	Come by Chance Lions Club	June 17 4-7p.m.
Chapel Arm	St. John the Baptist Parish Hall	June 18 4-7p.m.

Questions or comments can be addressed to **hydro@nlh.nl.ca** or by calling **1.888.576.5454**.



www.nlh.nl.ca