BENJAMINS MILL WIND PROJECT

Environmental Assessment Registration

01.11.2022

Natural Forces Developments LP
1801 Hollis St., Suite 1205
Halifax, NS B3J 3N4

P +1 (902) 422 9663
F +1 (902) 422 9780
naturalforces.ca

Executive Summary

This Environment Assessment document has been prepared for the registration of the proposed Benjamins Mill Wind Project (Project) by Dillon Consulting Limited on behalf of the Proponent, Natural Forces Developments Limited Partnership. The potential environmental effects of the proposed undertaking on the environment have been assessed and evaluated and are discussed herein. The purpose of this document is to provide information on the assessment of the environment for the protection of valued environmental components (VECs).

The proposed wind energy project, consists of 28 wind turbine generators capable of producing up to 150 MW of renewable energy that will be connected to the existing Nova Scotia Power transmission grid via overhead transmission lines. The Project will be located on a mix of privately-owned and provincial Crown lands within the West Hants Regional Municipality in Hants County. This undertaking will be constructed, owned, operated and maintained by Natural Forces Developments Limited Partnership (referred to herein as the Proponent or Natural Forces).

This Environmental Assessment registration details the desktop research, and field studies conducted in an effort to identify and assess potential impacts to physical, biophysical, and socio-economic valued environmental components (VECs).

Valued Environmental Components	Environmental Assessment Studies
Atmospheric Environment	Onsite Weather monitoring Climate Impact Assessment sound level impact assessment study
Physical Environment	Geology study Hydrology study of surface water and groundwater
Visual Environment	Visual Assessment Shadow Flicker Assessment
Terrestrial Environment	Vegetation and Lichen Surveys Assessment of Culturally Important Flora Preliminary Survey of Wetlands Terrestrial Wildlife Surveys
Aquatic Environment	Preliminary Fish Habitat Assessment Surveys
Species at Risk	Species at Risk and Species of Conservation Concern Assessment
Birds and Bird Habitat	Late-winter Resident Bird surveys Spring Migratory Bird Surveys Summer Breeding Bird Survey Nocturnal Breeding Bird Survey Fall Migration Surveys Nocturnal Avian Migration Survey Supplementary winter bird surveys are scheduled to occur in January/February 2022 and supplementary radar and acoustic monitoring surveys are scheduled to occur in Spring 2022, an addendum will be issued to reflect these results.
Bats and Bat Habitat	Acoustic Bat Monitoring Survey
Socioeconomic Environment	Radio communication System Impact Study
Cultural and Heritage	Archaeological Resource Impact Assessment and Screening

From the data that has currently been assessed, it is anticipated that residual effects following the application of the mitigative measures will be minor to negligible and short term in nature. The Proponent is committed to minimizing any potential for environmental impact as a result of the construction, operation, and decommissioning of the Proposed Benjamins Mill Wind Project and has committed to post construction monitoring and mitigation activities that may be required given the predicted impacts.

The Proponent believes that with the careful planning completed to date the anticipated Project Development Area minimizes many environmental concerns while providing an excellent opportunity to transform a previously disturbed and fragmented site into a productive source of environmentally friendly renewable energy. The Benjamins Mill Wind Project will help Nova Scotia achieve their provincially mandated targets of producing 80% renewable energy by 2030, and will support local community economic development.

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This Environmental Assessment (EA) Registration Document has been created to initiate the regulatory process for the Benjamins Mill Wind Project (Project) for the construction of a renewable (wind) power generating project capable of producing up to 150 MW of renewable energy in Benjamins Mill, Nova Scotia. The registration document has been prepared by Dillon Consulting Limited and the Proponent, Natural Forces Developments Limited Partnership, in alignment with the Guide to Preparing an EA Registration Document for Wind Power Projects in Nova Scotia.

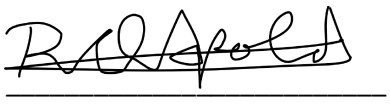
The Project is located on lands in Mi'kmaq traditional territory in an area where the Mi'kmaq have historically and continue to use the land and exercise their Aboriginal and Treaty rights.

1.0 Proponent Description

Name of Project	**Benjamins Mill Wind Project**
Name of Proponent:	Natural Forces Developments Limited Partnership
Joint Registry of Stocks Full Name of Proponent	Natural Forces Developments GP LTD., Natural Forces Technologies Inc., 3261507 Nova Scotia Limited, Natural Forces Wind Inc., and Natural Forces Assets Limited Partnership, carrying on business as Natural Forces Developments Limited Partnership
Joint Registry of Stocks ID Number	3324453
Mailing and Street Address of Proponent:	1205-1801 Hollis Street, Halifax, NS, B3J 3N4
Chief Executive Officer:	Robert Apold
Proponent's Contact Person for the purposes of this EA Registration:	Meg Morris Development Manager at Natural Forces mmorris@naturalforces.ca (902) 422-9663 (Phone) (902-422-9780) (Fax) www.naturalforces.ca

Signed by Robert Apold

On behalf of Natural Forces Developments Limited Partnership in acceptance the contents of the Environmental Assessment Registration Document



2.0 Description of the Undertaking

2.1 Project Overview and Purpose

The proposed wind energy project, called the Benjamins Mill Wind Project (BMWP or Project), consists of up to 28 wind turbine generators (WTGs) capable of producing up to 150 MW of renewable energy that will be connected to the existing Nova Scotia Power transmission grid via an overhead transmission line. The Project is being developed by Natural Forces Developments Limited Partnership (referred to herein as the Proponent or Natural Forces).

The purpose of this Project is to help Nova Scotia achieve their renewable electricity standards through the generation of clean, renewable energy, and reduce Nova Scotia's reliance on imported energy sources through the development of a localized renewable energy generation (Renewable Electricity Regulations 2021).

Canada's and Nova Scotia's recent energy policies encourage renewable energy generation to limit the negative consequences of fossil fuel usage, to reduce greenhouse gasses, and to meet future energy demands. To support the implementation of these policies, Nova Scotia has developed a number of initiatives to encourage the development of renewable energy projects. The Nova Scotia *Electricity Act* (2004) sets out clear requirements regarding the source of electricity to be supplied to the province. The Project will help achieve provincially mandated targets outlined in the *Renewable Electricity Regulations* made under Section 5 of the *Electricity Act*, which requires the province of Nova Scotia to achieve 80% renewable energy by 2030. Reaching this goal will also support the province's objectives of achieving a 53% reduction in greenhouse gas (GHG) emissions by 2030 and becoming net-zero by 2050 (Renewable Electricity Regulations 2021). The increase in renewable energy needed to meet these targets will likely be obtained mainly through wind, marine renewable, hydropower, solar, geothermal, and biomass. The Nova Scotia renewable electricity standard 2030 states that 1100 GWh of electricity must be acquired from independent power producers to meet 2030 targets (Renewable Electricity Regulations 2021).

The BMWP is located in an undeveloped fragmented forested area in Hants County near the communities of Smiths Corner and Falls Lake. The WTGs are proposed to be located in areas that have been previously clear cut through forestry activities, creating a highly fragmented habitat. The proposed BMWP can transform this disturbed habitat into a site that will provide an environmentally friendly and productive source of renewable energy for Nova Scotia while limiting potential impacts to the environment.

Development of wind energy projects has been instrumental in reducing harmful greenhouse gases associated with traditional carbon-based energy sources, both locally and abroad. Further, as previously mentioned, the Nova Scotia provincial target is to produce 80% of its energy from renewable sources by 2030. With less than a decade until this deadline, the development of wind energy is the most feasible option to help meet renewable energy goals while providing economic development for local communities.

2.2 Geographical Location

The proposed Project site is located in the West Hants Regional Municipality area of Hants County, approximately 13 km southwest of Windsor, Nova Scotia **(Figure 1**). The proposed WTG locations and associated infrastructure are situated mainly on privately-owned land with only four WTGs located on provincial Crown lands near Highway 14. The proposed development area has largely been used for forestry activities and therefore has a network of existing privately maintained forestry roads.

A lease for the privately-owned land where project infrastructure is located has been obtained by Natural Forces, which will continue for the construction and operational phases of the Project. This lease includes the land required to build approximately 24 of the wind turbines and the associated roads, collector lines, the substation and other project infrastructure. Appropriate land agreements will be obtained by Natural Forces with the province for the remaining infrastructure located on Crown land. As such, once the BMWP becomes operational leases will be obtained for the lands used by the turbines located on Crown land and a License of Occupation will be obtained to encompass the access roads and collector lines. Natural Forces has already begun working with the province for this process.

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Methals Rd
Duck Pond Rd
Mines Road Br
Spruce Brook
Mines Rd
Southwest Branch Avon River
Bottle Cove Brook
West Branch Avon River
Castle Frederick Rd
Sangster Bridge Rd
Avon River
HIGHWAY 14
Five Island Lake Brook
Long Lake Brook
Tingley Rd
Amber Lake Brook
Muir Lake
Pioneer Dr
Folly Lake
Summit Ridge Rd
South Branch
Wile Settlement Rd
Mockingbird Lake
Armstrong Lake East Rd
Smeltzer Brook
Armstrong Inlet
Mill Brook
New Ross Rd
Rocks Brook
North Canoe Lake
Otter Lake Brook
New Russell Rd
Boscobel Rd
Poplar Brook

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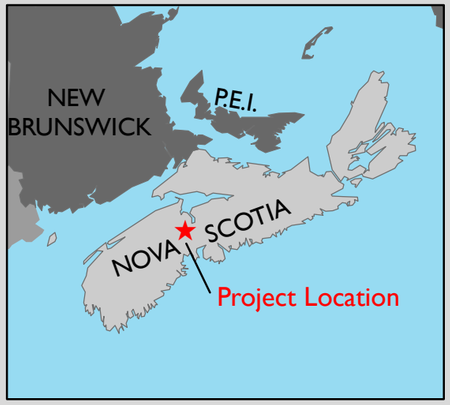
BENJAMINS MILL WIND PROJECT

PROJECT LOCATION

FIGURE 1

- Project Location
- Centre of Site (20N, 397362m E, 4972663m N)
- Highway
- Road
- Watercourse
- Waterbody



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SCALE 1:70,000

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY DILLON CONSULTING, GEONB, NATURAL FORCES

MAP CREATED BY: MEC
MAP CHECKED BY: KB
MAP PROJECTION: NAD 1983 UTM ZONE 20N

DILLON CONSULTING

PROJECT: 21-1329
STATUS: DRAFT
DATE: 2022-01-10

2.2.1 Siting Considerations

Natural Forces has a proven record in the development of renewable energy projects in Nova Scotia, Atlantic Canada and across the country. Through past experience in developing these projects, the Proponent has developed extensive knowledge on best practices with respect to site finding and development of community-based wind farms. To determine site suitability, the Proponent completed a detailed assessment of the considerations listed below prior to selecting the location of the BMWP.

Specifically, the Project site is attractive due to the wind resource, elevation, proximity to and location of the Nova Scotia Power transmission system, distance from residences, previous forest harvesting activities across the site, and low environmental sensitivity.

The following is a list of factors that were considered during the site finding and development process:

- Technical Considerations;
  - Suitable wind resource;
  - Regional topography;
  - Proximity to and location of transmission system; and
  - Available turbine technology.
- Environmental Considerations;
  - Proximity to wetlands and watercourses;
  - Proximity to residential dwellings or other areas sensitive to sound levels and visual impacts;
  - Sensitivity of flora and fauna;
  - Proximity to provincial or national parks, nature reserves and other sensitive areas; and
  - Risk of archaeological or heritage resource distribution.
- Land Use Considerations;
  - Known culturally significant areas;
  - Available access to the land;
  - Communication corridors;
  - Current land use;
  - Future land use; and
  - Proximity to residential properties, communities, and towns;
- Planning Considerations; and

Municipal zoning by-law regulations.

2.2.1.1 Technical Considerations

The BMWP is located on a topographical ridge with an elevation ranging from 190-261 m above mean sea level. As a result of the elevated topography and prevailing winds coming from the coastline (west), the BMWP site provides an attractive wind resource for a wind energy project.

Natural Forces has been in discussion with Nova Scotia Power Inc. (NSP) since 2020 regarding interconnecting the BMWP to the existing transmission grid. Together, Natural Forces and NSP have identified that there is a suitable 138 kV transmission line that crosses through the BMWP site. The Feasibility Study for a 48 MW BMWP identified no technical issues with the proposed Project connecting to existing line L-6054, and a Feasibility Study for a larger BMWP is ongoing. This line tap will require the

construction of approximately 200 m of new overhead transmission line and a new substation onsite. The new 200 m transmission line required will be constructed, owned, and operated by NSP, however, it has been included in the scope of this Environmental Assessment (EA). The point of interconnection, collector lines, and location of the new proposed substation are demonstrated in **Figure 2**.

The Proponent will be using the services of a third-party consultant to conduct a geotechnical investigation to determine geophysical conditions for turbine design and construction. This assessment is planned to be completed in the fall of 2022.

Lastly, based on site specific measured wind data, turbine availability, site suitability assessments by the manufacturers, and capacity available on the grid, an appropriate turbine technology will be finalized in 2022.

2.2.1.2 Environmental Considerations

Many environmental impacts associated with the construction and operation of a wind farm can be reduced or eliminated through proper screening during development. The Proponent has consulted with regulatory agencies and conducted desktop and field studies to locate wetlands, watercourses, sensitive habitats, endangered species, and residential dwellings near the BMWP lands in an effort to design the project to avoid as many of these sensitive features as possible.

A thorough desktop review of available data for flora and fauna species in the area (i.e., 100 km from the centre of the site) has been conducted in order to identify species at risk and species of high importance that may be impacted by the proposed development. The desktop review was then supplemented by several field assessments and surveys completed in 2021. Flora and fauna species at risk or of high importance identified during the desktop assessment or field surveys are discussed in **Section 6.2.3**.

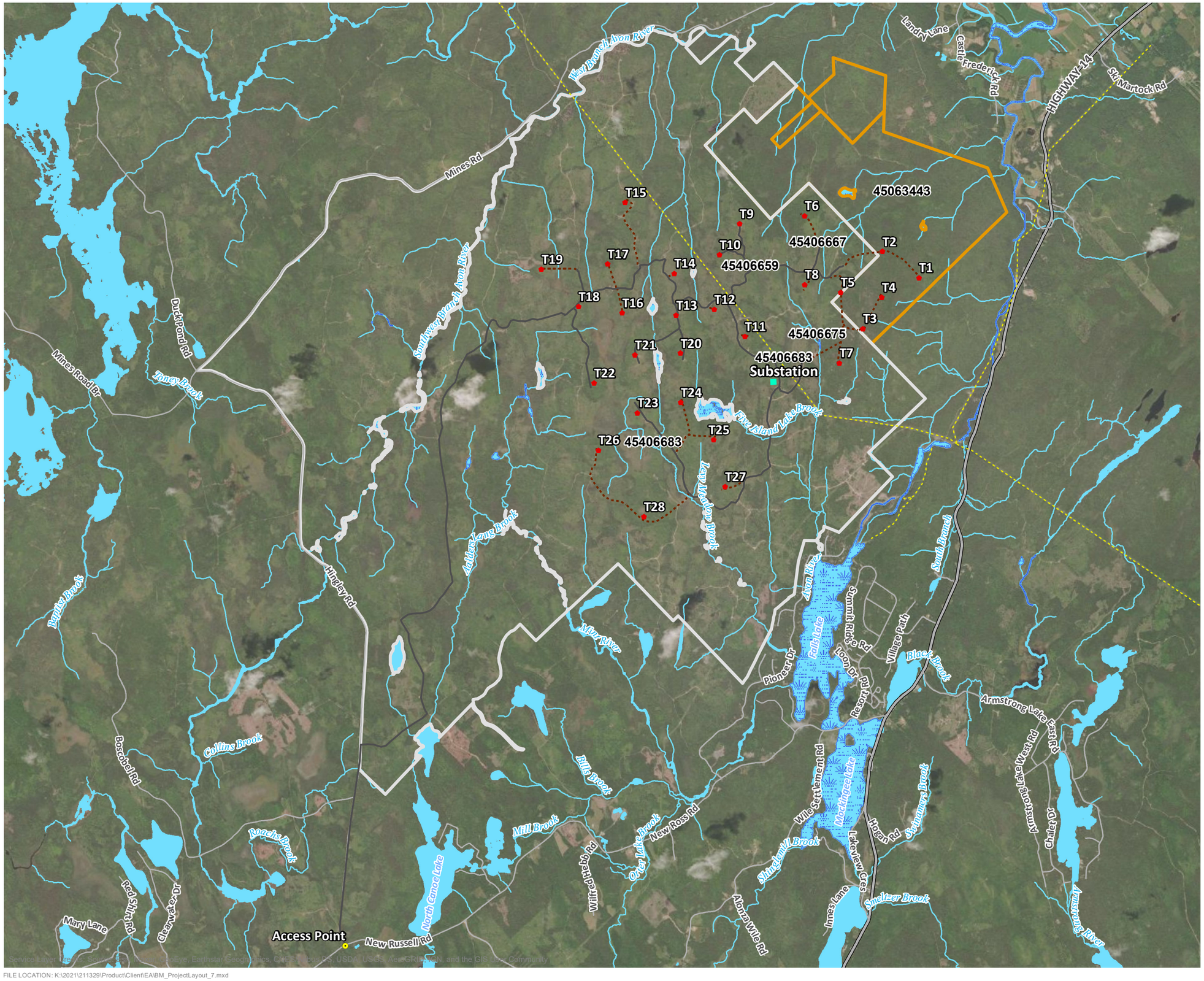
Archaeological resource desktop studies have also been conducted by Cultural Resource Management Group Ltd (CRM). Further details of this study are discussed in **Section 6.4**.

2.2.1.3 Land Use Considerations

The BMWP requires consideration of current land uses within the proposed Project site. The BMWP site is located on a mix of privately-owned and provincial Crown lands approximately 3.3 km west of Highway 14 (Figure 2). The privately-owned site lands have undergone several generations of wood harvesting and have a network of existing forestry roads. The provincial Crown lands are largely undisturbed with few existing roads that access the property. Currently, there is recreational use of the Crown land for activities such as hunting and snowmobiling, in addition to any use of the land by the Mi'kmaq Nation. These land uses have been considered in the site layout and consultation with the land users will continue.

Where part of the BMWP is located on provincial Crown land, any changes to access to those portions of the lands will be determined in collaboration with the province and will consider the current uses of the land.

Adjacent to the BMWP site is a mix of privately and Crown owned properties that have various land uses, including hiking trails and hunting cabins. The BMWP requires consideration of these current land



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BENJAMINS MILL WIND PROJECT

PROJECT LAYOUT

FIGURE 2

- Proposed Access Point
- Turbine
- Highway
- Public Road
- Existing Site Road
- New Site Road
- Transmission Line
- Substation
- Watercourse
- Waterbody
- Wetland
- Crown Land
- Privately Owned Land

0 0.25 0.5 1 km

SCALE 1:60,000

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY DILLON CONSULTING, GEONB, NATURAL FORCES

MAP CREATED BY: MEC
MAP CHECKED BY: KB
MAP PROJECTION: NAD 1983 UTM ZONE 20N

DILLON CONSULTING

PROJECT: 21-1329
STATUS: DRAFT
DATE: 2022-01-10

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uses and consultation with these land users will be ongoing to ensure safe use and continued enjoyment of these lands.

2.2.1.4 Planning Considerations

The Proponent has consulted the West Hants Regional Municipality Land Use By-Law (2019) zoning regulations for the Project area, and has engaged with both staff and Council to determine the steps necessary to obtain the required permits. The BMWP site is located in the General Resource zoning, making it appropriate for this type of development under current bylaws. The Proponent has submitted the application for the Development Agreement, the first of the planning requirements. Consultation with West Hants staff and Council will continue and the Development Agreement, Development Permit, and Building Permit will be obtained prior to commencing construction.

Following a detailed assessment of the above considerations, the proponent determined that the BMWP location has strong potential to provide efficient renewable energy while minimizing impacts to the community and the environment. The Project location and proposed layout from a regional and local context are shown in **Figure 2**.

2.3 Physical Components of the Project

The footprint of the Project is detailed in **Figure 2** and is estimated to cover approximately 130 hectares (ha). The following estimates are based on the full 28 turbine layout. This includes the following:

- 103 ha of existing roads to be upgraded and new access roads (includes approximately 14 km of new roads on site and 33 km of roads to be upgraded);
- 24 ha for the turbine foundations and crane pads;
- 1.5 ha for the substation;
- 1 ha for the collector lines that are not parallel to the roads; and
- 0.5 ha for the proposed transmission line and cleared right of way.

2.3.1 Civil Works

2.3.1.1 Access Roads

The access roads for the Project will range from 6 - 11 m wide with a maximum width of 15 m in areas to facilitate moving large turbine components (i.e. to navigate turning radiuses on turns). The access roads will be used to move workers and equipment about the site during construction, operation and decommissioning phases.

<u>New Access Roads</u>

The new access roads are anticipated to involve the removal of soil to a depth of between 0.25 – 1.0 m (depending on the ground conditions encountered during the geotechnical investigations) and placing layers of crushed stone. The stone is usually compacted, with a finished construction depth between 0.25 – 0.5 m, again dependent on the strength of the underlying ground formation. The internal site roads will be maintained in good condition during construction and throughout the lifetime of the Project to facilitate maintenance and on-going environmental studies. The roads will be left in place following the eventual decommissioning of the Project if the landowners are in agreement.

The removed topsoil would be stored in accordance with best practice guidelines, and later used for site restoration. Soil needed for backfill would be stored temporarily in low bunds adjacent to the excavations until needed. Any remaining excavated material would be shaped into fill slopes in the road bed, or removed from site to an approved landfill or disposed of appropriately.

Existing Access Roads to be Upgraded

The Project site has many existing roads currently used by local industry and by recreational users. It is anticipated that approximately 47 km of existing roads can be used with minor upgrades. However, portions of existing roads may need to be widened to support large truck and material movements and turning radii of the turbine components. The process for upgrading roads is similar to that of constructing new roads, however, clearing and grading is only required where roads need to be widened, which will greatly minimize the area of new disturbance from the proposed Project.

Transmission Line Access Roads

In addition to the main Project access roads that will be used to transport WTG parts and used by construction crews, there is also a need for access routes into the new proposed transmission lines. These access roads will make use of existing trails near the proposed line but these trails will need to be upgraded to support construction crews. Roads into the transmission line corridor would be temporary for gaining access and would be approximately 6 m in width. A road approximately 4m wide along the transmission line corridor may be maintained during the lifetime of the project to facilitate maintenance.

2.3.1.2 Crane Pads

The installation of the WTGs will require crane pads that will be approximately 70 m by 70 m in size. The crane pad is required to safely accommodate the weight of the large crane necessary for turbine installation and maintenance. Each WTG location will be designed to support the arrangement of the crane pad and the turbine foundation on the surrounding topography constraints of the Project site.

Construction of the main crane pads will involve the removal of soil to a depth of between 0.25 – 0.5 m, depending on the ground condition encountered during the geotechnical investigation. The subsoil will be covered by layers of graded crushed stone. Total construction depth is between 0.25 – 0.5 m, also dependent on the characteristics of the underlying geological formations.

The crane pads will be retained throughout the operation phase of the Project to allow for periodic WTG maintenance, and to accommodate any crane necessary should any large components require replacement. The crane pads may also be utilized during the decommissioning phase of the Project.

2.3.2 Turbine Foundation

It is anticipated that concrete foundations approximately 20 m in diameter will be required for each WTG. A detailed geotechnical investigation will be undertaken at each WTG location to establish the nature of the soil and substrate characteristics. A registered professional Engineer will design the foundations to match the geological conditions.

The construction of the reinforced concrete foundations will include excavation to a depth of approximately 3 meters, the placement of concrete forms and steel reinforcement, and the pouring of

concrete within the forms. The upper surface of the base will lie approximately 1 m below ground level. Rock chipping and blasting is anticipated to be required to facilitate excavation. The central support pedestal would extend 0.20 m above existing ground level to receive the bolted bottom tower section. Suitable excavated material would be compacted in layers on top of the concrete foundation to terminate in line with the existing ground level, leaving room to allow sufficient topsoil reinstatement for vegetation growth. The foundations will be regularly checked for any signs of failing during the operational phase.

The soils removed will be stored in accordance with provincial regulations and best practice guidelines. They will not be stored within 30 m of streams or wetlands, and will be replaced during the restoration phase in consultation with the Department of Natural Resources and Renewables Land Services Branch. Soil material needed for backfill will be stored temporarily in a designated area adjacent to the excavation location until needed. Any remaining excavated material will likely be recycled to another site needing clean fill material or graded into the natural slope of the surrounding site.

2.3.3 Wind Turbine Generators

The proposed Project consists of the construction of up to 28 wind turbine generators. Each WTG has an individual generating capacity of 4.2-6.2 MW for a total Project capacity of up to 150 MW. There are a variety of turbine models being considered for the Project. The specification range for features of models under consideration, which are designed and certified according to the latest international standards, are summarized in **Table 1**. Currently the basis for design is the International Electrotechnical Commission (IEC) standards of the IEC-61400 series. From base to blade tip, the WTGs under consideration have maximum heights of 170-200 m.

TABLE 1: TURBINE SPECIFICATIONS

Feature	Range Under Consideration
Rotor diameter	138 – 170 m
Swept area	15,000 – 23,000 m^2
Rotations per minute	Up to 12
Cut out wind speed	Up to 32 m/s
Hub height	100 – 131 m
Maximum sound pressure level	Up to 107.6 dB(A)
Tower material	Steel or concrete
Colour	White

All turbines will be monitored remotely 24-7 in real-time by a team of operators from the manufacturer. Natural Forces' operations team will also monitor the turbines from Halifax, Nova Scotia. The operators will have the ability to shut off the turbines should they observe conditions that could pose a risk to the turbines' proper functioning or risk to people or wildlife near the turbines. Ice may form on the rotor blades of WTGs in specific weather conditions. The ice build-up poses the risk of ice fragments detaching and creating safety hazards to the surrounding area. All turbines considered will be equipped with a reliable ice detection system. Once ice has been detected, the turbine rotor stops spinning, and will remain stopped until the ice has been melted, which will occur either passively through a natural

melting process based on climatic conditions or actively with a de-icing system that heats and melts the ice on the WTG blade. This will effectively reduce the risk of ice throw.

2.3.4 Lighting

A Lighting Plan for the turbines will be developed and approved by Transport Canada and Canadian Wildlife Services (CWS) to minimize impacts on migrating birds while ensuring aviation safety. The lighting plan will comply with Transport Canada recommendations and Standard 621 – Obstruction Marking and Lighting - Canadian Aviation Regulations (Transport Canada 2021). Chapter 12 of the standard outline's regulations for wind turbines greater than 150 m. The current standard requires two CL-864 (medium intensity, flashing red – 20-40 flashes per minute) lights installed on the nacelle with one operating and one as a back-up. At least three CL-810 (low intensity, flashing red in sequence with nacelle) lights are also required mid-way up the tower (half of the nacelle height) and are to be visible in all directions. These types of lights are likely to be used for the BMWP but will be adjusted as per Transport Canada recommendations.

The standard requiring lighting midway up the tower came into effect in 2016 and follows European practices for tall structures. This standard has been improved from the European practice by implementing flashing, instead of steady burning lights. This change was recommended from the Federal Aviation Administration's technical report on Evaluation of New Obstruction Lighting Techniques to Reduce Avian Fatalities (Patterson 2012).

2.3.5 Civil and Electrical Works

The electricity produced from the WTGs will be stepped-up from 34.5 kV to 138 kV at the substation via the main step-up transformer(s). Each wind turbine has a small pad mount transformer located inside the tower that initially steps up the voltage to 34.5kV. A bare copper earthing (grounding) cable will be laid alongside the WTG foundation for lightning protection; grounding will also be installed at other areas as determined by the electrical design. The electrical, communications and grounding cables will leave the WTG foundations below grade. This will be installed according to the design engineer's specification. Typical design will require the cables to be installed by the direct buried method consisting of excavation of a trench with a minimum depth of 1.2 m, placement of a layer of sand, then the collection system cables, earthing and fibre optic cable which are then covered by another layer of sand. Clean aggregate, as specified by the design engineer, will then be placed on top of the sand as the trench is filled back in.

Caution tape, stating "Danger Underground Electrical Cable" will be placed along the full length of the trench at approximately 0.15 m below the finish grade. Any buried electrical cable will likely be marked with permanent safety signs to warn of potential hazards from excavation. The size, type and location of the marker signs will be determined in consultation with the Land Services Branch and be in accordance with applicable safety standards.

2.3.6 Interconnection to Grid

The Project will be connected to the existing Nova Scotia Power L-6054 138 kV transmission line. A feasibility study has been completed for this point of interconnection for a 48 MW project size and at the time of the submission of this document to the province, another study was ongoing for a larger installed capacity. The planned interconnection will require a short new 138 kV line approximately 200

m long and a single-breaker switching substation including one 138 kV circuit breaker and associated switches, a control building and protection system, and communications and control between the point of interconnection switching substation and the Nova Scotia Power SCADA system.

2.3.7 Turbine Installation

The main WTG components include the tower sections, nacelle, generator, stator, hub and blades. Towers are typically delivered in six large sections if using conventional steel towers or numerous smaller sections if using the pre-cast concrete variety. Once delivered, the tower sections will be erected in sequence on the WTG foundations using a 150-tonne tailing crane and a large 800 – 1000 tonne main lift crane. The smaller crane will erect the base and lower midsection of the towers and then assist the main crane with the erection of the upper-midsection, the tower top section, the nacelle, generator, stator, hub and the blades. For the nacelle and blades, the assembly will involve the use of a small 135 tonne rough-terrain crane for vehicle off-loading, a 150-tonne tailing crane for preliminary assembly, and a main erection crane of approximately 800-1000 tonnes for the main lift. The blades are attached one at a time on the hub which will already be installed on the nacelle.

2.4 Setbacks and Separation Distances

The Project layout allots for the following setbacks from all proposed WTG locations:

- 30 m from wetlands and watercourses;
- 1.6 km from all residential dwellings and cabins;
- 3.9 km to nearest Important Bird Area (IBA) Southern Bight, Minas Basin;
- 4.3 km to the nearest Provincial Park (Falls Lake Provincial Park);
- >5 km to nearest Provincially Protected Nature Reserves (Panuke Lake Nature Reserve) and Wilderness Areas (South Panuke Wilderness Area); and
- 2.7 km to nearest communication tower.

Environmentally sensitive and managed areas are discussed further in **Section 6.2.5.1**.

2.5 Schedule

The approximate proposed schedule for the construction activities is presented in **Table 2**. Preconstruction activities and clearing are expected to start in Q4 of 2022 with operation of the BMWP in Q1 2024.

After the initial tree and land clearing and earth works activities for the construction of the BMWP are complete the following main construction activities will occur:

- Construction of access roads, crane pads and lay down areas;
- Construction of the turbine foundations;
- Installation of electrical infrastructure (i.e., power poles, power lines and underground electrical, transmission lines and substation);
- Turbine installation;

- Commissioning of the WTGs; and
- Removal of all temporary works and restoration of the site.

Construction activities will be limited to daytime hours when feasible. The overall erection process for the WTGs will take approximately six to eight days each, depending on the wind conditions, and will not start until suitable wind conditions prevail. Turbines cannot be erected when wind speeds exceed approximately 8 m/s, and the optimal time for assembly often occurs during the early evening. As a result, some construction in the early evening and night is possible during this stage of construction, however, it will be minimized to the extent possible.

TABLE 2: PROJECT SCHEDULE

Phase	Beginning of Phase
Phase I - Planning, Site Preparation and Construction	
- Clearing and Grubbing	Q4 2022
- Access Road and Laydown Area	Q4 2022
- Turbine Foundation	Q2 2023
- Electrical infrastructure	Q2 2023
- Crane Pad Construction	Q2 2023
- Turbine Installation	Q3 2023
- Commissioning	Q4 2023
- Removal of all temporary works and restoration of the site	Q1 2024
Phase II – Operation and Maintenance	Q1 2024
- Turbine Operation	Q1 2024
- Inspection and Maintenance	
Phase III - Decommissioning	
Infrastructure Removal	25+ years after commissioning
Site Reclamation	

2.6 Planning, Site Preparation and Construction

The main site access is from New Russell Road off Highway 14. The majority of the access roads will make use of existing designated roadways and private roads but may require upgrades to support oversized vehicle movements as described in **Section 6.3.3**. Using existing roads allows the Project to significantly minimize its footprint and potential impacts to the environment. Minor temporary road widening may be required along specific portions of provincially maintained roads allowing for wider turn widths. This road widening will be coordinated with Nova Scotia Public Works and the West Hants Regional Municipality Public Works Department and all necessary permits will be acquired before commencing work. New Russell Road will be the entry point for all workers, construction equipment and WTG components for the duration of the construction phase (Figure 2).

Clearing, Grubbing and Earth Works

Clearing, grubbing and earth works activities will be planned to occur outside of the breeding bird season where possible. If clearing is required during the breeding bird season, a qualified biologist will be onsite to conduct monitoring to identify possible breeding birds in the area and their active nests.

These monitoring efforts will follow Environment and Climate Change Canada's (ECCC) specific considerations related to determining the presence of nests. A biologist will observe the bird species in the area and determine if there is presence of suitable nesting habitat within the proposed clearing area. As well, they will observe bird behaviour including, but not limited to, territorial males and individuals carrying food to determine the potential for active nests in the area.

Additionally, the results of the bird surveys completed as part of this assessment will be reviewed to identify species of ground nesters that have been observed at the BMWP site. A large portion of the Project lands has been previously cleared during forestry activity and should ground nesters be found to reside in the Project area during the construction phase, nest searches will be conducted prior to construction activities that may impact ground nesters.

Fill Material

Fill material will likely be sourced on site via bedrock removal at each WTG location based on desktop geotechnical information and will be coordinated by the Project's construction manager and civil contractor. Should any wetland crossings be required during the construction of access roads, the Proponent will engage in ongoing consultation with the Nova Scotia Department of Environment and Climate Change (NSECC) to determine the proper alteration applications required and applicable wetland compensation. The Proponent is committed to following the proper measures as indicated by NSECC. Details on the Projects interactions with wetlands and watercourses is further discussed in **Section 7.2**.

Traffic Control

Traffic on site roads will need to be managed if forestry is still ongoing along the internal site roads throughout the duration of all phases of the Project. Traffic control signs (such as stop and yield) will be installed at the access road intersections. A speed limit of 30 km/h will be posted at site access locations.

Site Restoration

After construction, turbine erection, and commissioning are completed and the Project is in the operation phase, all temporary works will be removed and the land re-graded. The stored topsoil will be replaced, graded and given an aesthetically pleasing appearance.

2.7 Operation and Maintenance

Site Access and Traffic

Once the Project is operational, minimal vehicle activity will be required. The internal site roads will be used for periodic maintenance and safety checks. A comprehensive supervisory control and data acquisition (SCADA) system will be installed within the turbines for remote monitoring and control of the wind turbines, which will minimize the need for on-site personnel. The SCADA system ensures safe efficient operation of the turbines and of the overall Project site.

Project Safety Signs

Project signage will be located at the entrance to the site. These signs will provide essential safety information such as emergency contacts and telephone numbers. As well, the signs will provide

information about the Project and the companies involved in the Project. Safety signs and information will also be installed throughout the Project Site as required. These signs will be maintained throughout the operational life of the Project.

Inspection and Maintenance

Scheduled maintenance work will be carried out several times each year throughout the operational phase in addition to routine site visits. Unscheduled maintenance is anticipated to be minimal, as the SCADA system allows 24/7 monitoring of the turbines by the manufacturer and the operations team at Natural Forces. Maintenance procedures may require the use of small or large cranes for brief periods of time, for replacement of blades or other turbine components.

Vegetation Management

Minor vegetation management will be required during operation. This management will be minimal beyond vegetation that threatens safe operation of the Project, such as any trees close to the overhead collector lines or within the WTG footing/crane pad area. Herbicides will not be used to manage vegetation on site.

2.8 Decommissioning

The Project will be in operation for approximately 25 years, depending on the length of the power purchase agreement (PPA) with Nova Scotia Power. There is the potential to extend the operational period if a new PPA, or equivalent, and extended land agreements are secured. If an extension to the PPA is not obtained, the Project will be decommissioned by removing the infrastructure and reclaiming the site.

Infrastructure Removal and Site Reclamation

Decommissioning will commence within six to nine months after the PPA has been terminated. The WTG components will be dismantled and removed from the site. Similar traffic movements to those experienced during the delivery of the turbine components are anticipated. The decommissioning phase will require considerably lower vehicular support than during the construction phase. The following four steps are anticipated in the decommissioning phase:

1. The WTGs will be dismantled and removed from the site for scrap or resale. The base will be removed to below plough depth, and the stockpiled topsoil will be releveled so that the land may be returned to its former use.
2. The internal site roads and site entrance may be removed if required. After removal, the land will be returned to its former use.
3. The underground cables will be below plough depth and contain no harmful substances. They may be recovered if economically attractive or left in the ground. Terminal connections will be cut back below plough depth.
4. All other equipment, including overhead collector lines and the substation, will be dismantled and removed, and the land will be returned to its former use.

Site Restoration

After the turbines have been decommissioned all worksite infrastructure will be removed and the land re-graded for site restoration. Site restoration, aiming to have the decommissioned site resemble the natural state of the site will be initiated. Native plants and soil will be factored into the restoration plan to minimize the potential for habitat loss and invasive species spread.

2.9 Future Modifications or Extensions

There are no future phases planned for the BMWP at this time. The Proponent will sign a PPA with Nova Scotia Power for approximately 25 years, which is consistent with the WTGs life expectancy. Prior to the end of the PPA, decommissioning and site reclamation plans will begin, or a new PPA may be signed with necessary maintenance occurring to extend the life of the Project. Should the life of the project be extended beyond 25 years, the Proponent will re-engage with regulatory authorities at that time.

3.0 Mi'kmaq of Nova Scotia

3.1 Overview

Indigenous engagement and consultation are important aspects of any project development. It is fundamental that Indigenous communities have a full understanding of proposed projects in order to meaningfully engage in the development process and assess potential impacts to Aboriginal and Treaty Rights. This requires strong, active communication that considers the varied needs of individual communities. Natural Forces values the contributions that Indigenous Peoples make to improve upon their renewable resource projects across Canada. As such, Natural Forces, the Proponent, has developed an approach and initiated engagement with the 13 Mi'kmaq bands in Nova Scotia regarding the proposed Project.

Beyond sharing information and addressing Mi'kmaq concerns, Natural Forces aims to build lasting relationships and earn the support of the Mi'kmaq bands through open and accessible communication. Natural Forces makes it a priority to communicate all potential impacts of the Project, including benefits that renewable energy can bring through local economic growth, energy security through source diversity, and reducing air pollutants associated with carbon-based energy sources.

The sections below outline the approach and general methods of engagement and involvement proposed and implemented by Natural Forces to engage and consult with the Mi'kmaq bands in Nova Scotia for the Project, an essential component of the development process.

3.2 Regulatory Requirements and Guidelines for Consultation

The Province of Nova Scotia is required to consult with the Mi'kmaq bands prior to making decisions on approving developments that have the potential to adversely affect an Aboriginal or Treaty right. In this way, the Mi'kmaq are not stakeholders, they are Rightsholders. Recent case law states that the Province may delegate certain operational aspects of the duty to consult to project proponents, acknowledging that the proponents often have access to more detailed information on the planned phases and components of a given project, especially in early stages. In Nova Scotia, the actions taken by proponents in this respect are considered engagement, not consultation. Descriptions of the ongoing

engagement with the Mi'kmaq that Natural Forces is undertaking for the Project are included in this section.

As the developer of the Project, Natural Forces is actively engaging with the Mi'kmaq. The appropriate engagement process has been undertaken to meet, and exceed, requirements of the Proponents' Guide: The Role of Proponents in Crown Consultation with the Mi'kmaq of Nova Scotia (the Proponents' Guide), the provincial guidance document that accompanies the EA regulation, have and will continue to occur along with other engagement efforts as described in this report.

Although not a regulatory requirement, the Canadian Wind Energy Association published a document titled Wind Energy Development Best Practices for Indigenous and Public Engagement (2017) to help facilitate the responsible development of wind energy projects throughout Canada. This document has also been used as a guideline through the development of the Project and continues to be drawn upon for Mi'kmaq engagement.

3.3 Communities Engaged

The first step of the engagement process is the identification of the Mi'kmaq bands that could be impacted by the Project. This step provides a better understanding of the communities that currently and traditionally have lived and used the lands on which the Project is proposed and the surrounding resources. Properly identifying the appropriate Rightsholders ensures those whose rights may be impacted by the Project have access to information and opportunities to discuss and voice any questions or concerns about the Project that may arise.

Natural Forces contacted the Nova Scotia Office of L'nu Affairs (OLA, formerly the Office of Aboriginal Affairs) in January 2021 to initiate the process of properly identifying the Mi'kmaq bands whose Aboriginal and Treaty rights may be impacted by the Project. As part of this, Natural Forces sent a formal Project Description to OLA. Upon review and further discussions with Natural Forces, the OLA clarified that the Proponents' Guide would need to be followed and provided a list of the of the Mi'kmaq bands with which engagement is required, which includes Annapolis Valley First Nation, Glooscap First Nation, Millbrook First Nation, and Sipekne'katik First Nation. The Project site is located approximately 16 km SW of Glooscap First Nation and approximately 35 km SE of Annapolis Valley First Nation.

Though the OLA specified these four bands for engagement, Natural Forces broadened the engagement efforts to include all 13 Mi'kmaq bands in Nova Scotia, which are:

- Acadia First Nation
- Annapolis Valley First Nation
- Eskasoni First Nation
- Glooscap First Nation
- L'sitkuk (Bear River) First Nation
- Membertou First Nation
- Millbrook First Nation
- Paqtnkek Mi'kmaw Nation
- Pictou Landing First Nation
- Potlotek First Nation

- Sipekne’katik First Nation
- Wagmatcook First Nation
- We’koqma’q First Nation

Natural Forces has engaged with the 13 Mi’kmaq bands directly, as well as with Kwilmu’kw Maw-klusuaqn (KMKNO). KMKNO is the consultation organization that represents the Mi’kmaq bands in Nova Scotia, with the exception of Sipekne’katik First Nation and Millbrook First Nation.

3.4 Direct Engagement Activities

Natural Forces began engagement activities with the 13 Mi’kmaq bands in March 2021 with an initial letter to each of the Mi'kmaq Chiefs and either KMKNO or the bands’ Consultation Coordinator (or equivalent), introducing them to the Project as a proposed development. This initial contact included a Project description, maps, information on Natural Forces, contact details for further comments or questions, and an offer to meet to further discuss the Project. The letters were sent both by email and mail, and follow up emails were sent in April. This initial contact was made early in Project development to ensure the Mi’kmaq are informed and/or involved throughout all stages. No comments or follow up has been received based on this contact.

Following these letters, Natural Forces had two meetings with KMKNO to provide additional Project information and to discuss the communication protocol with the Mi’kmaq bands. During these meetings, Natural Forces provided a presentation introducing Natural Forces and the Project in more detail, and summarizing the ongoing development activities. KMKNO provided details on their preferred communication protocol both internally and for updates to each band.

In June 2021, Natural Forces met with the OLA to review the engagement activities that had taken place to date with the Mi’kmaq bands and the plans for future engagement. During this meeting, the OLA confirmed that engagement efforts had been appropriate and that Natural Forces should continue with the planned engagement.

In scoping the environmental surveys to occur at the Project site in 2021, Natural Forces worked with Dillon Consulting to hire a Mi’kmaq technician to complete a site walk-over to identify any culturally significant vegetation species that could be impacted. Natural Forces engaged with KMKNO and the Confederation of Mainland Mi’kmaq (CMM) to establish the best protocol in hiring a technician for this work. It was determined that the process should begin by reaching out to the nearest Mi’kmaq bands to the Project site. As no interest was identified from the nearest bands, the search was extended to include organizations such as the Mi’kmaw Conservation Group. A candidate was still not identified to fill this position with the expanded search. In lieu of having a Mi’kmaq monitor survey the site, Dillon Consulting engaged with Maqamigew Anqotumeg to compare the plant inventory from the site surveysto identify culturally significant vegetation species. It is noted that a site specific survey was unable to be carried out by Maqamigew Anqotumeg due to ongoing Covid-19 related travel restrictions during the appropriate growing seasons.

Natural Forces has also met with Membertou Geomatics to scope a Mi’kmaq Ecological Knowledge (MEK) Study at the Project site. The MEK study for the Project will begin as soon as possible, which will depend on travel restrictions due to COVID-19.

3.5 Indirect Engagement Activities

3.5.1 Webpage, Email, and Social Media

Project webpages are a great tool to share information and to receive comments from community members. The advantages of a website are that it can be updated frequently and it is continuously available to stakeholders and Rightsholders. The webpage is primarily used to inform the general public, stakeholders, and the Mi'kmaq bands about various aspects of the Project, including, but not limited to:

- Current project information;
- Notices for open information sessions;
- Maps of the Project location;
- Site specific turbine information;
- Posting of technical reports, such as the EA document;
- Project activity schedules;
- Construction activity notices; and,
- Educational and media related material.

Additionally, the 'Frequently Asked Questions' section on the website allows Natural Forces to address questions and concerns brought forward through all engagement and consultation activities. A webpage for the Project was created in the winter of 2021. This has ensured that information has been available to community members should they wish to learn more about the Project. The Project webpage can be viewed at:

https://www.naturalforces.ca/benjamins-mills-wind-project.html.

This webpage is updated on an ongoing basis, which will continue through all phases of the Project.

Email has, and will be, used to contact Mi'kmaq bands, answer questions, plan engagement activities, distribute newsletters, and send Project updates. When deemed necessary to reach individuals more effectively, documents will also be sent in the mail. Natural Forces also remains open to meeting with the Mi'kmaq bands to discuss the Project as needed when requested.

3.5.2 Toll-free Line

Natural Forces has a toll-free phone line for those who wish to contact the company via telephone. This removes the burden of cost on community members who are subject to long distance calling fees.

3.5.3 Signage

At the entry points to operational wind energy projects, signage is often posted to identify the project, the primary contact, and the presence of hazards, such as ice throw during certain weather conditions. Natural Forces will use signage as an opportunity to provide additional information about the Project, including facts about the construction schedule, electricity generation, and wind energy statistics. At a minimum, signage will include contact information for Natural Forces.

3.5.4 Other Engagement Tools

There are many other engagement tools that Natural Forces remains open to implementing. Such activities are often determined in conversation with communities to determine which activities are best suited for a particular community. These include, but are not limited to:

- Participation in community events: BBQs, sporting events, and other gatherings can allow an opportunity for the Proponent to have informal discussions about the Project with community members.
- Presentations to schools and other community groups: Information sessions held in schools and to community groups can be completed if interest arises from the Nation.
- Workshops: Workshops can be facilitated in many different formats and for several objectives based on community needs.
- Expert visits: If a key area of concern is identified, an expert can be integrated into the engagement process as opposed to working solely with the proponent. Experts may attend a meeting, presentation or community workshop as most appropriate to the level of interest and the issue of concern.

All of these additional engagement tools are subject to the current policies and recommendations surrounding COVID-19. These additional engagement tools should be used when it is deemed safe to do so, and when a specific need is identified that would be of benefit to the concerned band.

3.6 Effects of the Undertaking on the Mi'kmaq in Nova Scotia

As previously mentioned, the rights of various Mi'kmaq bands in Nova Scotia may be impacted by the Project. Ultimately, the effects of an undertaking on the Mi'kmaq can only be determined by the Mi'kmaq. No comments or feedback have been received to date that indicate an assessment of any impacts. As such, Natural Forces will work with Membertou Geomatics to complete a MEK study for the Project site, and will continue engaging with the Mi'kmaq bands throughout the Project phases. During the registration and public review period of the EA, the Proponent will be available to answer questions and explain any context to community members.

3.7 Ongoing Engagement

This report outlines Natural Forces' approach to facilitating an open, transparent, and comprehensive dialogue with the Mi'kmaq bands to fulfill and extend beyond the provincial duty to consult. Natural Forces will continue efforts to notify, inform, and engage with the Mi'kmaq in Nova Scotia about the Project.

Natural Forces has and will continue to address comments and concerns from all First Nations and First Nation organizations to the best of their ability. To date, Natural Forces has not received opposition to the Project. Generally, the Project has been very well received.

Natural Forces is committed to continuing consultation and engagement with the Mi'kmaq bands throughout the lifetime of the Project to ensure their concerns are properly addressed and that the bands have a full understanding of the Project, its schedule, construction activities, and work to be carried out.

4.0 Public Engagement

4.1 Overview

Stakeholders play an important role in the energy transition within Nova Scotia and should be actively involved in clean energy projects. The Proponent aims to facilitate inclusive public processes that encourage input throughout Project development. This section describes Natural Forces' approach to outreach and engagement, including both past and future activities, and reflects feedback received from the community regarding the proposed Project.

Core to the Proponents approach to engagement is that the concerns expressed by community members are not only addressed but that they become supportive of the Project and the immense benefits that renewable energy can bring through local economic benefits, energy security through source diversity, and a reduction in air pollutants from carbon-based energy sources. The Proponent recognizes that traditional forms of information sharing are not always successful and has developed, over several years, various alternative and creative forms of engagement to reach all stakeholders involved in the Project.

Engagement with the public and other stakeholders began in early 2021. Throughout Project development, Natural Forces has and will continue to meet with various community stakeholders, local businesses, and members of municipal, provincial, and federal government agencies. These communications have been important to build relationships with stakeholders early in Project development and to ensure alignment with regulations and community needs. Natural Forces has also assembled a stakeholder list to which regular updates on Project status are sent in the form of newsletters.

4.2 Community Overview

4.2.1 Closest Communities

Upper Falmouth, Falls Lake, Vaughn and Smith's Corner are the communities that are located closest to the Project site. These neighborhoods consist of a mix of year-round residents and seasonal cottagers. The Smith's Lake and Vaughn areas are home to several subdivisions constructed by the same developer and run by Homeowners' Associations.

4.2.2 Businesses

Major industries in Hants County include natural resources, manufacturing and hospitality, with the majority of businesses located in the Windsor area. Most likely to benefit from the project are local skilled trades, supply and hospitality businesses.

Businesses in the immediate Project area are few and consist of gas stations, a campground, plant nurseries, corner stores and a winery. Some industrial warehouses exist on the outskirts of the area.

4.2.3 Elected Officials

The Project is in the constituency of Hants West, represented in the Nova Scotia Legislature by Melissa Sheehy-Richard. Windsor and the immediate Project area fall in West Hants Regional Municipality. The municipality is divided into eleven districts and is led by a Mayor (currently represented by Mayor

Abraham Zebian). The project is located in District 7, Vaughn – Upper Falmouth, and is represented by Councillor Ed Sherman.

4.2.4 Recreation

The community is home to the South West Hants Fire Station and accompanying hall. There are various hiking trails in the area, some of which are maintained by the West Hants Trails Association.

The Project site is actively being used for forestry purposes, with several existing logging roads. Through community consultation, we have learned that some of the Project and surrounding land is used by community residents for hunting, hiking and snowmobiling purposes.

4.2.5 Nearby Wind Projects

As the Hants County and Annapolis Valley area have abundant wind resources, there are existing wind projects in the area. In general, community members have mentioned that they are accustomed to having wind projects in their community.

Wind projects nearest to the site include:

- The Ellershouse Wind Farm, a 10 turbine, 23.5 MW project located 29 km from the Project. This Ellershouse Wind Farm was commissioned in 2018.
- The South Canoe Wind Energy Project, a 34 turbine, 102 MW project located 30 km from the Project. This Sound Canoe Wind Energy Project was commissioned in 2015.

4.3 Community and Public Engagement

Natural Forces employs a fulltime Communications and Government Relations Manager as well as several development staff who are dedicated to stakeholder engagement and local outreach. The Proponent has a flexible, place-based approach to engagement that ensures the consideration of a wide range of interests and allows the maximization of community participation. In-person engagement is always conducted in accordance with COVID-19 regulations and guidance.

The following section lists and describes the activities the Proponent has and intends to use throughout the lifetime of the Project. This section includes a non-exhaustive list of the tools that will be used to consult and engage with residents, stakeholders and Rightsholders.

Maintaining flexibility with consultation and engagement is vital to address current and future concerns in an appropriate manner that best suits the needs of the community.

Various forms of communication have been, and will be used to engage stakeholders and are detailed in the following section and summarized in **Table 3**. Examples of some of the print materials used for consultation are included in **Appendix A**.

TABLE 3: STAKEHOLDER COMMUNICATION CHANNEL MATRIX

Channel	Community Members	Economic & Special Interest Groups	Elected Officials
Email	X	X	X
Telephone	X	X	X
Newsletters	X	X	
Website	X	X	
Meetings and Presentations	X	X	X

4.3.1 Stakeholder Identification

The first step of the consultation process is the identification of stakeholders. This important step provides a better understanding of the people living within the community and leads to a better understanding of how the Project could impact the community. Properly identifying the stakeholders ensures those who will be affected by the Project have access to information regarding the Project and opportunities to discuss and voice any questions or concerns that may arise. In the early stages of development, the Proponent undertook comprehensive stakeholder identification. Stakeholders were identified in the following categories:

- Community Members
- Economic and Special Interest Groups
- Elected Officials

Each phase of the Project will have differing objectives when it comes to community and public engagement for each of these three categories of stakeholders. These objectives are summarized in **Table 4**.

TABLE 4: PROJECT PHASE OBJECTIVES FOR COMMUNITY AND PUBLIC ENGAGEMENT

Phase	Community Members	Economic & Special Interest Groups	Elected Officials
Early development	• Inform of the Project • Bring forward concerns and questions the community members may have about the Project • Address or seek to address any concerns through development activities and studies being conducted	• Inform of the Project • Discuss any concerns from the business perspective and discuss potential synergies in working together on the Project	• Inform and educate on the Project and the Proponent • Form relationships with local leaders and become a resource for municipal leaders when their constituents ask questions • Listen to better understand the community where the

Phase	Community Members	Economic & Special Interest Groups	Elected Officials
			project is located and understand its members • Follow advice from municipal leaders on how best to approach informing and engaging with community members
Mid-development	• Continue informing on the Project progress and the results of the studies conducted on site • Inform local community members about opportunities for the public to participate in the Project • Continue to address or seek to address any concerns or questions arising	• Inform on Project progress • Address concerns • Build a list of local suppliers interested in the Project	• Inform on Project progress • Continue to keep communication lines open • Build on the relationship established • Continue to offer our expertise as a resource for and to local leaders and community members
Pre-construction	• Inform on Project progress and on any activities that may impact local community members • Address concerns arising before construction	• Informing business owners of Project progress • Continue communication with businesses interested in supplying services or material for the Project • Provide tenders to suppliers that meet the right criteria as appropriate	• Inform on the Project progress • Continue communication • Listen to concerns heard by municipal leaders • Continue to offer our expertise as a resource for and to local leaders and community members
Construction	• Inform on construction activities that could impact the area • Share accurate schedule for construction activities • Continue to address concerns and	• Inform of the Project progress • Share accurate schedule for construction activities • Continue to address concerns and questions raised	• Inform of Project progress • Share accurate schedule for construction activities

Phase	Community Members	Economic & Special Interest Groups	Elected Officials
	questions raised		
Operation	• Provide the opportunity to visit the Project • Inform about Project facts • Continue to address questions as they arise	• Provide the opportunity to visit the Project • Inform about Project facts • Provide contact details for a project representative should any issues or questions arise	• Provide the opportunity to visit the Project • Inform about Project facts • Provide contact details for a Project representative • Continue to offer expertise as a resource for and to community members and future developments

4.3.2 Public Consultation Comments Received

Through the engagement methods described in the sections below, the Proponent has received various comments, questions, and feedback on the proposed Project. These comments and the steps taken to address them are listed in Table 5.

TABLE 5 COMMENTS, QUESTIONS, AND FEEDBACK ON THE PROPOSED PROJECT.

Comment	Methods Used to Submit Comment	Methods Used Proposed to Address Comment	Summary of Response
Will the Project impact the value of my property?	• Open House conversation • Email	1. Discussion at open house with individuals 2. Canadian Renewable Energy Association materials on wind energy and property values provided to individuals 3. Email response to individuals	Many studies globally and throughout Canada have been conducted on this topic and have found that being located near wind turbines does not impact local property values. One such study, a review of properties in Chatham- Kent, Ontario conducted following national professional appraisal guidelines found that it was highly unlikely that a relationship exists between wind farms and the market values of rural residential real estate. These findings are consistent with studies throughout Canada and internationally. We acknowledged that in the absence of understanding how the project will affect the viewscape of the general area during the development of the project, this might affect some purchasers but that as the studies show, once the project is built, there is no evidence that wind projects affect property values. Further information and studies are discussed on the following Canadian Renewable Energy Associations page: https://canwea.ca/communities/property-

Comment	Methods Used to Submit Comment	Methods Used Proposed to Address Comment	Summary of Response
			values/. Paper copies of these sheets were available at the open house.
Will I hear the turbines from my home?	• Open House conversation • Email	1. Discussion at open house with individuals 2. Canadian Renewable Energy Association materials on wind energy and sound levels provided to individuals 3. Email response to individuals 4. Frequently Asked Question posting on website	There is a possibility that some homes will hear the turbines under very specific weather conditions a handful of times throughout the year. However, this is mitigated by having the wind turbines set back sufficiently far from nearby homes. In this instance, the nearest home to a proposed turbine location is 1.6 km away in which case, the noise heard will be faint especially given the natural environment surrounding the Project. Modelling has also been carried out to predict the worst-case sound levels that could be experienced at nearby houses. This modelling shows that the sound levels will not exceed the provincial limit of a maximum of 40 dB(A) at a residence. Anecdotal evidence from other wind projects throughout Canada was also shared to explain that local landowners have expressed their surprise that they could not hear the project from their homes.

Comment	Methods Used to Submit Comment	Methods Used Proposed to Address Comment	Summary of Response
Will post construction sound level monitoring studies be completed?	• Open House conversation • Email	1. Discussion at open house with individuals 2. Email response to individuals	This type of study has been shown to be ineffective in monitoring the sound levels coming from a project like this one because it cannot distinguish between sound coming from the Project and that coming from other background sources, such as the wind itself and cars on the road. Therefore, this type of study is not planned. Rather, there is a Complaint Resolution Plan for the Project that individuals can follow if they experience sound levels from the Project that are bothersome. Then, there are various mitigation measures that can be put in place to reduce the sound levels, such as the addition of vegetation nearby to block the sounds.
Will the Project impact recreational land uses in the area, such as hunting, hiking, and snowmobiling?	• Open House conversation • Email	1. Discussion at open house with individuals 2. Email response to individuals	We have been and will continue to work with all land users who express interest or concern. We are well-versed in designing our sites to accommodate other land uses, such as snowmobile trails, and will mitigate impacts as much as possible. As this is an industrial land use, our main focus is the safety of anyone using the lands.
How will emergency services be involved with the Project?	• Open House conversation • Email	1. Discussion at open house with individuals 2. Email response to individuals	Our operations team will prepare an emergency response plan, likely in collaboration with the local fire departments. Part of this can be site visits to ensure that the fire departments are familiar and comfortable with the Project site.
Will the Project deter terrestrial wildlife from using the area?	• Open House conversation	1. Discussion at open house with individuals 2. Email follow-up response to individuals	From our experience with our other projects, this type of development does not in practice deter wildlife from using an area. In fact, we have had sightings of deer, black bears, coyotes, and other animals at our operational sites. Habitat fragmentation tends to be the biggest impact to terrestrial wildlife from this type of development. However, for this Project, we are using a site that has largely been heavily forested and has an existing network of access roads. We will take advantage of the existing infrastructure to allow us to reduce the amount of additional fragmentation. Ultimately, our environmental assessment studies will help in determining the types of species that use the area and how we can mitigate our impact on them.

Comment	Methods Used to Submit Comment	Methods Used Proposed to Address Comment	Summary of Response
Which roads will be used to access the Project during construction? Some local infrastructure (i.e. bridges) would not be able to handle the weight of oversized materials.	• Open House conversation • Group meeting conversation	1. Discussion at open house with individuals 2. Discussion in meeting with group	We are still evaluating the access options for during construction activities. Ultimately, we need an access route that can support oversized loads. We are actively accepting feedback on the options from land users and local residents and stakeholders. We understand that some roads and bridges are maintained by local homeowners associations, so we will be sure to work with these groups in addition to municipal staff in our planning efforts. Our environmental assessment will also inform this decision. *NB: The main access road to the site has been selected since the open house. The access road is presented in the EA.
I have heard that uranium has been identified in the area of the Project. What is being done about this?	• Open House conversation	1. Discussion at open house with individuals 2. Email follow-up response to individuals 3. Study initiated to assess uranium presence	This concern will be fully evaluated prior to the start of any construction activities. As this is a new concern for this project, we will engage a third party to evaluate the risk associated with the uranium leaching. *NB: Immediately after the open house, research was conducted to understand the potential for a uranium deposit in the Project area. As well, industry experts were contacted to discuss this risk. It was ultimately understood that the risk is low given the shallow depth at which the turbine foundations will be built. To further clarify this position, a desktop study was initiated by a 3rd party. This information will be shared with the public at the next open house. .
Will construction or operation of this Project contaminate my well?	• Open House conversation	1. Discussion at open house with individuals 2. Email follow-up response to individuals	By siting the Project infrastructure over a kilometer from any residence, we have significantly reduced any risk of impact on nearby well water. Additionally, nearby hydrology and groundwater is assessed through the environmental assessment process with the province to ensure avoidance and/or mitigation of impacts. We also carry out geotechnical studies prior to construction activities, which would reveal any impacts to groundwater and allows time for mitigative measures to be applied.

Comment	Methods Used to Submit Comment	Methods Used Proposed to Address Comment	Summary of Response
Will we be able to see the Project from our communities nearby?	• Open House conversation	1. Discussion at open house with individuals	Due to the topography of the area it is actually less likely that the nearest residences will be able to see the Project since we have proposed the Project in an elevated area that has forested lands around it. On the other hand, because the Project is proposed on elevated land, the Project (or parts of it) will be visible from surrounding areas that are slightly further from the Project. The shadow flicker maps and photomontages were also presented to the individuals and discussed in detail.
How far will the turbines be from residences?	• Open House conversation • Group meeting conversation	1. Discussion at open house with individuals 2. Discussion in meeting with group 3. Frequently Asked Question posting on website	Natural Forces uses the industry standard of a minimum of 1 km setback from residences for any wind turbine locations. In this case, the turbines are setback more than a kilometer from nearby residences.
Can local companies take part in the Project?	• Open House conversation • Group meeting conversation	1. Discussion at open house with individuals 2. Discussion in meeting with group 3. Frequently Asked Question posting on website	For construction contracts, Natural Forces makes every effort to hire local contractors using our in-house construction management company Natural Forces Construction to ensure smaller companies are able to participate as subcontractors of the overall construction contract.

4.3.3 Meetings with Elected Officials and Special Interest Groups

Natural Forces has and will continue to engage elected officials and special interest groups to provide Project information. The Proponent believes these discussions help to formulate bonds with trusted community leaders and ensures they are aware of the Project details prior to hearing of the Project from their constituents and/or members. These conversations help to determine possible areas of concern in the communities allowing Natural Forces to address these potential issues in initial communications.

These meetings will continue to occur throughout the development, construction and operation of the Project. These key stakeholders and elected officials have and will be notified prior to any communication with the community to allow time for their questions to be answered in advance.

This category of consultation also includes all the relevant regulators. As such, the government engagement and consultation efforts for the Project are summarized in the sections below by jurisdiction.

4.3.3.1 Municipal Consultation

Natural Forces has had formal and informal meetings to discuss the proposed Project with West Hants Regional Municipality staff and Council. In May 2021, the Proponent met with city planners to establish a working relationship, and to begin discussions surrounding municipal permitting requirements. In

November 2021, the Proponent met with the planners again to give a presentation on the Project, and clarify further details regarding the municipal permitting process.

In January 2021, the Proponent engaged with the municipal Councillor that represents the area where the Project is located to introduce both Natural Forces and the Project. This was followed in June 2021 with a presentation at a municipal Council meeting. This presentation introduced the proposed Project and discussed benefits to the local area. The Proponent answered questions from Councillors as part of this.

The Proponent will continue to work with the municipality.

4.3.3.2 Provincial Consultation

The Proponent has met and discussed the Project with various provincial organizations. The Land Services Branch of the Department of Natural Resources and Renewables (formerly Lands and Forestry) has been engaged on the topic of the use of the Crown lands. The Office of L'nu Affairs has been engaged on the topic of Mi'kmaq engagement. The scoping of this EIA document was designed in consultation with the Department of Environment and Climate Change and the Wildlife Division of the Department of Natural Resources and Renewables. Consultation topics included:

- Submission process and timelines;
- Pre-registration consultation;
- Consultation and engagement efforts; and
- Scoping and guidance of wildlife surveys and studies to conduct as part of the Project EIA.

The Proponent commits to maintaining dialogue with provincial authorities when necessary throughout the duration of the Project.

Additionally, the Proponent met with the MLA for the area in January 2021 to introduce both Natural Forces and the Project, and to gather more information about the appropriate stakeholders with which to engage.

4.3.3.3 Federal Consultation

The Proponent has consulted federal government entities, or consulted guidance documents and databases, regarding the development and construction of the Project. The following federal government entities were contacted and consulted: the Canadian Wildlife Services branch of Environment and Climate Change Canada, the Canadian Coast Guard, Navigation Canada, Transport Canada, the Department of National Defense, and the Royal Canadian Mounted Canadian Police. Similar to their provincial counterparts, federal regulators have provided guidance in the preparation of this document, Project planning, and design.

The Proponent will continue to engage federal regulators when required throughout the development, construction, and operation of the Project.

4.3.4 Digital Communications

4.3.4.1 Project Website

Websites have proven to be an excellent way to make project information available for the general public to access and stay up to date on the progress of wind energy projects. The website has and will continue to be updated periodically in order to inform the general public, Rightsholders, and stakeholders about all aspects of the proposed development. Website content and updates will include some or all of the following items:

- Purpose of the project;
- Project details and progress;
- Contact information for Natural Forces;
- Notices for public information sessions;
- Photos of the Project location and turbine types;
- Progress reports on the EA;
- FAQ section that addressed concerns identified during consultation activities;
- Construction activity notifications;
- Online questionnaire and comment form; and
- Media and Press Release related material.

Additionally, the 'Frequently Asked Questions' section on the website allows Natural Forces to address questions and concerns brought forward through all engagement and consultation activities.

A webpage for the Project was created in the winter of 2021. This has ensured that up to date information has been available to community members should they wish to learn more about the Project. The Project webpage can be viewed at:

https://www.naturalforces.ca/benjamins-mills-wind-project.html.

This webpage is, and will continue to be, updated on an ongoing basis.

4.3.4.2 Email

Email will be used to contact stakeholders, answer questions sent via our contact page, plan informal engagement activities, and distribute newsletters and to send Project updates to our stakeholder list.

4.3.4.3 Social Media

Social media is used by the Proponent to post pertinent information to the Project, including construction updates and open house notifications on applicable group platforms. The Proponent can be found on Twitter at @naturalforcese1 and on LinkedIn at:

https://www.linkedin.com/company/natural-forces

In lieu of posting to the company Facebook page, the Proponent has identified popular community pages and creates content for individual community members to share.

4.3.5 Open Houses

Open houses are used to consult and engage with stakeholders and local community members in a relaxed and welcoming atmosphere. Natural Forces prefers a drop-in style open house to allow stakeholders to attend the meeting and receive answers to their questions when and for the duration of time that best suits their schedule. The Proponent also believes there are many other benefits to the one-on-one discussions such as:

- Having discussions about the Project specifics, the community, the region, other developments, etc.;
- Being able to discuss with the experts conducting the studies;
- Intimate conversation for those who may not be comfortable with public speaking; and,
- Forming relationships with the attendees and to exchange views.

Open houses have, among others, the following elements:

- A general sign-in, information sheet and COVID tracing system;
- Several information boards displaying the location of the proposed Project in relation to nearby communities, facts, and figures pertaining to the wind energy generation, and general public updates on the status and progress of development activities;
- Large-scale maps and renderings that illustrate the Project area; and
- Take home resources, including a summary of information presented at the open house and fact sheets on common topics.

4.3.5.1 First Open House

The Proponent held an open house in July 2021 at the South West Hants Fire Hall, which is an accessible site and is located close to the Project site. Local community members, special interest groups, and government officials were invited to come learn more about the Project and meet the Natural Forces team in person from 4 pm to 8 pm. Community members and stakeholders were invited via email, newspaper advertisement, and letters. Invitations to the open house were sent to 18 individuals who had requested to be on the stakeholder list, Municipal council and staff, 3 recreational special interest groups and their members, and, nearby homeowners associations and their members.

Approximately 30 people attended the first open house. The attendance at the open house was tracked using a sign-in sheet, which also doubled for COVID-19 contact tracing.

Attendees were given handouts containing the Project information that was presented on display boards at the open house. This included a preliminary Project layout, Project overview, Project timeline, frequently asked questions, a sound level study map, and contact information should stakeholders have any questions about the Project. In addition, attendees were given the opportunity to pose their questions and provide their feedback using post-it notes on a display board and by filling out a questionnaire. All of the questions that were asked at and after the open house were recorded and added to the frequently asked questions section of the Project website. Additionally, all attendees who asked for follow up information were contacted.

In addition to the questions, Project information presented at the open house can be viewed on the Project website for anyone who was not able to attend the open house in person. More information on the website is outlined above in **Section 4.3.4.**

The second open house for the Project is being planned for January 2022, which will provide the most up to date information on the Project.

4.3.6 Other Engagement Tools

There are many other engagement tools that the Proponent has used or is open to using should it be appropriate for the community. These are listed in the sections below.

These additional engagement tools should be used when a specific need or synergy exists.

4.3.6.1 Newsletters

The Proponent uses newsletters as a key engagement tool to update and inform the local community on recent Project activities. Circulating the newsletters with Natural Forces' primary contact information also provides community members the necessary information to contact the appropriate person should questions or concerns arise.

Newsletters are distributed via Canada Post and/or email directly to nearby residents, landowners, and individuals who have expressed interest in the Project. These newsletters introduce the Project with a brief description, identify the location of the proposed Project, provide information on the EIA progress, and include contact information with a statement encouraging the public to voice any concerns.

The Proponent distributed the first newsletter in December 2020 with preliminary information on the Project and Natural Forces, contact information for questions, a timeline, and the Project location. Another newsletter was sent out in November 2021 with updates on Project development. As the Project continues to progress, the Proponent will continue to use newsletters as a form of communicating with community members and key stakeholders.

4.3.6.2 Newspaper Advertisements

Advertisements in local newspapers were used to inform the local community of the open house event that was held in July 2021. This form of communication will continue to be used to inform local community members of upcoming events, as well as provide information on Project benefits and contact information for the Proponent.

4.3.6.3 Individual Dialogue

The Proponent encourages and welcomes individual dialogue with stakeholders throughout the development, construction, and operation of the Project. Individual dialogue can occur under many forms such as email correspondence, phone calls and in-person discussions. Individual discussions can be most effective at resolving concerns as they can easily facilitate mutual learning and an exchange of varying perspectives.

4.3.6.4 Signage

At the entry point(s) to the Project during construction and operation, the Proponent will have signage introducing the Project, listing the primary contact person, and identifying the presence of any hazards, such as ice throw during certain weather conditions. Natural Forces will use this as an opportunity to

provide additional information about the Project including facts about the construction schedule, electricity generation, and wind energy statistics. At a minimum, signage will include contact information for the Proponent.

4.3.6.5 Town Hall or World Café

If there is a desire in the community, the Proponent will participate in a town hall or world café style meetings.

Town hall style meetings are formal engagement activities that include a presentation from the Proponent followed by a question-and-answer period. The question-and-answer period usually involves an appointed moderator who directs questions from the audience to a panel made up of several members of the Project development team and/or consultants.

A World Café exercise is an engagement method that makes use of an informal café-style setting for participants to explore an issue by discussing it in small table groups. Discussion is held in multiple rounds of 20-30 minutes, with the cafe ambiance intended to allow for more relaxed and open conversations to take place.

4.3.6.6 Participation in Community Events

Proponent presence at local BBQs, sporting events, and other community gatherings can allow an opportunity for the Proponent to have informal discussions about the Project with local residents.

4.3.6.7 Group Presentations

Group presentations can be completed if interest arises. To date, the Proponent has held such presentations to a number of community groups interested in the Project.

4.3.6.8 Expert Visits

If a key area of concern is identified, an expert can be integrated into the community engagement process as opposed to working solely with the Proponent. Experts may attend an open house or community workshop as most appropriate to the level of interest and the issue of concern.

4.3.7 Issues Resolution

The Proponent has drafted a Complaint Resolution Plan as part of this EA registration document. This plan will cover what community members should do and whom to contact should there be negative impacts affecting the community members or the environment caused by the Project. The Complaint Resolution Plan is located in **Appendix B**.

5.0 Environmental Assessment Scope and Methodology

Environmental assessment (EA) is used as a planning tool in the initial stages of project conceptualization, planning, and design. Its intention is to identify or predict Project-related effects based on results of scientific assessment and/or traditional knowledge, and to determine standard and design mitigation strategies to avoid, reduce, or eliminate adverse environmental effects. The scope of the assessment and the methods used to prepare this EA Registration document, including the

characterization of the factors to be considered, and the details of the assessment of each valued component of the environment are provided below.

The Project, like any other development project, has the potential to interact with the environment in both positive and negative ways. The assessment of those potential interactions constitutes an Environmental Assessment. The assessment is completed in three steps;

1. Identification of the Valued Environmental Components (VECs) that the Project has the potential to interact with;
2. Identify the Phase of the Project during which the interaction is most likely to occur; and
3. Identify mitigation to reduce, or eliminate, those potential impacts.
4.

5.1 Selection of Valued Environmental Components

VECs are those components of the biophysical and socioeconomic environments that are of value or interest to regulatory agencies, the public, other stakeholders, and Indigenous peoples.

VCs are typically selected for assessment on the basis of: regulatory issues, scientific concern, legislation, guidelines, policies, and requirements; input arising from consultation with regulatory agencies, the public, stakeholder groups, and First Nations; field reconnaissance; and professional judgment.

The Proponent has identified physical, biophysical and socio-economic VECs that were subject to assessment based on knowledge and experience, Technical Review Committee (TRC) comments and a review of the regulatory requirements. The VECs are listed in **Table 6** and addressed throughout this report.

TABLE 6: IDENTIFIED VALUED ENVIRONMENTAL COMPONENTS

Physical VECs	Biophysical VECs	Socioeconomic VECs	Cultural and Heritage VECs
Atmospheric Environment (Weather Conditions, Climate and Climate Change, Ambient Air Quality, Ambient Sound Levels)	Terrestrial Environment (Vegetation, Wildlife, Wetlands)	Economy	Archaeological and Cultural Resources
Physical Environment (Geology; Surface Water, Groundwater)	Birds and Bird Habitat	Land Use and Value	Existing and Historic Land Uses
Visual Environment (Shadow Flicker, Visual Aesthetics)	Bats and Bat Habitat	Transportation	
	Aquatic Environment (Fish and Fish Habitat)	Recreation and Tourism	
	Species at Risk	Human Health	

5.2 Spatial and Temporal Boundaries

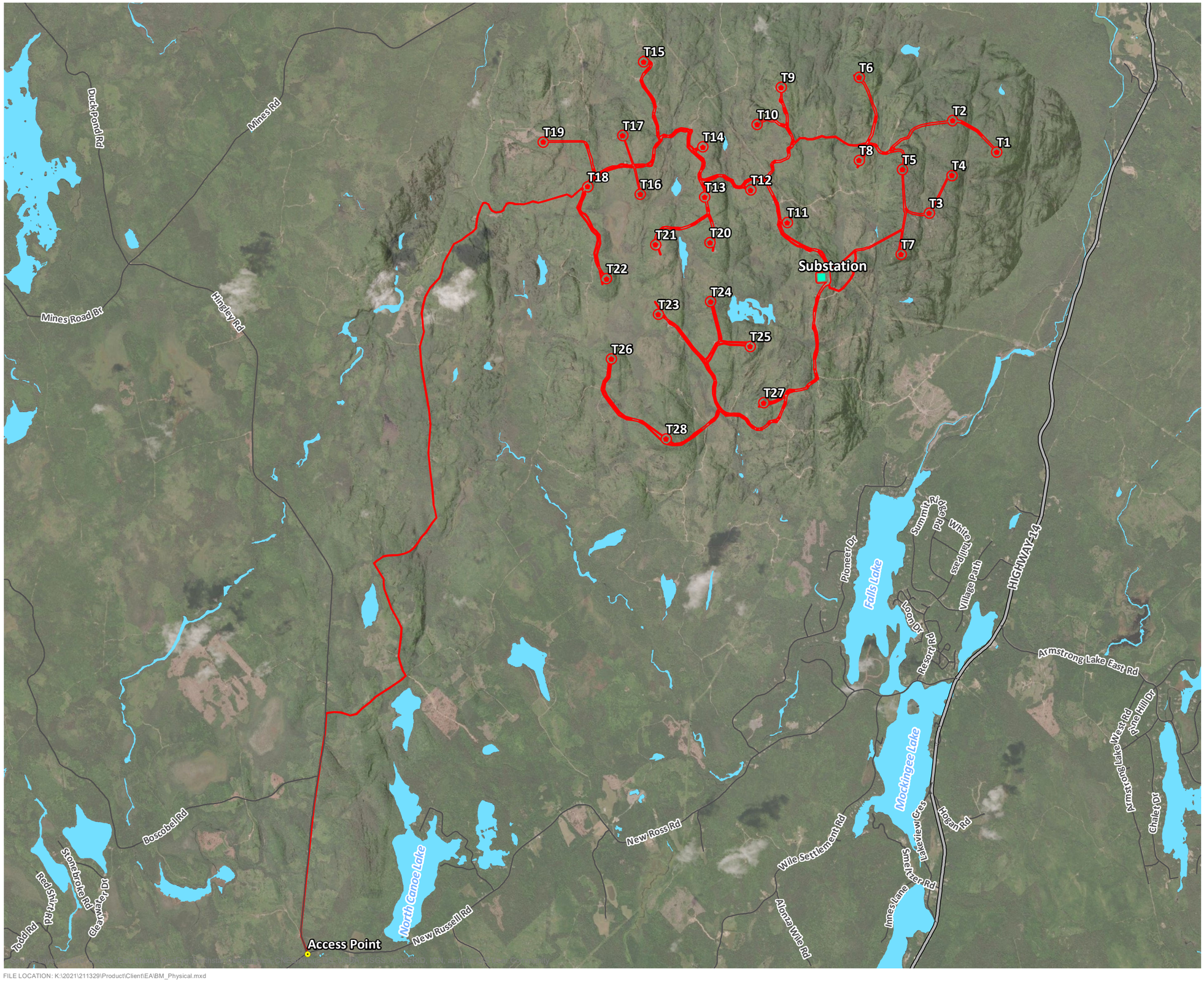
Spatial and temporal boundaries must be determined for each component in the assessment process to properly evaluate the Projects impacts on the VECs. Spatial boundaries are the physical bounds in which the physical Project and related activities are located, as well as zones affected by Project activities. Temporal boundaries are the time frame in which the activities will occur within the spatial boundary.

5.2.1 Spatial Boundaries

The spatial boundaries of the assessment are typically based on the natural system boundaries for biophysical VECs, or administrative/political boundaries for socioeconomic VECs. The assessment of potential environmental interactions with the VECs encompasses two spatial boundaries: the Project Development Area (PDA) and the relevant local assessment area (LAA).

The PDA is defined as the anticipated area of physical disturbance (or physical footprint) associated with the Project. As illustrated on **Figure 3**, the PDA is defined as 15 m on either side of roadways (either existing or new), collector lines and transmission line; 75 m around the base of each turbine locations; and 25 m around the substation. The PDA is the same for all VECs discussed within this EA Registration document.

The relevant LAA for each VEC is defined as the maximum area where Project-specific environmental interactions can be predicted and measured with a reasonable degree of accuracy and confidence (i.e., the “zone of influence” of the Project phases on each VEC). The LAA, which can vary by VEC, is summarized for each VEC in **Table 7**.



Natural Forces

BENJAMINS MILL WIND PROJECT

PROJECT DEVELOPMENT AREA

FIGURE 3

- Proposed Access Point
- Proposed Turbine Location
- Highway
- Public Road
- BM Substation
- Waterbody
- Project Development Area

0 0.25 0.5 1 km

SCALE 1:50,000

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY DILLON CONSULTING, GEONB, NATURAL FORCES

MAP CREATED BY: MEC
MAP CHECKED BY: KB
MAP PROJECTION: NAD 1983 UTM ZONE 20N

DILLON CONSULTING

PROJECT: 21-1329

STATUS: DRAFT

DATE: 2021-12-22

FILE LOCATION: K:\2021\211329\Product\Client\EA\BM_Physical.mxd

TABLE 7: LOCAL ASSESSMENT AREAS (LAA) FOR VALUED ENVIRONMENTAL COMPONENTS

VEC	Local Assessment Area (LAA)
Atmospheric Environment (Weather conditions, Climate and Climate Change, Ambient Air Quality, Ambient Sound Level)	A 2 km buffer around all Project components, including the PDA.
Physical Environment (Geology; Surface Water, Groundwater)	A 500 m buffer around all Project components, including the PDA.
Visual Environment (Shadow Flicker, Visual Aesthetics)	A 2 km buffer around all Project components, including the PDA.
Terrestrial Environment (Vegetation, Wildlife, Wetlands)	A buffer of 50 m along roads required to access turbine sites during construction and operation and along powerline corridors. A buffer of 150 m around turbine bases, substations and ancillary equipment.
Birds and Bird Habitat	A 500 m buffer around all Project components, including the PDA.
Bats and Bat Habitat	A 250 m buffer around all Project components, including the PDA.
Aquatic Environment (Fish and Fish Habitat)	A 100 m buffer upstream and downstream of all watercourse crossings, including the Project site.
Species at Risk and Species of Conservation Concern	A 10 km buffer around all Project components, including the PDA.
Socioeconomic Environment (Demography, Economy, Land Use and Value; Transportation, Recreation and Tourism, Human Health)	The PDA and the surrounding rural communities within the West Hants Regional Municipality.
Cultural and Heritage Environment (Archaeological and Cultural Resources, Existing and Historical Land Uses)	Archaeological and Cultural Resources screening includes the site property boundaries Existing and Historical Land Uses: A 5 km buffer around all Project components, including the PDA.

5.2.2 Temporal Boundaries

Temporal boundaries vary according to the different Project phases and potential effects. Typically, the Planning, Site Preparation and Construction phase is short-term (for example, effects related to the use of laydown areas for construction activities) due to the short duration of the activities. The temporal boundaries for the Project generally correspond to the timing duration of the Project phases and are outlined below in Table 8.

TABLE 8: TEMPORAL BOUNDARY FOR PROJECT PHASES

Phase	Temporal Boundary
Phase I - Planning, Site Preparation and Construction, Site Restoration	Q4 2022 – Q1-2024
Phase II – Operation and Maintenance	Q1 2024 – Operations end (estimated 25+ years after commissioning)
Phase III – Decommissioning, Infrastructure Removal and Site Reclamation	Estimated 25+ years after commissioning

5.3 Effects Assessment Methods

The assessment of potential environmental interactions with the Project involves identifying the potential for the Project to interact with the VECs outlined in the section above. As each phase of the Project involves different activities, and potentially different interactions with the VECs, the assessment was completed in consideration of each of the Project phases (Site Preparation and Construction; Operation and Maintenance; and Decommissioning) as well as for Accidents, Malfunctions, and Unplanned Events. The potential interactions between the Project and the VECs are presented in **Section 7.0**.

For each of the areas where a Project-VEC interaction has the potential to occur the following assessment methodology was followed:

Scope of VEC – This involves defining the VEC and a rationale for its selection, including a description of temporal and spatial boundaries.

Existing Conditions – This involves the establishment of current existing (baseline) environmental conditions for the VEC in the absence of the Project. Existing conditions were defined based on both desktop information sources as well as confirmatory field work in the Project site and LAA (where available).

Assessment of Project-VEC Interactions –This involves describing how a potential interaction could occur in the absence of mitigation; a discussion of the mitigation and environmental protection measures that are proposed to avoid, reduce, or eliminate adverse interactions between the Project and the VEC, and a characterization of the interactions and prediction of potential environmental effects that could occur as a result of the interactions.

All phases of the Project are assessed, as are accidents, malfunctions, and unplanned events. The evaluation also considers the effects of the environment on the Project. A summary of the assessment for each VEC is provided, leading to an overall conclusion in respect of the interactions and associated effects of the Project on the VEC. The summary also outlines the planned follow-up confirmatory field studies that are recommended for each VEC in order to confirm the predicted environmental effects.

5.4 Project Risk Categories

In order to qualify the potential risk to biophysical VECs (i.e., wild species and/or their habitat), wind power projects are assigned to one of four project risk categories described in the publication Guide to Preparing an EA Registration Document for Wind Power Projects in Nova Scotia (NS Environmental Assessment Branch 2021). The project risk category is determined by a combination of site sensitivity, project size, and turbine height. With this qualification, the Project can be planned and monitored such that impacts resulting from construction or operation can be minimized and/or mitigated.

The above publication categorizes projects within one of four Levels of Concern based on the facility size and site sensitivity. The Project size has been categorized as being medium in size (11-40 turbines); however, the PDA was assessed as very high Environmental Sensitivity due to the presence of species at risk and a known bat hibernacula within a 25 km radius. Therefore, the Project merits a ranking of a Category 4, defined as follows:

> "Projects in this category present the highest level of potential risk to wildlife, and/or their habitat(s) and require the highest level of effort for environmental assessment. Comprehensive baseline surveys are required for category 4 projects. These surveys must be completed over the course of one calendar year. The Proponent must apply standards and protocols for bird monitoring specified for "Category 4" projects as defined by Environment and Climate Change Canada and the Canadian Wildlife Service. Long-term monitoring extended over five years or more, for example, may in some cases be required to document potential negative effects of functional habitat loss."

6.0 Valued Environmental Components (VECs)

6.1 Physical VECs

6.1.1 Atmospheric Environment

6.1.1.1 Weather Conditions

The Project is located within the South Mountain Ecodistrict of Nova Scotia's Western Ecoregion of the Acadian Ecozone (Webb and Marshall 1999). The Western Ecoregion is characterized by mild winters and warm summers, with total precipitation between 1300-1500 mm per year (NSDLF 2019). The ecodistrict has a mean annual temperature of 6.5°C, a mean summer temperature of 17.2°C and a mean winter temperature of -4.3°C. The ecodistrict accumulates about 1350 mm of precipitation annually, with 480 mm between May and September. During the summer, the ecodistrict experiences a significant moisture deficit of about 56 mm of precipitation. The ecodistrict has an average growing season of 203 days, receiving 1663 annual growing degree-days (5° C basis) (Webb and Marshall 1999).

The Nova Scotia wind atlas was used in the site finding stage and indicates the approximate wind speed at the PDA is between 6.5-7.0 m/s at a height of 80 m, with the predominant wind direction from the west. A site-specific wind monitoring campaign is underway and confirms the westerly wind direction, as shown in the site wind rose in **Figure 4**.

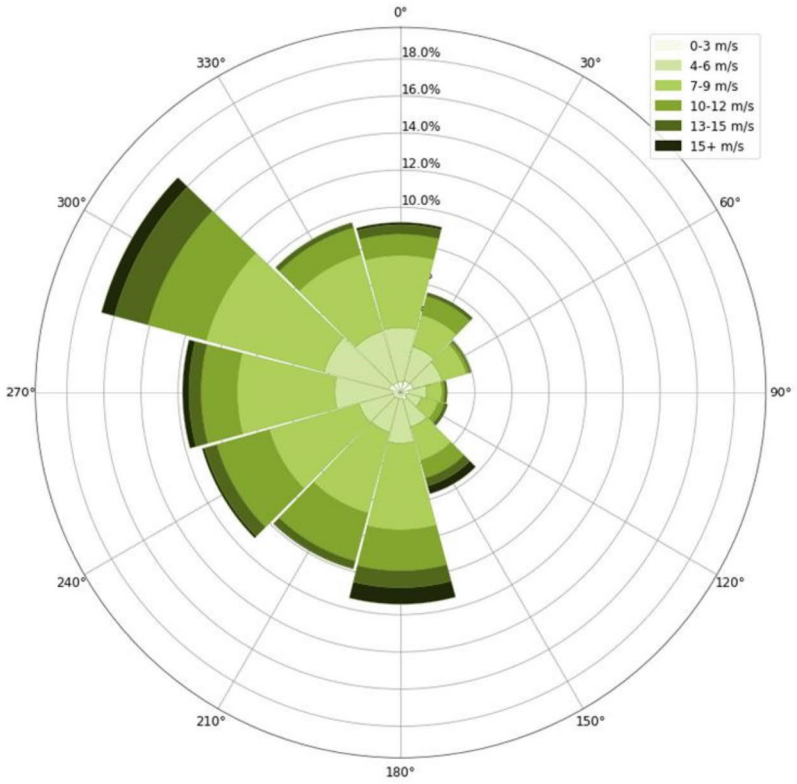


FIGURE 4: WIND ROSE GENERATED FROM WIND DATA COLLECTED ON THE PROJECT SITE.

6.1.1.2 Climate and Climate Change

Current climate conditions are generally described by the most recent 30-year period for which Environment and Climate Change Canada (ECCC) has developed statistical summaries referred to as climate normals. The closest weather station to the Project with available historical data is the Windsor Martock weather station, located approximately 4.5 km from the Project. The Windsor Martock weather station provides historical data for temperature and precipitation, amongst a limited number of other variables, but does not provide historical data for wind. Canadian Climate Normals for 1981-2010 that are representative for the BMWP site are not available from ECCC. The nearest available wind data is from the Kentville CDA weather station, located over 20 km northwest of the BMWP site. The elevation of the BMWP site and distance inland from the Bay of Fundy are very different from the location of the Kentville CDA weather station and wind conditions are likely to reflect this. A 60 m meteorological tower is located at the BMWP and has been monitoring the weather conditions since September 2020.

Canadian Climate Normals from 1981 to 2010 reported from the Windsor-Martock weather station, including yearly averages, maximum extremes for precipitation and temperature are presented in **Table 9**. Based on precipitation data from the Windsor Martock weather station, from 1981 to 2010, annual daily average temperature was 7.4°C and ranged between -5.5°C in January and 19.9°C in July (ECCC 2021). The extreme maximum temperature was 36.5°C recorded on August 10, 2001 and the extreme minimum temperature was -32.5°C recorded February 7, 1993 (ECCC 2021). Precipitation amounts, on average, were highest between November and January. Extreme daily precipitation in the past century ranged from 55.4 mm (May 2001) to 94.2 mm (September 2002) (ECCC 2021).

TABLE 9: 1981 TO 2010 CANADIAN CLIMATE NORMALS – WINDSOR MARTOCK STATION DATA (ECCC 2021)

Parameter	Monthly Range	Annual Average	Extreme Daily Maximum	Extreme Daily Minimum
Daily Average Temperature (°C)	-5.5 - 19.9	7.4	36.5	-32.5
Total Precipitation (mm)	76.3-147.1	1309.6	94.2	0

6.1.1.3 Ambient Air Quality

Nova Scotia Environment monitors the outdoor air quality at six sites across the province (NSE 2010). The Air Quality Health Index (AQHI) is based on the measurement of three key air pollutants: ground-level ozone, nitrogen dioxide, and particulate matter. The associated health risk is represented by the AQHI scale, which ranges from 1 to 10+. AQHI index values are also grouped into health risk categories, ranging from Low (AQHI 1-3) to Very High (AQHI 10+).

The closest Air Quality Health Index monitoring sites are located in Kentville, Nova Scotia and Greenwood, Nova Scotia. The Kentville station is approximately 25 km to the Northwest and the Greenwood Station is approximately 50 km to the West of the BMWP site. The AQHI is generally rated low at both locations (ECCC 2021). Both of these monitoring sites are located in developed municipalities, with Greenwood hosting an active air force base. The Project site, in comparison, is undeveloped with occasional forestry activity, and is therefore anticipated to have an even lower AQHI rating.

6.1.1.4 Ambient Sound Levels

The proposed BMWP is located in a rural area with an active forestry industry and recreational use. Due to the site elevation, wind resource, industrial activity and recreational uses, ambient noise levels in the area may be elevated. As the site was chosen for its excellent wind resources, particularly windy days can greatly increase existing ambient sound levels.

The Proponent has undertaken a sound level impact assessment study to assess the impact of the sound emissions on the dwellings, seasonal residences, and local businesses surrounding the Project during both construction and operation. The study, which is presented in **Appendix C,** concluded that, while heightened sound levels during construction activities are unavoidable, the sound level assessment for the construction period shows that sounds levels at nearby residences are not expected to be significant. The operational sound level modelling for the Project demonstrates that the sound levels expected to be experienced at local receptors under worst case conditions adhere to the Nova Scotia guidance.

6.1.2 Physical Environment

6.1.2.1 Geology

The surficial geology in the South Mountain ecodistrict is dominated by a thin stony till cover with bedrock very close and often exposed at the surface (Nova Scotia DNR 2015). Almost the entire

ecodistrict is characterized by Gibraltar/Bayswater soils which are derived from the parent material and are typically shallow and acidic. These soils are often well-drained, coarse sandy loams. Surface stoniness in these soils is usually high and sometimes excessive. The landscape is often dotted with large, granite boulders which can restrict forest operations and travel. The surficial geology of the PDA is primarily made up of fragmented rock consisting of angular blocks and finer interstitial debris; overlain by thin, discontinuous veneer of till generally 1-4 meters thick (Stea, et al., 1992)

There is a potential for existing soil contamination to be present within the Project area. As a result of industrial forestry operations carried out in the past, historical spills, leaks, and releases from forestry machinery may have occurred on the Project area. These contaminants, if present, may pose hazardous risks or cause adverse effects to the nearby environment. All suspected contaminated soils will be reported, investigated and properly cleaned up.

The bedrock geology of the South Mountain Ecodistrict is a fairly homogenous land mass underlain by Devoian granite (the South Mountain Batholith). The bedrock geology of the PDA is composed of the mid to late Devonian granodiorite and monzogranite and is part of the Liscomb Complex (Keppie, 2000). A few small outliers of carboniferous rocks from the Windsor Group (Early Carboniferous, 340 to 330 Ma) and a few small sections of Meguma Group (Cambrian to Ordovician in age, 540 to 480 Ma) occur along the margins of the ecodistrict (Nova Scotia DNR 2015). The local geology is presented on **Figure 5**.

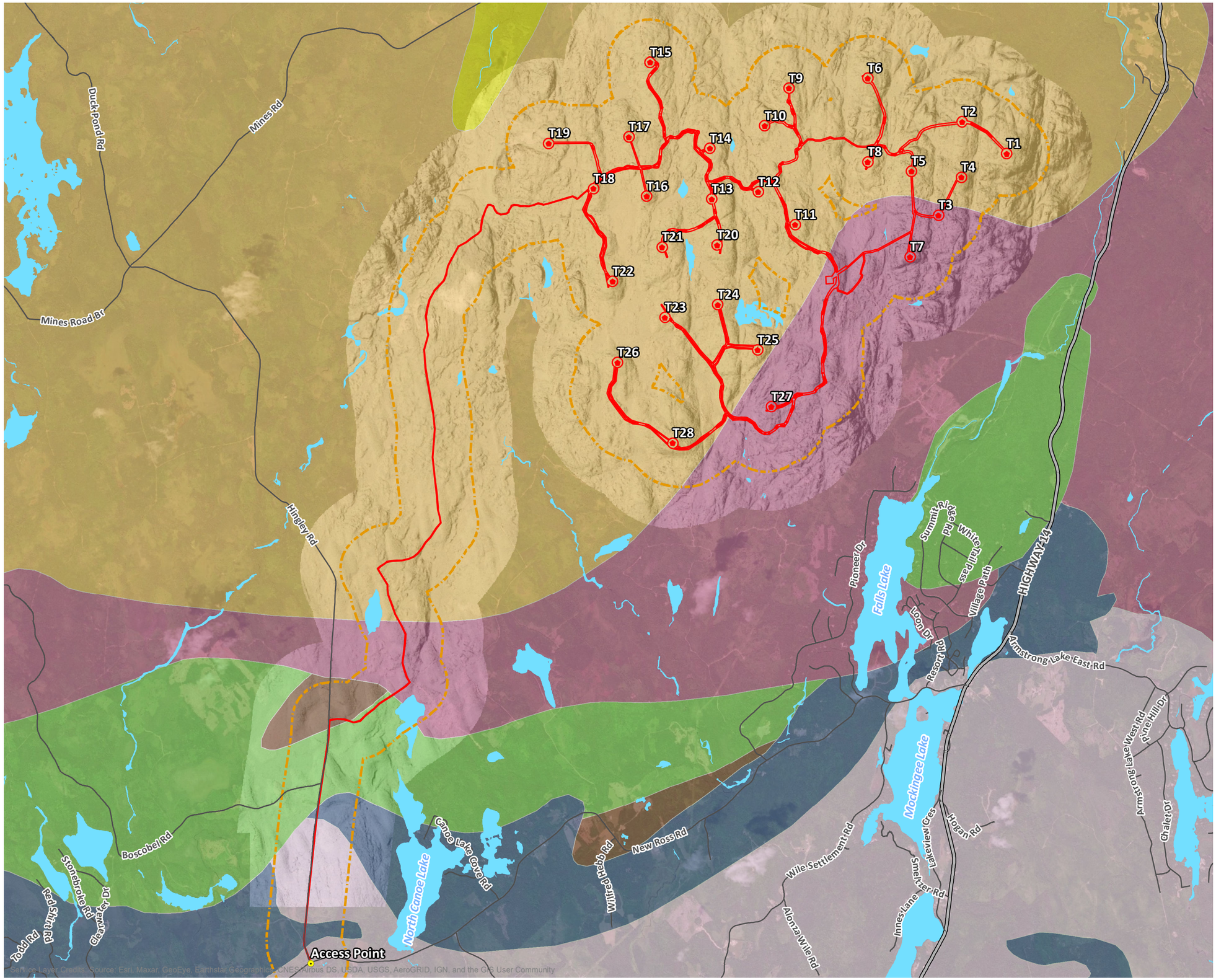
Based on the Nova Scotia Department of Lands and Forestry Geoscience and Mines Bedrock Geology Map of the central Annapolis Valley area (OFM ME), the bedrock underlying the Project areas consists of Middle - Late Devonian biotite monzogranite (LDS) and Middle – Late Devonian fine grained granodiorite (LDfm) (WHPDD 2018). It is recognized that there is potential for uranium to be present in the geological units underlying the Project area.

6.1.2.2 Surface Water

Surface water flow across the site is expected to be guided by topography. The general topography in the South Mountain ecodistrict (720) is characterized by low, rounded hills or slight ridges, along with broad, shallow depressions (NSDLF 2019). Some of the highest elevations within western Nova Scotia occur in the South Mountain ecodistrict, including within the Project area. The elevation of the site ranges from 90 m above sea level at the north of the site in the vicinity of the Southwest Branch of the Avon River to maximum peaks approximately 260 m above sea level.

The ecodistrict also includes the headwaters of some of the province's longest rivers, including the Avon, Gaspereau, and Gold Rivers (Nova Scotia DNR 2015). The Project site is located within the Avon River secondary watershed (1DE-2, NSE 2011) and contains several rivers, tributaries and lakes. The Avon River secondary watershed includes three main river branches (South, West, and Southwest). Mapped rivers and tributaries that fall within the area of the proposed Project include the Mint River, Levy Meadow Brook, and Five Island Brook. Lakes in the vicinity of the Project Area include Five Island Lake, Bennett Lake, Duck Ponds, Pine Lake, and Splash Dam Lake. Mapped water features within the Project Area are shown on **Figure 6.**

The proposed Project is situated within the Avon River Secondary Watershed, which encompasses a drainage area of 460 square kilometres, and empties into the Minas Basin in the inner Bay of Fundy



Natural Forces

BENJAMINS MILL WIND PROJECT

BEDROCK GEOLOGY

FIGURE 5

- Access Point
- Turbine
- Highway
- Road
- Waterbody
- Project Development Area
- Local Assessment Area

Bedrock Geology

- Goldenville Formation
- Halifax Formation
- Horton Bluff Formation
- Middle - Late Devonian biotite monzogranite
- Middle - Late Devonian fine grained leucomonzogranite
- Middle - Late Devonian granodiorite
- Middle - Late Devonian leucomonzogranite

0 0.25 0.5 1 km

SCALE 1:50,000

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BENJAMINS MILL WIND PROJECT

AQUATIC LOCAL ASSESSMENT AREA

FIGURE 6

- Proposed Access Point
- Proposed Turbine Location
- Watercourse (Nova Scotia Hydrographic Network)
- Waterbody
- Wetland (Nova Scotia Hydrographic Network)
- Project Development Area
- Local Assessment Area for the Aquatic Environment
- Field Delineated Watercourse
- Watershed Boundary

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(Isaacman 2005). The St. Croix River joins the Avon River just below Windsor, creating a total watershed of 1,306 square kilometres. The northerly flowing Avon River (approximately 64 km in length) headwaters in Card and Bag Lakes on the South Mountain, southwest of the town of Windsor. At Windsor Forks, the main tributary, the West Branch of the Avon River, adds its flow, along with the Southwest Branch of the Avon River, to the Avon. Levy Meadow Brook and Five Island Brook also flow across the proposed Project area, flowing south into Falls Lake.

An assessment of potential watercourse crossings within the proposed project footprint was conducted during the 2021 environmental assessment surveys. The assessment included both desktop and field assessments for the purpose of identifying watercourses and assessing the watercourses potential to support fish habitat. Details of the assessment are provided in **Appendix K**.

The PDA intersects 23 watercourses, of these, 19 potentially support fish habitat based on a preliminary assessment; presence/absence fish surveys could be completed to confirm if fish are present, where necessary. The remaining watercourses are relatively small, generally ephemeral to seasonally flowing and have been ruled out as being fish habitat because they are not connected to a fish-bearing waterbody or have a pH too low to support fish (i.e., < 4). The majority of the assessed watercourses appear run north/south with the exception of watercourses on the eastern side of the site that run east/west. There are no known springs on the site. Details of the assessment of the watercourses to support fish or fish habitat are provided in **Section 6.2.4**. Details of the wetland assessment are provided in **Section 6.2.1.3**.

6.1.2.3 Groundwater

Approximately 34% of municipal water supplies in Nova Scotia obtain their water from groundwater sources and 12% use a combination of groundwater and surface water (NSE 2017). Wells in Nova Scotia are either shallower dug wells sourcing the overburden aquifers, or deeper drilled wells sourcing the bedrock aquifers. The most common water supply for homes not served by a public system is a drilled well. The Nova Scotia Department of Environment and Climate Change has developed several initiatives to protect the quality of groundwater by minimizing the potential for contamination from human activities. The department works with municipalities and stakeholders to develop source water protection plans and to delineate Protected Water Areas and Wellhead Protection Areas (WHPA) in Nova Scotia. In Nova Scotia, a minimum of three WHPA zones are recommended. Protection applied to the various zones of a designated wellhead are not particularly onerous for residential zoned properties; however, they are fairly restrictive for other uses.

The PDA is not located in a Wellhead Protection Area or a designated Protected Water Area under the *Nova Scotia Environment Act*. The nearest protected water areas to the PDA are the Falmouth Municipal Water Supply located to the north and Mill Lakes Watershed is located to the north east. There are no known potable wells located within the PDA, based on well records, accessible through the Nova Scotia Groundwater Atlas (GNS 2020), the closest potable well to the PDA is located in Mill Section, approximately 1.6 km north-east from the closest Proposed WTG.

Localized groundwater in the vicinity of the PDA will flow towards nearby tributaries and lakes. Regional groundwater flow is north toward the Minas Basin/Bay of Fundy, however as the PDA extends to the south there may also be regional flow to the south towards the Atlantic Ocean.

A desktop review of the New Scotia Groundwater Atlas (GNS 2020) was completed by Dillon Consulting (2022). It should be noted that the information provided within the Nova Scotia Groundwater Atlas is not guaranteed for accuracy. There are a number of domestic water wells located within the Falls Lake area to the Southwest of the PDA. The wells range from 15.2 to 152.3 meters deep and have between 6.1 and 12.2 meters of casing. Bedrock in the Falls Lake area was encountered between ground surface and 9.7 meters below ground surface (mbgs) (GNS 2020). Domestic Water wells are also located in the area of North Canoe Lake which is in the vicinity of the access point to the PDA. The wells range from 23.8 to 97.4 meters deep and have between 4.8 and 12.2 meters of casing. Bedrock in the area of North Canoe Lake was encountered between ground surface and 4.8 mbgs (GNS 2020).

A groundwater chemistry sample was collected from a groundwater well on October 18, 1965 within the vicinity of the PDA, however no information was provided on the well, sample methodology or depth the sample was collected.

6.1.3 Visual Environment

The existing landscape surrounding the PDA consists of a combination of rolling hills, forested areas in various stages of regeneration due to harvesting activities, lakes, and open fields. There are also some small residential neighbourhoods located at least 1.6 km from the nearest proposed WTG. The immediate Project site is located on an elevated area that is fairly remote. The land has largely been forested and therefore has a network of existing forestry access roads throughout and impacted vegetation. A small portion of the Project site is a forested area not impacted by forestry activity. The details of a visual assessment are presented in **Appendix D**.

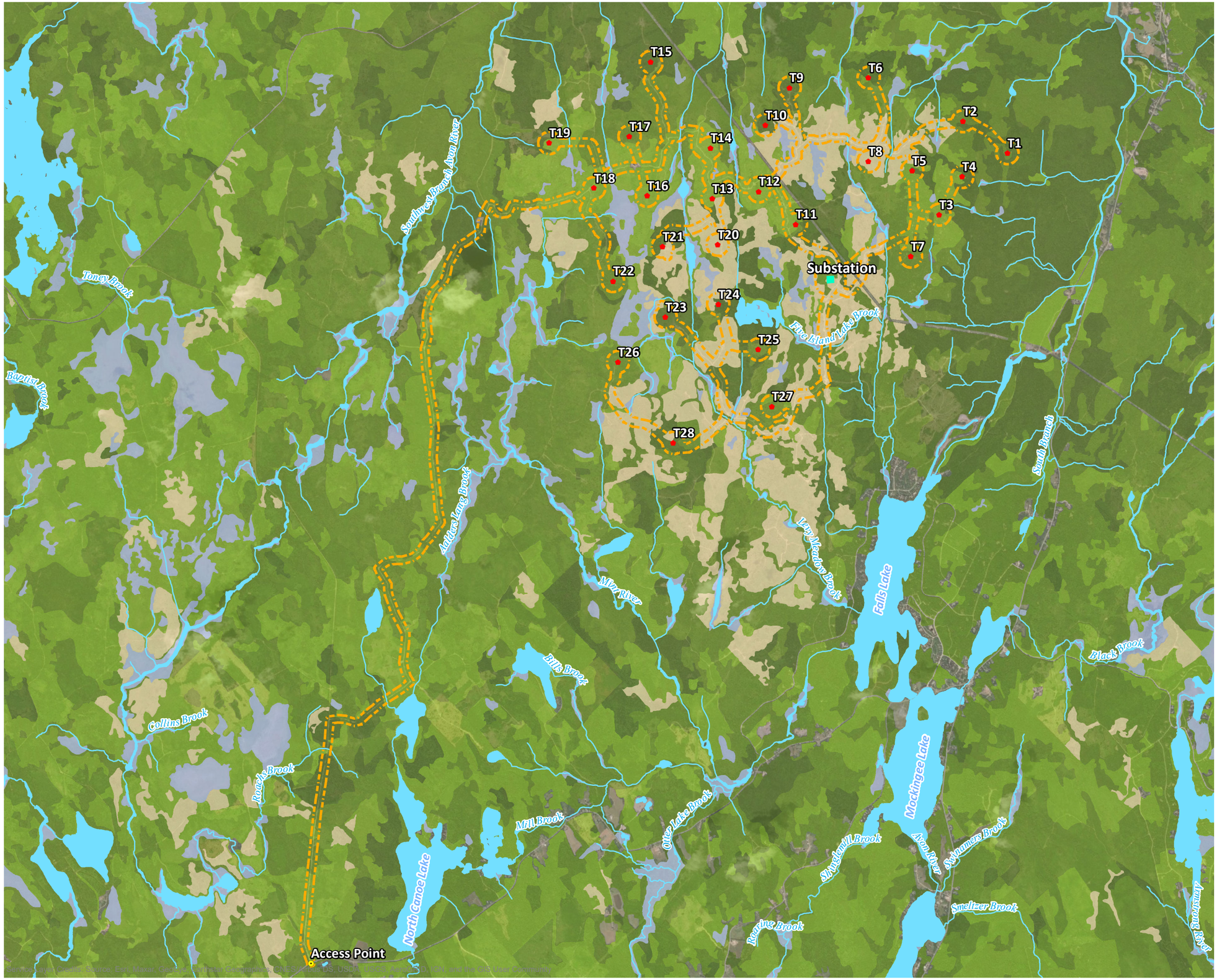
6.2 Biophysical VECs

6.2.1 Terrestrial Environment

The terrestrial environment considers the vegetation, wildlife and wetlands within the assessed area. For all VECs of the terrestrial environment, as part of this EA, the assessed area included 50 m on either side of roads required to access turbine sites during construction and operation and along powerline easements; as well as 150 m around turbine bases, substations and ancillary equipment. Vegetation, wildlife and wetlands were selected as terrestrial environment VECs because they are valued in their relationship with species at risk, migratory birds and bats and other biological and physical components addressed as VECs in this environmental assessment (EA) Registration.

The assessed area primarily consists of forested lands which were previously disturbed through forestry activities. A description of the existing terrestrial environment is based on data and observations obtained through desktop and biological field surveys. Details of the baseline assessments for vegetation (including lichens), wildlife and wetlands are discussed in the sections below.

Most of the terrestrial habitat identified in the assessed area consisted of the following habitat types: hardwood-dominant forests, conifer-dominant forests, mixed-wood forests, previously cut disturbed areas, bogs and fens, and swamps and marshes. The major habitat types were identified based on the results of the desktop and field surveys. These habitats are described in relation to the VECs in the sections and the shown on **Figure 7**.



BENJAMINS MILL WIND PROJECT

HABITATS WITHIN THE TERRESTRIAL LOCAL ASSESSMENT AREA

FIGURE 7

- Proposed Access Point
- Proposed Turbine Location
- Substation
- Watercourse
- Waterbody
- Local Assessment Area

Habitat

- Conifer - Dominant Forest
- Mixed - Wood Forest
- Hardwood - Dominant Forest
- Recently Cut Area
- Wetland

0 0.25 0.5 1 km

SCALE 1:50,000

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6.2.1.1 Vegetation

This VEC covers the vegetation component of terrestrial habitats and includes plant species and lichens within habitats associated with the assessed area, shown on **Figure 8.** A high level desktop assessment was completed to identify environmental constraints prior to the field surveys for plants and lichens during the 2021 growing season. Surveys of areas were completed during the 2021 growing season by experienced botanists with experience in lichen identification. Details of the assessment methodology and findings are presented in **Appendix E**.

Concurrently, a list of culturally important vegetation for the Mi'kmaq Nation in Nova Scotia was prepared by a Terrestrial Biologist from Maqamigew Anqotumeg. The list was established following a desktop analysis of the site and includes vegetation that are culturally significant to the Mi'kmaq Nation in Nova Scotia for herbal medicine and foraging and are believed to likely be present within the Site Plans of the Project. The plants identified during the 2021 vegetation surveys were cross referenced with the list of culturally important vegetation. The list of culturally significant plants with the potential to occur in the area is included in **Appendix E**. A list of the flora deemed to be of cultural significance to the Mi'kmaq Nation that was identified across the Project site is presented in **Table 10**.

TABLE 10: CULTURALLY SIGNIFICANT FLORA TO THE MI'KMAQ NATION OBSERVED AT THE BENJAMIN MILLS WIND PROJECT SITE.

Plant Name	Mi'kmaq Name	Habitat at BMWP Site
Alleghaney blackberry (Rubus allegheniensis)	Ajioqjimanaqsi (blackberry)	• Clear cut or previously cut-over areas
American beech (Fagus grandifolia)	Suomusi	• Hardwood-dominant forest • Mixed-wood forest • Swamps and marshes
American mountain ash (Sorbus americana)	Epsimusi	• Clear cut or previously cut-over areas • Conifer-dominant forest • Mixed-wood forest
Beaked hazlenut (Corylus cornuta)	Mlipkanjmusi	• Mixed-wood forest
Common plantain (Plantago major)	Wijikanipkl	• Clear cut or previously cut-over areas
Common yarrow (Achillea millefolium)	N/A	• Clear cut or previously cut-over areas
Creeping snowberry (Gaultheria hispidula)	Kna'ji'j	• Clear cut or previously cut-over areas • Conifer-dominant forest • Mixed-wood forest • Bogs and fens • Swamps and marshes
Dwarf red raspberry (Rubus pubescens)	Katomin	• Hardwood-dominant forest
Eastern white pine (Pinus strobus)	Kuow	• Clear cut or previously cut-over areas • Hardwood-dominant forest • Mixed-wood forest

Plant Name	**Mi'kmaq Name**	**Habitat at BMWP Site**
		• Swamps and marshes
Goldthread (Coptis trifolia)	Wisawkweskl	• Mixed-wood forest • Swamps and marshes
Harlequin blue flag (Iris versicolor)	N/A	• Clear cut or previously cut-over areas
Late lowbush blueberry (Vaccinium angustifolium)	Pkwiman (blueberry)	• Clear cut or previously cut-over areas • Conifer-dominant forest
Northern wild raisin (Viburnum nudum)	Skinaqanmusi	• Clear cut or previously cut-over areas • Mixed-wood forest • Swamps and marshes
Partridge berry (Mitchella repens)	Ka'qaujumnaqsi	• Hardwood-dominant forest • Mixed-wood forest • Swamps and marshes
Pearly everlasting (Anaphalis margaritacea)	Wapwasuek	• Clear cut or previously cut-over areas
Pin cherry (Prunus pensylvanica)	Maskwe'simanaqsi	• Clear cut or previously cut-over areas • Hardwood-dominant forest • Conifer-dominant forest
Red elderberry (Sambucus racemosa)	Pukulu'skwimanaqsi (elderberry)	• Hardwood-dominant forest
Red raspberry (Rubus idaeus)	Klitaw	• Clear cut or previously cut-over areas • Hardwood-dominant forest • Swamps and marshes
Red spruce (Picea rubens)	Mekwe'k kawatkw	• Clear cut or previously cut-over areas • Hardwood-dominant forest • Mixed-wood forest
Sheep laurel (Kalmia angustifolia)	N/A	• Clear cut or previously cut-over areas • Conifer-dominant forest • Mixed-wood forest • Bogs and fens • Swamps and marshes
Striped maple (Acer pensylvanicum)	Wapoq	• Hardwood-dominant forest • Mixed-wood forest
Sugar maple (Acer saccharum)	Snaweyey	• Hardwood-dominant forest • Mixed-wood forest
Sweet-fern (Comptonia peregrina)	N/A	• Clear cut or previously cut-over areas
Velvet-leaved blueberry (Vaccinium myrtilloides)	Pkwiman (blueberry)	• Clear cut or previously cut-over areas • Conifer-dominant forest • Mixed-wood forest • Swamps and marshes
Wild sarsaparilla	Wopapa'kjukal	• Hardwood-dominant forest

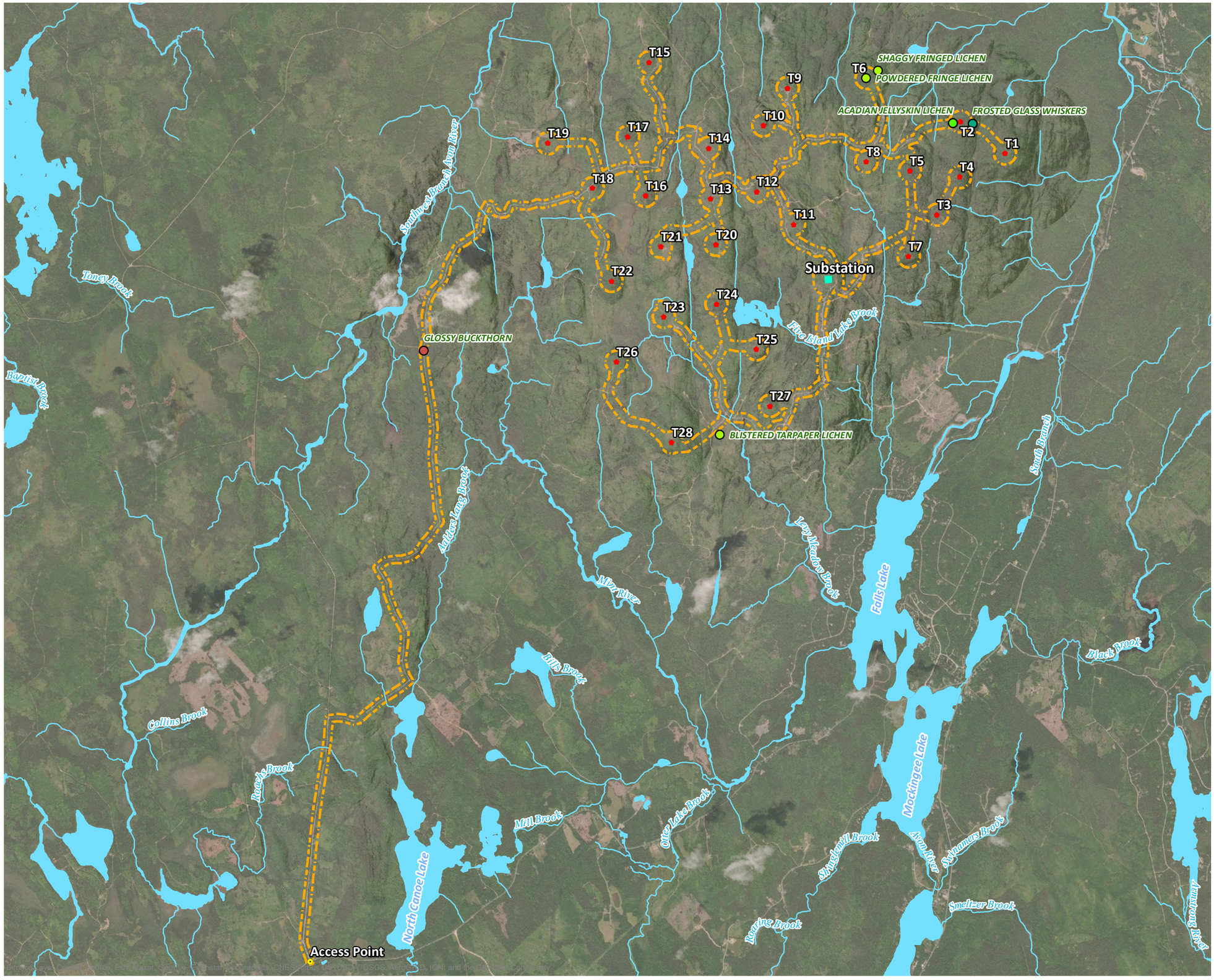
Plant Name	Mi'kmaq Name	Habitat at BMWP Site
(Aralia nudicaulis)		• Conifer-dominant forest • Mixed-wood forest • Swamps and marshes
Wild strawberry (Fragaria virginiana)	Atuomkominaqsi	• Clear cut or previously cut-over areas
Yellow birch (Betula alleghaniensis)	Nimnoqn	• Clear cut or previously cut-over areas • Hardwood-dominant forest • Mixed-wood forest

The regional vegetation of the South Mountain Ecodistrict is generally dominated by Acadian forest tree species. Locally, the site consists of two ecoelements; the Spruce Hemlock Pine Hummocks and Hills ecoelement, and the Red and Black Spruce Hummocks ecoelement (NSDLF 2019). The majority of the site is covered by Spruce Hemlock Pine Hummocks and Hills ecoelement, which consists of well drained coarse grained soils. This ecoelement is dominated by red spruce, eastern hemlock and white pine in areas with slightly moist soils; and by white pine, red oak and red pine on the drier hilltops. The remaining portions of the site, which tends to be wetter and consist of imperfectly drained course-grained soils (NSDLF 2019), are characterized by the Red and Black Spruce Hummocks ecoelement. This ecoelement includes late successional shade-tolerant softwoods, such as red spruce and eastern hemlock, along with white pine (NSDFL 2019).

The general vegetation within each habitat type is described as follows:

Hardwood-dominant Forests

Hardwood forests are characterized by temperate trees and understory flora and require rich and well drained soils (NSDFL 2021). This habitat type was the least-common encountered and was generally limited to the Crown Land Property which has not been forested as much as the privately-owned resource land parcels. The hardwood forest habitat encountered during the 2021 vegetation surveys was dominated by red maple and included a diverse understory of mostly herbaceous plants. No vegetation SAR or SoCC were identified within the hardwood-dominant forests. Several culturally significant plants were identified within the hardwood forest habitat including: American beech (Suomusi), dwarf red raspberry (Katomin), eastern white pine (Kuow), partridge berry (Ka'qaujumnaqsi), pin cherry (Maskwe'simanaqsi), elderberry (Pukulu'skwimanaqsi), red raspberry (Klitaw), red spruce (Mekwe'k kawatkw), striped maple (Wapoq), sugar maple (Snaweyey), wild sarsaparilla (Wopapa'kjukal), and yellow birch (Nimnoqn).



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Natural Forces

BENJAMINS MILL WIND PROJECT

VEGETATION WITHIN THE TERRESTRIAL LOCAL ASSESSMENT AREA

FIGURE 8

- Proposed Access Point
- Proposed Turbine Location
- Substation
- Watercourse
- Waterbody
- Local Assessment Area

Plant Observation

- Invasive Species
- Species at Risk
- Species of Conservation Concern

0 0.25 0.5 1 km

SCALE 1:50,000

N W E S

MAP DRAWING INFORMATION:
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Dominant vegetation within the hardwood forest habitats of the terrestrial LAA included:

- A diverse herbaceous understory with ferns, flowering plants (e.g., asters, lilies, trillium) sedges and berries; and,
- Hardwood trees such as maples (i.e., red, striped, sugar and mountain), American beech, white ash, and paper and yellow birch.

Conifer-dominant Forests

Conifer-dominant forests are common in areas previously disturbed by fire or windthrow (NSDFL, 2021), or, in the case of this site, forestry activities. A typical spruce and pine forest in Nova Scotia consists of an overstory of black spruce and pines (white, red, jack), a shrub layer dominated by ericaceous species (i.e., lambkill, blueberry and huckleberry), along with black spruce regeneration, and a herb cover may be present but is dependent on the amount of light reaching the ground (NSDFL, 2021). No vegetation

SAR or SoCC were identified with the conifer-dominate forests during the 2021 vegetation surveys at the BMWP site. Several culturally significant plants identified within the hardwood forest habitat included: American mountain ash (Epsimusi), creeping snowberry (Kna'ji'j), blueberry (Pkwiman), pin cherry (Maskwe'simanaqsi), wild sarsaparilla (Wopapa'kjukal), and sheep laurel (no associated Mi'kmaq name provided).

Dominant vegetation observed within conifer-dominate forests included the following:

- Conifer trees (e.g., black spruce and Balsam fir.
- Woody shrubs (e.g., blueberry, smooth service berry, rhodora and juniper); and,
- Depending on the presence of open spaces, some locations had an understory of fern, grasses and asters, and other hardy flowering plants (i.e., northern starflower, painted trillium, wild sarsaparilla).

Mixed-wood Forests

Mixed wood forests are tree dominated landscapes that contain both coniferous and deciduous trees (NSDLF 2021). Several lichen SAR/SoCC were identified on hardwood trees within the mixed-wood forests during the 2021 vegetation and lichen surveys at the BMWP site. A complete list of vegetation and lichens, along with their conservation status (as of December 2021) is included in **Appendix E**. A list of the SAR and SoCC lichen species are detailed below in **Section 6.2.3.** Several culturally significant plants identified within the mixed-wood forest habitat included : American beech (Suomusi), American mountain ash (Epsimusi), beaked hazlenut, (Mlipkanjmusi), creeping snowberry (Kna'ji'j), eastern white pine (Kuow), goldthread (Wisawkweskl), northern wild raisin (Skinaqanmusi), partridge berry (Ka'qaujumnaqsi), red spruce (Mekwe'k kawatkw), sheep laurel (for which no associated Mi'kmaq name was provided), striped maple (Wapoq), sugar maple (Snaweyey), blueberry (Pkwiman), wild sarsaparilla (Wopapa'kjukal), and yellow birch (Nimnoqn).

Dominant vegetation within mixed-wood forests included the following:

- A diverse tree overstory that varied between landscapes. Dominant deciduous trees included maples (i.e., red, striped, sugar and mountain), American beech, white ash, and paper and

yellow birch. Dominant conifer tree species included eastern white pine, spruce (white, red and black) and Balsam fir;
- Woody shrubs (e.g., blueberry, smooth service berry, American witch-hazel, northern wild raisin, rhodora and juniper); and,
- Herbaceous understories were variable and depended on the available light and open spaces in the tree canopy.

Clear Cut or Previously Cut-Over Areas

This category includes all regenerating habitat that has been recently or historically harvested for forestry products. The majority of the PDA is anticipated to fall within this habitat type. No vegetation SAR or SoCC were identified within previously cut lands during the 2021 vegetation surveys at the BMWP site. Several culturally significant plants identified within the previously cut lands included : blackberry (Ajioqjimanaqsi), American mountain ash (Epsimusi), common plantain (Wijikanipkl), creeping snowberry (Kna'ji'j), eastern white pine (Kuow), blueberry (Pkwiman), northern wild raisin (Skinaqanmusi), pearly everlasting (Wapwasuek),pin cherry (Maskwe'simanaqsi), red raspberry (Klitaw), red spruce (Mekwe'k kawatkw), wild strawberry (Atuomkominaqsi) and yellow birch (Nimnoqn), as well as common yarrow, Harlequin blue flag, sheep laurel and sweet fern (for which no associated Mi'kmaq names were provided).

Several plants that are considered to be exotic were identified within disturbed habitats. The majority of the exotic species are weeds and common in Nova Scotia in disturbed areas and along road sides. Two species: multiflora rose (Rosa multiflora) and glossy buckthorn (Frangula alnus); however, are considered to be invasive species and were observed in the disturbed cutover landscapes within the assessed area. Multiflora rose is prolific in invading native habitats such as woodlands, forest edges where it can form impenetrable thickets that exclude native plant species (Bergmann and Swearingen 2005). Multiflora rose was wide spread through through previously cut areas within the LAA, shown on Figure 7. Glossy buckthorn can also spread very quickly and tends to shade out native shrubs and plants; as well, it can harm nearby plant species by producing allelopathic chemicals from its roots (Pridham 2009). Locations where glossy buckthorn was identified within the LAA are shown on Figure 8.

Dominant vegetation within clear cut or previously cut-over areas included the following:

- A diverse tree overstory that varied between landscapes. Dominant deciduous trees included red maple, trembling aspen, American mountain ash, paper and grey birch, white poplar, northern red oak, and Bebs willow. Dominant conifer tree species included eastern white pine, spruce (white and red) and Balsam fir; and
- Diverse assemblages of herbaceous plants including several weeds (e.g., black knapweed, mouse-ear hawkweed and common dandelion), grasses, asters, ferns and others;

Bogs and Fens

Bogs and fens typically consist of peatlands saturated with water. Bog vegetation may or may not include trees and are usually covered with Sphagnum spp. and ericaceous shrubs. The vegetation of fens is more diverse than in bogs and generally consists of sedges and mosses and shrubby trees (NSE

2021). No vegetation SAR or SoCC were identified within bogs or fens during the 2021 vegetation surveys at the BMWP site. Culturally significant plants identified with bogs and fens habitat included sheep laurel (no associated Mi'kmaq name provided) and creeping snowberry (*Kna'ji'j*).

Dominant vegetation within bogs and fens included the following:

- Woody shrubs (i.e., leatherleaf, sheep laurel, rhodora and sweet grass);
- Herbaceous plants (i.e., northern pitcher plant, three-leaved false soloman's seal, Virginia St. John's-wort, asters and other ferns, grasses and sedges); and
- Trees (when present) included black spruce and hardwood trees (i.e., red maple and paper birch).

Swamps and Marshes

Swamps and marshes are wetland types with mineral soils and are not typically dominated by peatlands (NSE 2021). Swamp vegetation is often dominated by trees and shrubs, but also often contain grasses, sedges ferns and rushes in open areas. Marshes, which are typically wetter than swamps, typical host emergent aquatic plants (macrophytes) such as rushes, reeds, grasses and sedges, as well as floating and submerged aquatic macrophytes, and non-vascular plants. No vegetation SAR or SoCC were identified within swamps and marshes during the 2021 vegetation surveys at the BMWP site. Several culturally significant plants identified within swamps and marsh habitat including : American beech (*Suomusi*), creeping snowberry (*Kna'ji'j*), eastern white pine (*Kuow*), goldthread (*Wisawkweskl*), northern wild raisin (S*kinaqanmusi*), partridge berry (*Ka'qaujumnaqsi)*, red raspberry (*Klitaw*), blueberry (*Pkwiman*), wild sarsaparilla (*Wopapa'kjukal*); and sheep laurel (for which no associated Mi'kmaq name was provided).

Dominant vegetation within swamps and marshes included the following:

- Woody shrubs (including speckled alder, smooth service berry, mountain holly, Canada yew, red raspberry, and sheep laurel);
- Herbaceous plants (including water horsetail, white meadow sweet, asters and other grasses and sedges); and,
- Trees (when present) included conifers (i.e., black spruce, Balsam fir, and eastern white pine) and hardwood trees (i.e., red maple and American beech).

During the 2021 vegetation and lichen surveys, one species at risk (SAR) lichen and four species of conservation concern (SoCC) lichen species were observed within mix-wood forests. The list of SAR and SoCC lichen species with their legal protection status and/or provincial rarity rankings (S-Ranks) from the Atlantic Canada Conservation Data Centre (ACCDC) are presented below in **Table 11** and their locations are presented on **Figure 8**. Further information on vegetation SAR and SoCC, along with the ACCDC report and information on the legal protection status are presented in **Section 6.2.5** and **Appendix L**.

TABLE 11: SPECIES AT RISK AND SPECIES OF CONSERVATION CONCERN FLORA OBSERVED AT THE BENJAMIN MILLS WIND PROJECT SITE

Plant Name	**Status and S-Rank**
Frosted glass-whiskers (Sclerophora peronella Atlantic pop.)	S1? SARA: Special Concern COSEWIC: Special Concern
Blistered tarpaper lichen (Collema nigrescens)	S3
Powdered fringe lichen (Heterodermia speciose)	S3
Acadian jellyskin lichen (Leptogium acadiense)	S3S4
Shaggy fringed lichen (Anaptychia palmulata)	S3S4

Notes:
Atlantic Canada Conservation Data Centre (ACCDC) S-Ranks as follows: S1: Critically imperiled in province; S2: Imperiled in province; S3: Vulnerable in province; S4: Apparently secure, uncommon but not rare in province; S5: Secure: Common, widespread and abundant in province S#S# = a numeric range rank used to indicate any range of uncertainty about the status of the species or community, ? = Inexact or Unknown. (ACCDC 2021).
Status refers to listings of E: Endangered, T: Threatened, V: Vulnerable or SC: Special Concern on Schedule 1 of the federal *Species at Risk Act* (SARA), the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or the *Nova Scotia Endangered Species Act* (NSESA).

6.2.1.2 Wildlife

The majority of the proposed Project is located within an area that has been extensively used for forestry practices. The majority of the site (i.e., Hingley Road, network of logging roads and the proposed turbine locations) is dominated by previously harvested areas (clear-cuts or strip-cuts) that are now in different stages of natural regeneration, or have become conifer plantations. Nevertheless, some areas within the proposed project footprint still extend through several less disturbed habitat types, including areas of relatively mature hardwood and softwood forest stands, as well as wetlands and watercourses.

A total of eleven mammal species, six amphibian species and two reptile species were identified within the assessment area during the terrestrial field studies conducted in 2021. Incidental observances made during the other field programs including; direct observations (i.e., sightings) and/or indirect evidence (e.g., scat, tracks, bones, and browse) of any wildlife species encountered were also documented. Targeted searches of wetland and pond habitats, when encountered, were conducted for reptiles and amphibians in conjunction with the wetland surveys.

A list of recorded observations of wildlife from the 2021 surveys (excluding bats and birds) is presented in **Appendix F**.

The mammal species observed or detected include:

- American Beaver (*Castor canadensis*);
- American Black Bear (*Ursus americanus*);
- Fisher (*Pekania pennanti*);
- Eastern Chipmunk (*Tamias striatus*);
- Eastern Coyote (*Canis latrans*);
- North American Porcupine (*Erethizon dorsatum*);

- Northern Flying Squirrel (*Glaucomys sabrinus*);
- Red Squirrel (*Tamiasciurus hudsonicus*);
- Snowshoe Hare (*Lepus americanus*);
- Striped Skunk (*Mephitis mephitis*); and
- White-tailed Deer (*Odocoileus virginianus*).

Reptiles and amphibian species observed, or detected, include:

- Eastern Red-backed Salamander (*Plethodon cinereus*);
- Green Frog (*Lithobates clamitans*);
- Maritime Garter Snake (*Thamnophis sirtalis pallidulus*);
- Northern Ringneck Snake (*Diadophis punctatus edwardsii*);
- Northern Leopard Frog (*Lithobates pipiens*);
- Pickerel Frog (*Lithobates palustris*);
- Spring Peeper (Pseudacris crucifer); and
- Wood Frog (*Lithobates sylvaticus*).

A deer wintering area (DWA) is located adjacent to the Project site, on the north side of the West Branch of the Avon River. During the winter, White-tailed Deer congregate in high density groups in areas with which provide shelter from the prevailing wind, offer maximum exposure to the sun and offer cover as well as access to vegetation for browse (NSDNR 2012). DWAs are identified by NSDNRR for identifying areas for special management practices in Nova Scotia. Although no designated DWAs on the Project site, there is potential for deer to winter in uncut forested areas, generally located on the east side of the project site.

The encountered wildlife species listed above have populations in Nova Scotia that are considered secure according to the ACCDC (2021) with the exception of a fisher. One fisher was observed during the spring while crossing one of the site access roads. The fisher is ranked S3 (i.e., Vulnerable) by the ACCDC and is therefore included with the SoCC discussion in **Section 6.2.5**.

Although not encountered, the eastern painted turtle and mainland moose were reported by the ACCDC as being observed within 10 km of the BMWP site and potential habitat is available at the site. Dillon personnel checked accessible water bodies, when encountered as part of the wetland and watercourse surveys, for the presence turtles. Dillon biologists were aware of the potential for moose to be present in the LAA and to record signs of moose if encountered. Such signs include scat, tracks, high browse and shed antlers; however, there were no observations or signs of moose reported during the 2021 field surveys.

6.2.1.3 Wetlands

Wetlands were assessed as part of the Terrestrial Environment VEC because they may perform many important functions and services in landscapes (e.g., improving water quality, controlling floods, providing critical habitat for rare and endangered species, and many others). In addition to performing important landscape functions, wetland ecosystems are typically some of the most productive ecosystems encountered in Nova Scotia. As such, in Nova Scotia (and elsewhere), many VECs (e.g., SAR

and SoCC, migratory birds and culturally significant flora and fauna) are hosted within wetland ecosystems.

A preliminary wetland assessment was conducted of wetlands located within the Terrestrial LAA between July 26 and September 30, 2021, the detailed methods and results are presented in **Appendix G.** Based on the preliminary proposed project layout that was used for the EA assessment, over 107 wetlands (totaling approximately 286 ha of land) were assessed within the LAA, shown on **Figures 9A-D**. Of these assessed wetlands, approximately 32 ha are located within the PDA and the proposed turbine locations are not predicted to directly interact with any wetlands as none were identified within the proposed footprint to these structures. Approximately 94 of the identified wetlands, primarily swamps, within the LAA are located adjacent to existing roads (i.e., within 30 m) and would likely already be seeing some level of impacts from the ongoing forestry activities onsite.

Wetland class was determined based on the principles of the Canadian Wetland Classification System (National Wetlands Working Group 1997) and the Nova Scotia Wetland Policy (GNS 2019). The majority of wetlands assessed within the Terrestrial LAA in 2021 are treed and shrub swamps, however, many bogs and fens are also present on the landscape. **Table 12** provides a summary of the number of each wetland class and average wetland size by class, as well as a total delineated area of each wetland class present within the assessed area.

TABLE 12: SUMMARY OF WETLANDS IN THE TERRESTRIAL LAA

Wetland Class	Total wetlands within Assessed Area	Total Area Delineated within the Assessed Area (ha)	Average size of Wetlands (ha)
Swamp	75	21.43	0.29
Fen	5	1.37	0.27
Bog	29	9.76	0.34

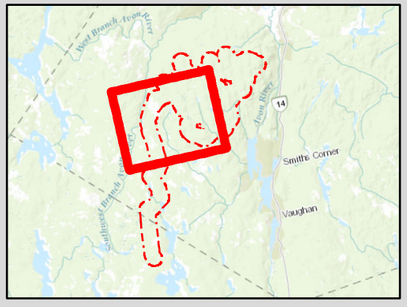
Natural Forces

BENJAMINS MILL WIND PROJECT

WETLANDS WITHIN THE TERRESTRIAL LOCAL ASSESSMENT AREA

FIGURE 9A

- Proposed Turbine Location
- Project Development Area
- Local Assessment Area
- Preliminary Field Delineated Wetland
- Wetland
- Waterbody



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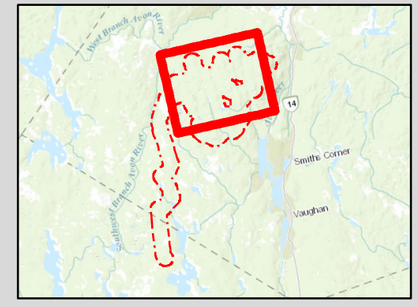
BENJAMINS MILL WIND PROJECT

WETLANDS WITHIN THE TERRESTRIAL LOCAL ASSESSMENT AREA

FIGURE 9B

- Proposed Turbine Location
- Substation
- Project Development Area
- Local Assessment Area
- Preliminary Field Delineated Wetland
- Wetland
- Waterbody



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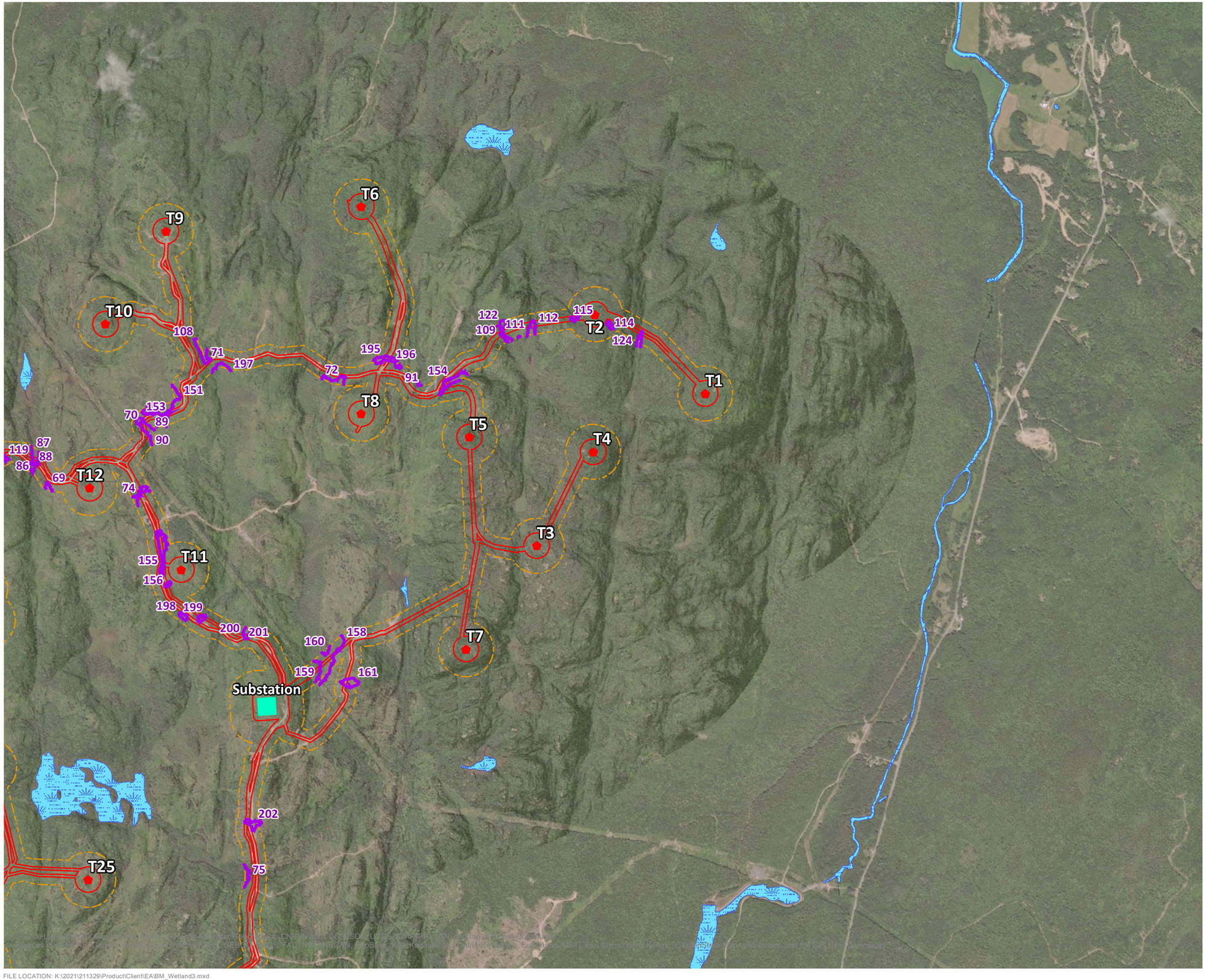

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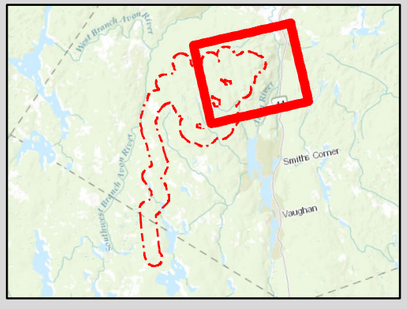
BENJAMINS MILL WIND PROJECT

WETLANDS WITHIN THE TERRESTRIAL LOCAL ASSESSMENT AREA

FIGURE 9C

- Proposed Turbine Location
- Substation
- Project Development Area
- Local Assessment Area
- Preliminary Field Delineated Wetland
- Wetland
- Waterbody



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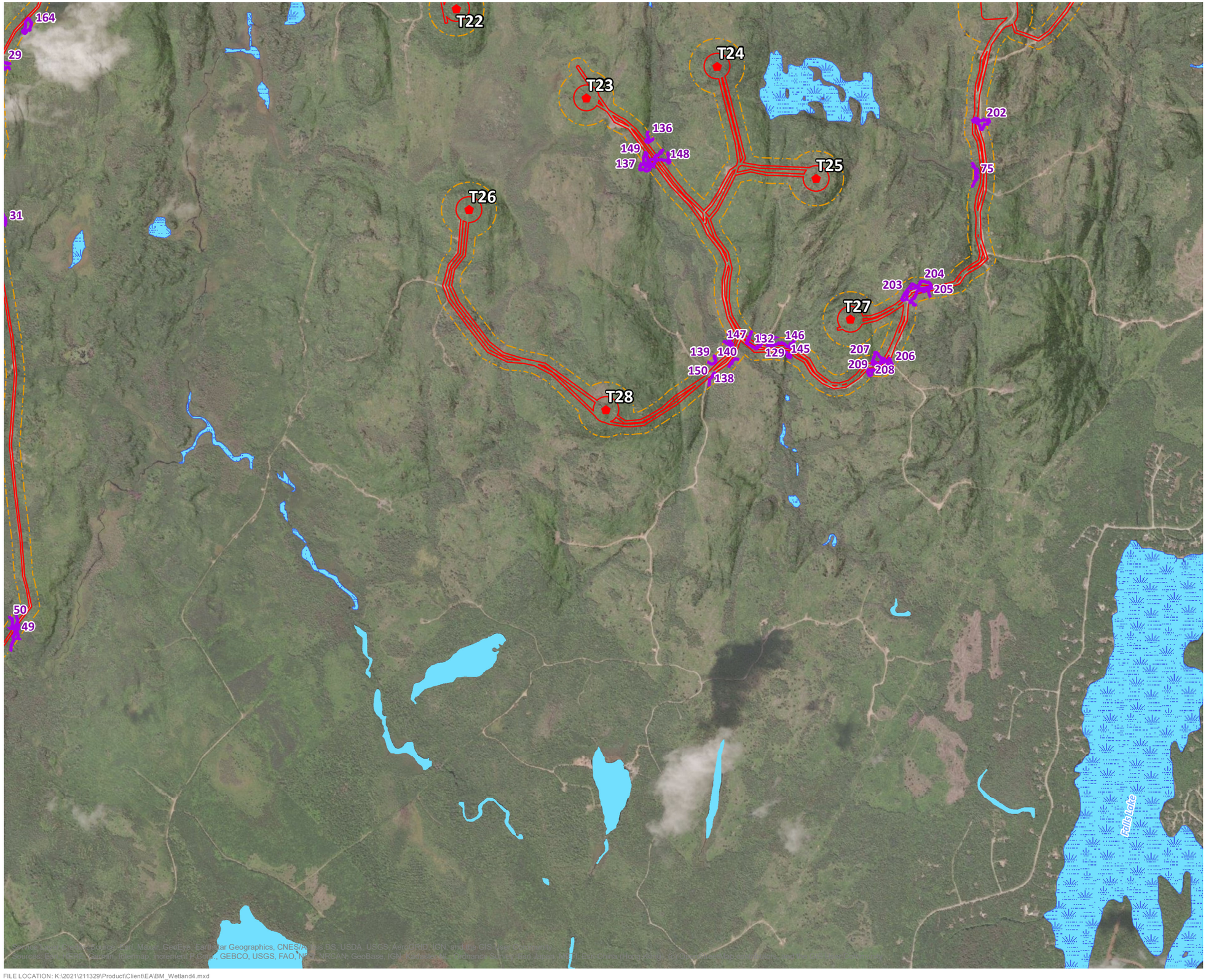

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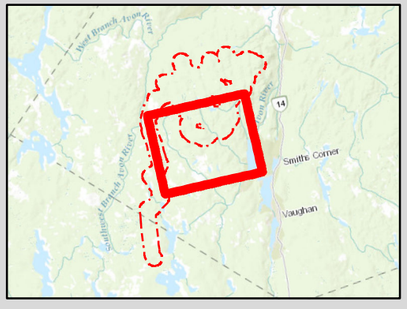
BENJAMINS MILL WIND PROJECT

WETLANDS WITHIN THE TERRESTRIAL LOCAL ASSESSMENT AREA

FIGURE 9D

- Proposed Turbine Location
- Project Development Area
- Local Assessment Area
- Preliminary Field Delineated Wetland
- Wetland
- Waterbody



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6.2.2 Birds and Bird Habitat

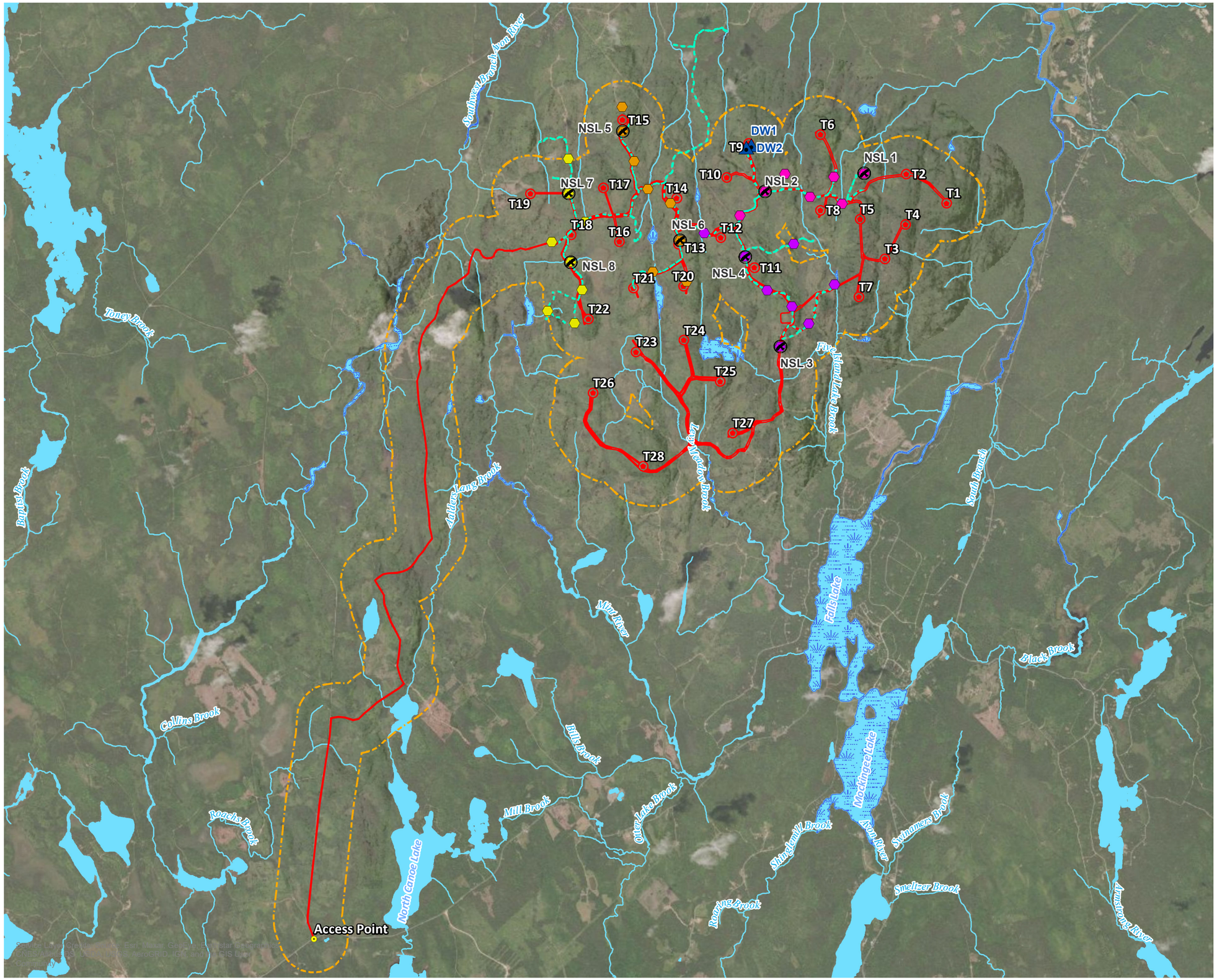
Nova Scotia's extensive coastline and abundance of mud flats make it an important migration pathway for birds. Additionally, a designated Important Bird Area (IBA), the Southern Bight (NS020) of the Minas Basin is located approximately four kilometres from the nearest proposed WTG location. As such, a study design was proposed and discussed with the Nova Scotia Department of Natural Resources and Renewables biologists prior to being implemented with consideration for the ecological setting of the site and the nearby important bird habitats. The study included field surveys for breeding birds, migratory birds and resident bird populations with strategic timing designed to match breeding and migratory windows specific for the region. Although one late season winter survey was completed, additional winter surveys are planned for January and February 2022 to confirm resident winter birds in the area are accurately represented. An addendum will be issued to reflect the results.

Bird surveys were conducted throughout 2021 within the LAA for birds (i.e., 500 m buffer around all Project components, including the PDA). Bird survey location are shown on **Figure 10**. The methodology and results of the field surveys that were conducted in 2021 are detailed in **Appendix H**.

During the 2021 bird surveys, over 7,000 individual birds of over 90 different species were recorded within the local assessment area. The bird populations present in the assessment area were observed through the techniques of point counts, area searches/transects, and diurnal watch counts. A summary of the total number of species and individual birds by season is presented below in **Table 13**.

TABLE 13: SUMMARY OF THE NUMBER OF BIRD SPECIES AND INDIVIDUAL BIRDS DETECTED DURING THE 2021 AVIAN FIELD SURVEYS

Season	Methods	Number of Species Observed (Diversity)	Number of Birds Detected (Abundance)
Late-Winter Surveys (April)	• Area Searches	29	288
Spring Surveys (April to June)	• Transect-based Point Counts; • Diurnal Watch Counts; and • Breeding Nocturnal Owl Survey.	83	3217
Summer Surveys (June to late July)	• Transect-based Point Counts; • Observed Incidentally between Surveys; and, • Breeding Common Nighthawk Survey.	74	1478
Fall Surveys (mid-August to late-October)	• Transect-based Point Counts; and, • Diurnal Watch Counts.	70	2604



Natural Forces

BENJAMINS MILL WIND PROJECT

SURVEY LOCATIONS AND LOCAL ASSESSMENT AREA FOR BIRDS

FIGURE 10

- Proposed Access Point
- Proposed Turbine Location
- Watercourse
- Waterbody
- Wetland
- Project Development Area
- Local Assessment Area
- Durnal Watch Counts
- Nocturnal Survey Location
- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Winter Area Search

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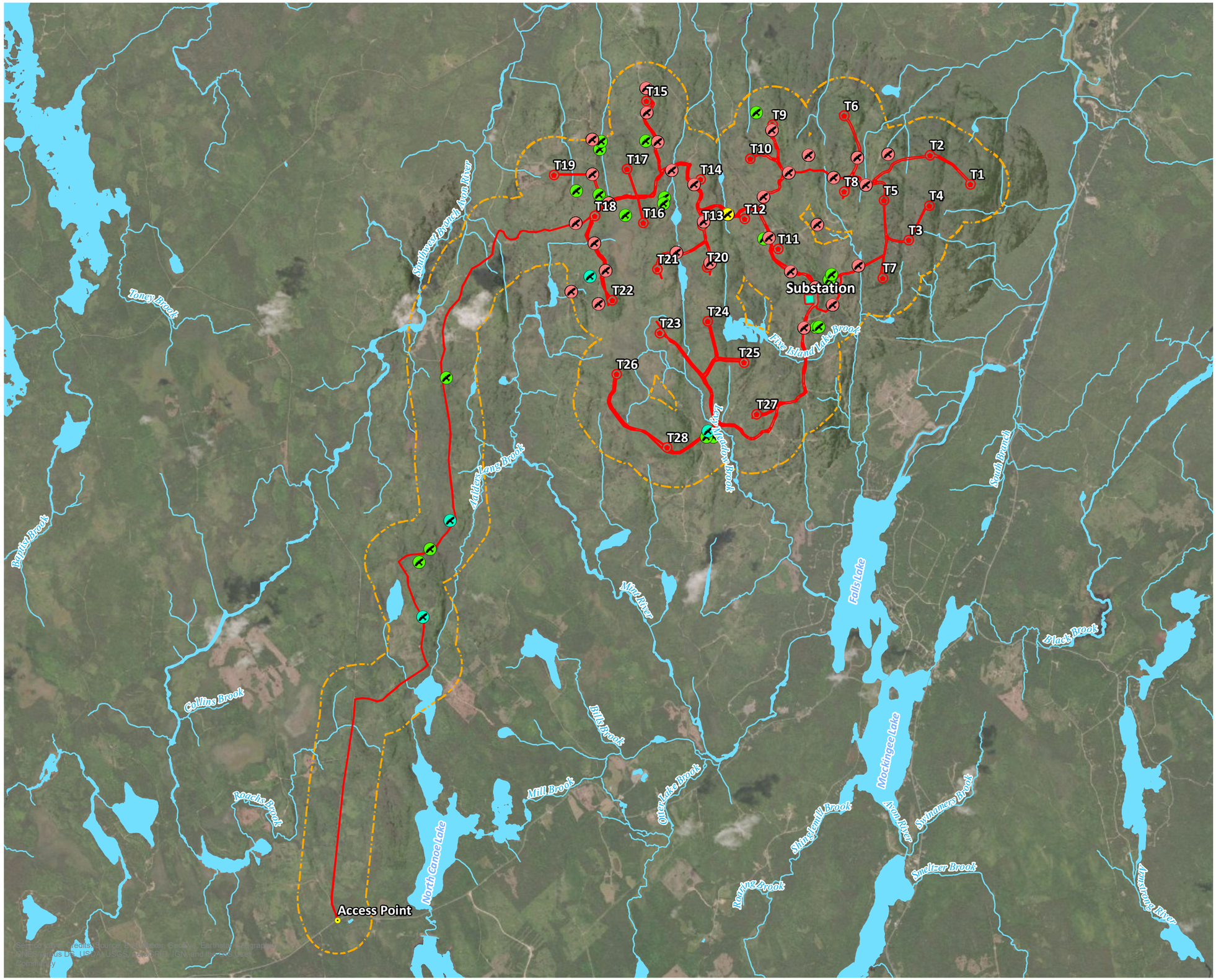

Natural Forces

BENJAMINS MILL WIND PROJECT

OBSERVATION LOCATIONS OF BIRD SPECIES AT RISK AND SPECIES OF CONSERVATION CONCERN

FIGURE 11

- Proposed Access Point
- Proposed Turbine Location
- Substation
- Watercourse
- Waterbody
- Project Development Area
- Local Assessment Area

Point Count Observation

- Species at Risk
- Species of Conservation Concern

Incidental Bird Observation

- Species at Risk
- Species of Conservation Concern

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During the 2021 bird surveys, 8 SAR and 20 SoCC species were detected, their locations at the time of detection are presented on **Figure 11** (above) and the species are summarized below in **Table 14**. **Table 14** also includes the legal protection status and provincial rarity rankings by the ACCDC (S-ranks) and the season of which they were detected in. Descriptions of the bird SAR that were detected during the survey program and their preferential habitat is also provided in **Section 6.2.3**.

TABLE 14: BIRD SAR AND SOCC IDENTIFIED WITHIN THE ASSESSMENT AREA DURING THE 2021 SURVEYS

Common Name	Scientific Name	Status	ACCDC S-RANK**	2021 Season Species Detected In			
				Late Winter*	Spring	Summer	Fall
Species At Risk							
Peregrine Falcon anatum/tundrius	Falco peregrinus pop. 1	NSESA: V	S1B SNAM				X
Rusty Blackbird	Euphagus carolinus	SARA: SC NSESA: E	S2B			X	
Evening Grosbeak	Coccothraustes vespertinus	SARA: SC NSESA: V	S3S4B,S3N	X	X	X	X
Eastern Wood-Pewee	Contopus virens	SARA: SC NSESA: V	S3S4B		X		
Canada Warbler	Cardellina canadensis	SARA: T NSESA: E	S3B		X	X	
Olive-sided Flycatcher	Contopus cooperi	SARA: T NSESA: T	S2B		X	X	X
Common Nighthawk	Chordeiles minor	SARA: T NSESA: T	S2B		X	X	
Chimney Swift	Chaetura pelagica	SARA: T NSESA: E	S2B,S1M				X
Species of Conservation Concern							
Canada Jay	Perisoreus canadensis		S3	X	X	X	X
Red-breasted Nuthatch	Sitta canadensis		S3	X	X	X	X
American Kestrel	Falco sparverius		S3B		X	X	X
Gray Catbird	Dumetella carolinensis		S3B		X	X	X

Common Name	Scientific Name	Status	ACCDC S-RANK**	2021 Season Species Detected In			
				Late Winter*	Spring	Summer	Fall
Pine Siskin	Spinus pinus		S2S3			X	X
Red Crossbill	Loxia curvirostra		S3S4		X	X	X
Swainson's Thrush	Catharus ustulatus		S3S4B			X	X
Ruby-crowned Kinglet	Regulus calendula		S3S4B		X	X	X
Bay-breasted Warbler	Setophaga castanea		S3S4B		X	X	X
Veery	Catharus fuscescens		S3S4B		X	X	
Yellow-bellied Flycatcher	Empidonax flaviventris		S3S4B		X	X	
Boreal Chickadee	Poecile hudsonicus		S3		X	X	X
Northern Harrier	Circus hudsonius	NAR	S3S4B	X	X	X	X
American Robin	Turdus migratorius		S5B, S3N	X	X	X	X
Purple Finch	Haemorhous purpureus		S4S5B,S3S4N		X	X	X
Blackpoll Warbler	Setophaga striata		S3S4B		X		X
Black-billed Cuckoo	Coccyzus erythropthalmus		S3B				X
Cape May Warbler	Setophaga tigrina		S2B			X	
Northern Goshawk	Accipiter gentilis		S3S4		X		
Turkey Vulture	Cathartes aura		S2S3B				X

Notes: Notes: Legal protection status refers to the protection status under the *Species at Risk Act* (SARA) and the *Nova Scotia Endangered Species at Risk Act* (NSESA) as of December 2021.

Special Concern (SC), Vulnerable (V), Threatened (T), Endangered (E), Not at Risk (NAR)

*The winter survey occurred outside of the typical window for winter bird surveys (i.e., in April 2021). Additional surveys are planned for January and February 2022. Following their completion an addendum will be provided to NSECC.

**S-Ranks as of December 2021

6.2.2.1 Late Winter Survey Summary

Overwintering bird species were surveyed using transect-based area searches over the course of five days in April 2021. As April is outside of the typical window for winter bird surveys, the winter survey results are considered incomplete and will be supplemented by additional surveys planned for January and February 2022. The methods, including the details of the transect locations and results are presented in **Appendix H** and on **Figure 10**. One of four transects, averaging 9.4 km each, was surveyed on each survey day to maximize site coverage. During the 2021 late winter bird surveys at the Project

site, 22 resident bird species and seven early migratory bird species were detected. Of the 22 resident bird species detected, there was one SAR, Evening Grosbeak (*Coccothraustes vespertinus*), and four SoCC, Red-breasted Nuthatch (*Sitta canadensis*), Canada Jay (*Perisoreus canadensis*), American Robin (*Turdus migratorius*) and Northern Harrier (*Circus hudsonius*) detected. The most commonly detected resident species within the assessment area during the late winter survey program had secure or apparently secure populations within Nova Scotia (i.e., with an ACCDC provincial ranking of S4 or S5), as broken down in **Figure 12**. The most frequently detected species included:

- Dark-eyed Junco (*Junco hyemalis*)
- Black-capped Chickadee (*Poecile atricapillus*)
- Blue Jay (*Cyanocitta cristata*)
- Song Sparrow (*Melospiza melodia*)
- Common Raven (*Corvus corax*)

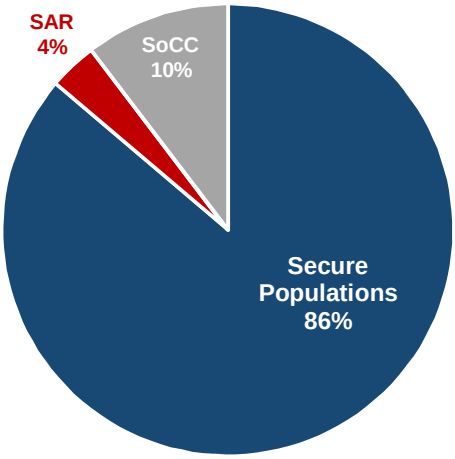


FIGURE 12: RESIDENT BIRD SPECIES DETECTED DURING 2021 LATE WINTER SURVEYS

6.2.2.2 Spring Survey Summary

The spring survey was comprised of five visits along four transect-based survey routes to conduct point count surveys, as well as diurnal watch counts and a breeding nocturnal owl survey. The survey methodology, including the details of the point-count and transect locations and results are presented in **Appendix H** and on **Figure 10**.

The highest period of migration was determined for each transect based on species diversity. This period occurred in mid to late May for two of the surveyed transects (Transect 2 and 4). However, along the remaining two transects (i.e., transect 1 and 3), species diversity was highest in late May, indicating that some migration likely continues into early June.

A total of 83 species were identified during the Spring Survey program, including two owl species that were detected during the breeding nocturnal owl survey (i.e., Great Horned Owl (*Bubo virginianus*) and Northern Saw-whet Owl (*Aegolius acadicus*)). Of the 83 bird species detected, six were identified as SAR and 16 were identified as SoCC. The most commonly detected species within the assessment area during the spring surveys had secure or apparently secure populations within Nova Scotia (i.e., with an ACCDC provincial ranking of S4 or S5), as broken down in **Figure 13**. The most frequently detected species included:

- White-throated Sparrow (*Zonotrichia albicollis*);
- Hermit Thrush (*Catharus guttatus*);
- Palm Warbler (*Setophaga palmarum*);
- Common Yellowthroat (*Geothlypis trichas*);
- Dark-eyed Junco (*Junco hyemalis*);
- Yellow-rumped Warbler (*Setophaga coronata*);
- Blue Jay (*Cyanocitta cristata*);
- Black-capped Chickadee;
- Northern Flicker (*Colaptes auratus*); and
- Mourning Dove (*Zenaida macroura*).

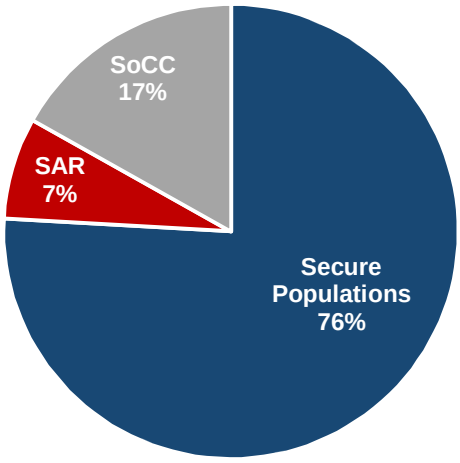


FIGURE 13: BIRD SPECIES DETECTED DURING 2021 SPRING

6.2.2.3 Summer Survey Summary

The Summer Survey program was comprised of two visits to the same four transect-based survey routes with point counts, and a breeding Common Nighthawk survey. The transect-based survey routes were conducted once each during both the early and late-breeding period.

The survey methods, including the details of the survey locations and timings of the diurnal watch counts, as well as the results, are presented in **Appendix H** and on **Figure 10**.

A total of 74 species were detected during the Summer Survey program. Of the 74 bird species detected, five were identified as SAR and 16 were identified as SoCC. The most commonly detected species within the assessment area during the summer surveys had secure or apparently secure populations within Nova Scotia (i.e., with an ACCDC provincial ranking of S4 or S5), as broken down in **Figure 14**. The most frequently detected species included:

- Common Yellowthroat (*Geothlypis trichas*);
- White-throated Sparrow (*Zonotrichia albicollis*);
- Hermit Thrush (*Catharus guttatus*);
- Magnolia Warbler (*Setophaga magnolia*);
- Palm Warbler (*Setophaga palmarum*);
- Ovenbird (*Seiurus aurocapilla*);
- Alder Flycatcher (*Empidonax alnorum*);
- Black-and-White Warbler (*Mniotilta varia*);
- Mourning Dove (*Zenaida macroura*); and
- Chestnut-sided Warbler (*Setophaga pensylvanica*).

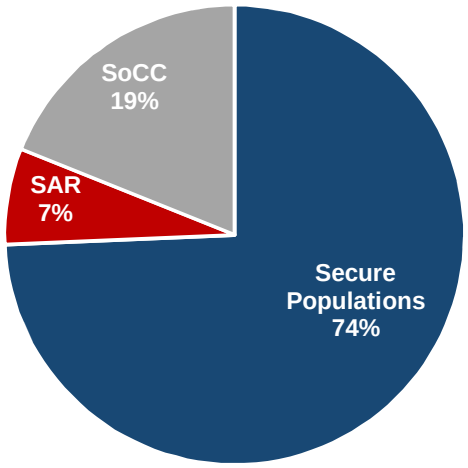


FIGURE 14: RESIDENT BIRD SPECIES DETECTED DURING THE 2021 SUMMER SURVEY PROGRAMS

6.2.2.4 Fall Survey Summary

The Fall Survey program was comprised of five visits, corresponding with the Spring Survey program, along point count surveys along transect-based survey routes, as well as diurnal watch counts.

The survey methods, including the details of the survey locations and timings of the diurnal watch counts, as well as the results, are presented in **Appendix H** and on **Figure 10**.

The highest period of migration was determined for each transect based on species diversity, as was for the spring migration period. Generally, this period occurred between mid to late September and early October. The highest fall migration species diversity along of the two transects; however, occurred in late August.

A total of 70 species were identified during the Spring Survey program. Of the 70 bird species detected, 6 were identified as SAR and 17 were identified as SoCC. The most commonly detected species within the assessment area during the fall surveys had secure or apparently secure populations within Nova Scotia (i.e., with an ACCDC provincial ranking of S4 or S5), as broken down in **Figure 15**, with two exceptions; American Robin and Purple Finches. Although American Robins and Purple Finches have ACCDC S-ranks for of S5 and S4S5, respectively for breeding populations in Nova Scotia; the non-breeding populations of American Robin and Purple Finch are considered to be SoCC with ACCDC S-ranks of S3 and S3S4, respectively. The most commonly detected species within the assessment area during the fall surveys included:

- American Goldfinch (*Spinus tristis*);
- Blue Jay (*Cyanocitta cristata*);
- Dark-eyed Junco (*Junco hyemalis*);
- Palm Warbler (*Setophaga palmarum*);
- Yellow-rumped Warbler (*Setophaga coronata*);
- Black-capped Chickadee (*Poecile atricapillus*);
- American Robin (*Turdus migratorius*);
- Purple Finch *(Haemorhous purpureus*);
- Common Yellowthroat (*Geothlypis trichas*); and
- White-throated Sparrow (*Zonotrichia albicollis*).

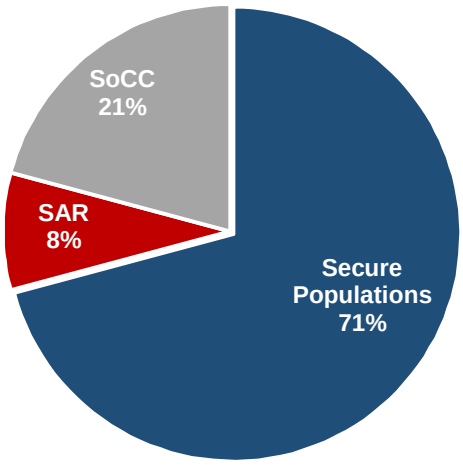


FIGURE 15: RESIDENT BIRD SPECIES DETECTED DURING 2021 FALL SURVEYS

6.2.2.5 Nocturnal Avian Migration

This section provides an overview of the nocturnal migration aspect of the avian VEC. **Appendix I** provides a detailed assessment of the radar and acoustic monitoring surveys conducted at the Project area in 2021.

Per the *Guide to Preparing an EA Registration Document for Wind Power Projects in Nova Scotia* (Nova Scotia Government 2021) avian radar and acoustic studies were completed at the Project during the spring and fall migration periods 2021. The location of the radar and acoustic equipment was chosen based on access to the Project area, site security and clear sight lines for the equipment. The radar was located approximately 635 m from the nearest proposed turbine and the acoustic sensors were placed near the radar location and throughout the Project area. This distribution of radar and acoustic sensors allowed for sampling of nocturnal migrants throughout the Project area and provided a representation of nocturnal avian movements at the Project area. Spring migration data were collected between May 10 and June 3, 2021 and fall data were collected between July 16 and October 31, 2021.

Avian radar data were collected using Furuno x-band marine radars. Due to limited available radar equipment at the time of initiating the spring migration season, different radar models were used at the Project during spring and fall. While the radar model and antenna orientation were different across seasons, both systems have been used in the past to assess migratory bird movements at proposed wind energy projects in the Maritimes and have been proven to provide an adequate representation of bird passage rates and flight heights.

Two types of acoustic monitoring devices were used consistently across the spring and fall seasons to detect nocturnal flight calls (NFCs) of migratory birds at the Project area. A 21c microphone system (Old Bird) (Old Bird Inc., Ithaca, New York, USA) was deployed in conjunction with the radar. In addition, a network of acoustic sensors (Audiomoths™) were deployed across the Project area to record NFCs. Acoustic sensors were programmed to start recording up to an hour prior to sunset, and to stop after sunrise. The exact range of each recording unit is unknown but thought to be approximately 200 m or more for the Old Bird system (i.e., the unit placed near the radar site) and approximately 100 m for the Audiomoth™ units (i.e., the units located at the radar site and across the Project area).

While some level of migration was observed on most nights, a large proportion of the migratory activity observed in each season was limited to a few nights. Also, most activity was observed when favourable tailwinds were present. These findings are typical to other radar and acoustic studies completed in Nova Scotia (e.g., Peckford and Taylor, 2008). When examining nights when large numbers of targets were detected (i.e., when most of the migration occurred) the bulk of the migratory movements were detected at around 500 m altitude and there tended to be fewer of targets at lower altitudes (i.e., within the Rotor Sweep Area [RSA]).

When examining differences in detections within nights, most activity was observed during the middle of the night, and secondarily during the early portion of the night. Fewer detections were observed near dawn, suggesting that migrants may not be using the Project area as a stopover location.

Overall, the observations made at the Project were in general alignment with radar and acoustic monitoring completed in other areas of Nova Scotia in that migration was focused on a few nights during the season when tailwinds were light to moderate.

6.2.3 Bats and Bat Habitat

Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*M. septentrionalis*), and the Tri-Colored bat (*Pipistrellus subflavus*) are known bat species that reside in Nova Scotia. All three are small-bodied bats typical of the plain-nosed bats and all three are listed provincially and federally as Endangered. The listing is the result of drastic bat population declines that have occurred due to a fungal infection (white nose syndrome) that appears to severely affect hibernating bats. It is believed that mortalities affecting up to 90% of populations result from interference with hibernation and starvation during the winter period. The syndrome was first observed in 2006 in New York and has been since confirmed in Ontario, Quebec, New Brunswick and Nova Scotia (EC 2014b). One other bat species, *Eptesicus fuscus*, commonly called the Big Brown Bat, is also known to reside in Nova Scotia however, few sightings have been recorded. The Hoary Bat (*Lasiurus cinereus*), Eastern Red Bat (*Lasiurus borealis*), and the Silver-haired Bat (*Lasionycteris noctivagans*) are migratory bat species that are less common in Nova Scotia, but are known to live in the province for a portion of the year (Moseley, 2007).

The Little Brown Myotis are distributed throughout much of Canada, with the exception of northern Canada. They are also found in southern Alaska, across the United States from coast to coast, and the higher elevation forested regions of Mexico. There is also a population of this species in Iceland; however, they are presumed to have been accidently transported there on ships by humans. Mating occurs in the fall and they have liter sizes ranging from one to two pups, but most commonly one (Havens, A. 2006). Northern Myotis are distributed across southern Canada and as far north as Newfoundland. They also inhabit much of the United States, extending through to Florida. Mating occurs during the autumn months and they are known to only have one offspring (Ollendorff, J. 2002). The Tri-Colored Bat inhabits the southern edge of Canada, eastern United States, eastern edge of Mexico, extending as far south as northern Honduras. Mating occurs between August and October, and they are known to have one set of twins in each litter (Hamlin, M. 2004). The Big Brown Bat is known to reside as far north as southern Canada, as far south as northern South America, and the West Indies (Mulheisen, M. and K. Berry 2000).

Resident bats live in three different roosting sites: day roosts, night roosts, and hibernacula. Day and night roosts are used during the spring, summer and fall months whereas hibernacula sites are used during the winter months. Common hibernacula sites are typically caves and old mining shafts; whereas day and night roosts commonly include tree hollows, spaces between tree bark, rock crevices, buildings, and tree foliage.

The Hoary Bat (migratory) has been spotted as far north as Southampton Island in Nunavut as well as Iceland, and as far east as Bermuda and the Orkney Islands off Scotland, during the summer months. They commonly spend the winter months in California, southeastern United States, Mexico, and Guatemala. Hoary bats are thought to mate around the time of autumn migration, and their litter size can range from one to four, but are most commonly two (Anderson, S. 2002). The Eastern Red Bat

(migratory) is widely distributed between southern Canada, Central America, Chile, and Argentina. Like the Hoary bat, mating takes place during autumn migration and their litter size can range from one to four, but are most commonly two (Myers, P. and J. Hatchett 2000). The Silver-haired Bat (migratory) is known to inhabit the lower south-central part of Alaska, the west coast of Canada, and the entire lower third of Canada; as well as most of the United States except for the south eastern and south western coasts, and as far south as the Victoria province of Mexico. Like the Hoary Bat, they have also been documented as far east as Bermuda. Their litter size ranges from one to two, but are most commonly litters of two (Bentley, J. 2017).

The migratory bats that have been spotted in Nova Scotia are known as solitary tree bats, and prefer to roost in a large variety of forested habitats with minimal human activity. They have; however, also been known to roost in mildly populated areas as well (Moseley, 2007).

There are at least 21 caves with recorded bat populations on main land Nova Scotia, and 16 of them are within 100 km from the Project Study Area, as detailed in **Table 15**.

TABLE 15: DISTANCE OF KNOWN HIBERNACULA AND APPROXIMATE DISTANCE TO THE PROJECT SITE.

Hibernacula	Approximate Distance from Site (km)	Direction from Site
Frenchman's Cave	19	E/NE
Frenchman's II	19	E/NE
Miller's Creek Cave	N/A: Quarried away in 1981	NE
Cheverie Cave	25	N/NE
Woodville Ice Cave	26	E/NE
Centre Rawdon Gold Mine	32	E/NE
Walton Barite Mine	40	NE
Peddlar's Tunnel	46	NE
Minasville Ice Cave	52	NE
Vault Cave	55	W/NW
The Ovens	59	S
Cave of the Bats	63	E
Hayes Cave	67	E/NE
Black Brook	75	E
Gays River Gold Mine	75	E
Lear Shaft	79	NE

Source: Moseley, 2007

Frenchman's Cave and Frenchman's II, which is part of the same cave system, is the closest known hibernaculum to the Site. It is considered a small hibernaculum with bat populations ranging from 10 – 50 bats. However, a survey of the population size and species type present may indicate a larger

population than previously thought. In 2003, 66 bats were identified with the majority (71%) being Northern Myotis, 26% being Little Brown Myotis and 3% being the Tri-Colored bat (Moseley, 2007).

Hayes Cave is the most significant hibernaculum in NS, having bat populations in the thousands; it is located approximately 67 km from the edge of the Site. Bat population size at this hibernaculum have been monitored for several decades, spanning back to 1963. All three resident bat species that are known to be in NS have been recorded at this location, with the majority of species being Little Brown Myotis and Northern Myotis. Interestingly, this location has the only recorded sighting of the Big Brown Bat in Nova Scotia (Moseley, 2007).

Lastly, no observations of potential bat hibernacula were identified in the Study Area during site visits and field surveys.

6.2.3.1 Previously Recorded Bat Species According to ACCDC Database

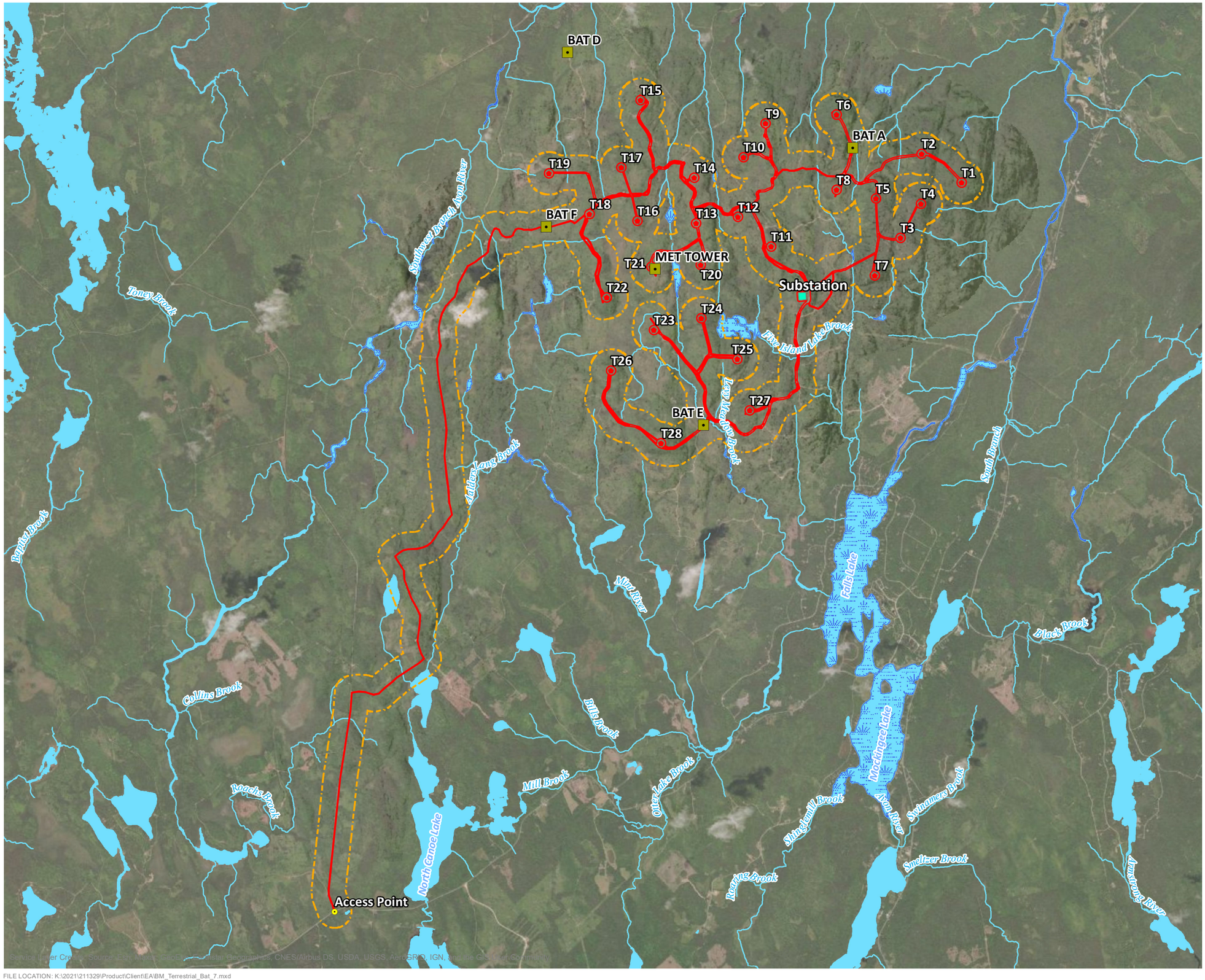
The ACCDC databases were queried for known observation data of provincial and federal bat SAR or SoCC within close proximity of the Project site. Bat hibernaculum and bat species occurrences are recorded within 10 km of the Project site.

6.2.3.2 Observed Bat Species

Acoustic bat surveys were conducted in 2021 across the Project Site from June 1 through to October 15 (the survey period). Six acoustic survey stations were installed at within the Study Area of the proposed Project as a mechanism to capture the various terrain and habitat types within the Study Area. Details of the survey methodology, analysis and results are presented in **Appendix J**. A summary of the selected survey locations and habitat description is provided below in **Table 16**, while station location are shown on **Figure 16**.

TABLE 16: DESCRIPTION OF ACOUSTIC BAN MONITORING STATIONS

Bat Monitor Location	Microphone Elevation (above ground level)	Surrounding Habitat Description
Bat A	1.8 m	Open area with some small immature birch trees and next to a sizable cliff of bedrock outcropping, which could be a potential bat roosting location. Northeast corner of the subject property.
Bat D	2.3 m	Open area that was part of a clear-cut hardwood stand. The area is revegetated by immature deciduous trees and shrubs. Northwest corner of the subject property in the vicinity of proposed WTG 15.
Bat E	1.8 m	Open area adjacent to a treed swamp and a watercourse. South of the subject property, between proposed WTG 27 and 28.
Bat F	1.8 m	Open area next to the road with exposed boulders and adjacent to mature softwood trees. East side of the subject property.
MET Tower	1.2 m	Relatively flat and open area that was recently clear-cut with minimal re-vegetation. Attached to the MET tower near the centre of the Site and the proposed location of WTG 21.
MET Tower	30 m	



Natural Forces

BENJAMINS MILL WIND PROJECT

ACOUSTIC BAT SURVEY LOCATIONS

FIGURE 16

- Proposed Access Point
- Proposed Turbine Location
- BM Substation
- Watercourse
- Waterbody
- Wetland
- Local Assessment Area
- Project Development Area

Bat Observation

- Bat Survey Location

0 0.25 0.5 1 km

SCALE 1:55,000

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY DILLON CONSULTING, GEONB, NATURAL FORCES

MAP CREATED BY: MEC
MAP CHECKED BY: KB
MAP PROJECTION: NAD 1983 UTM ZONE 20N

DILLON CONSULTING

PROJECT: 21-1329

STATUS: DRAFT

DATE: 2022-01-10

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

FILE LOCATION: K:\2021\211329\Product\Client\EA\BM_Terrestrial_Bat_7.mxd

The following bat species/species groups were captured during the 2021 bat acoustic survey program, and carried forward as part of the bat acoustic analysis:

- Silver-haired Bat (abbreviated LANO) and Eastern red bat (abbreviated LABO). Both of these species are migratory and were assessed together as a group based on similarities of their calls. Silver-haired Bats produce calls with a constant frequency (CF) tail around 22 – 25 kHz. Although
- Eastern Red Bats produce calls with a minimum frequency between 30 – 35 KHz, they also produce calls with lower minimum frequencies within the range of Silver-haired Bats. Although Big Brown Bat (abbreviated EPFU) also produce calls with a CF similar to Silver-haired Bat and are generally reported as EPFU/LANO, given the few sightings reported to date in Nova Scotia all potential EPFU/LANO calls were assumed LANO; hence the species grouping of LANO/LABO.
- Hoary Bat (abbreviated LACI) is a migratory bat with calls that are reliably differentiated from all other species. Hoary bat calls have lower frequency (ranging from 25 to 18 kHz) and are noticeably longer in duration compared to other bat species known to occur within the Project area.
- Myotid Bat species (abbreviated MYOTID) is a species group that includes residential (i.e., non-migratory) bat species in Nova Scotia including Little Brown Myotis, Northern Myotis, and the Tri-Colored Bat. Unlike the migratory species outlined above, the Myotid species group of bats produce shorter duration calls with a minimum frequency between 40 – 45 kHz, and maximum frequencies ranging between 120 kHz and 80 kHz. Occasionally, Myotis calls can have a minimum call frequency of 35 kHz.

A total of 146 bat passes were recorded during the survey period, of which 94% (or 137 bat passes) were recorded during the months of July through September (inclusive). The month of August alone was responsible for 63% (or 92 bat passes) of the 146 recorded bat passes. A total of eight bat passes were recorded in the month of June, with only a single bat pass recorded between October 1 and October 15. The number of monthly bat passes detected at each acoustic monitoring station is detailed in **Table 17**.

The total number of bat passes per species/species group (and broken down by migratory and non-migratory species) during each monitoring month in 2021 is presented in **Figure 17**. Similarly, the total number of bat passes per species/species group per monitoring station per month is presented in **Figure 18**. As illustrated in **Figures 17** and **18**, the MYOTID species group accounts for 68% (or 99 passes) of the 146 bat passes recorded during the survey period, of which 69% (or 68 passes) of the 99 MYOTID passes occurred during the month of August alone.

TABLE 17: TOTAL NUMBER OF BAT PASSES DETECTED AT EACH MONITORING STATION PER MONTH BY SPECIES GROUP

LOCATION A						
	June	July	August	September	Oct 1-15	Total
LACI		1	3			4
LANO/LABO		1	1			2
MYOTID	1	2	13	2	1	19
total	1	4	17	2	1	25
LOCATION D						
	June	July	August	September	Oct 1-15	Total
LACI		2		4		6
LANO/LABO			1	2		3
MYOTID		3	19	2		24
total	0	5	20	8	0	33
LOCATION E						
	June	July	August	September	Oct 1-15	Total
LACI	2	2	3	1		8
LANO/LABO			4	1		5
MYOTID	4	3	6	1		14
total	6	5	13	3	0	27
LOCATION F						
	June	July	August	September	Oct 1-15	Total
LACI			3	1		4
LANO/LABO		1	2	2		5
MYOTID	1	3	7	2		13
total	1	4	12	5	0	22
LOCATION MET						
	June	July	August	September	Oct 1-15	Total
GROUND LEVEL						
LACI			2			2
LANO/LABO				1		1
MYOTID		4	13	1		18
total	0	4	15	2	0	21
~30 m ABOVE GROUND						
LACI			2			2
LANO/LABO		1	3	1		5
MYOTID			10	1		11
total	0	1	15	2	0	18
TOTAL	8	23	92	22	1	146

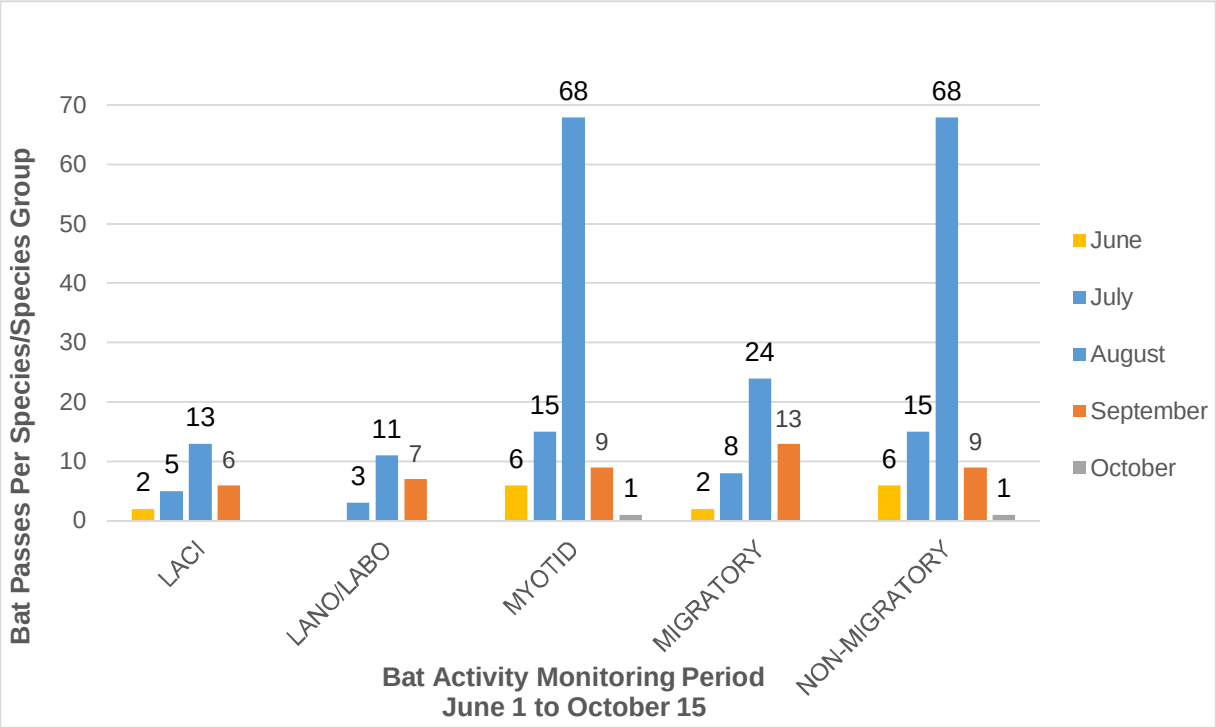


FIGURE 17: TOTAL NUMBER OF BAT PASSES PER MONTH BY SPECIES GROUP

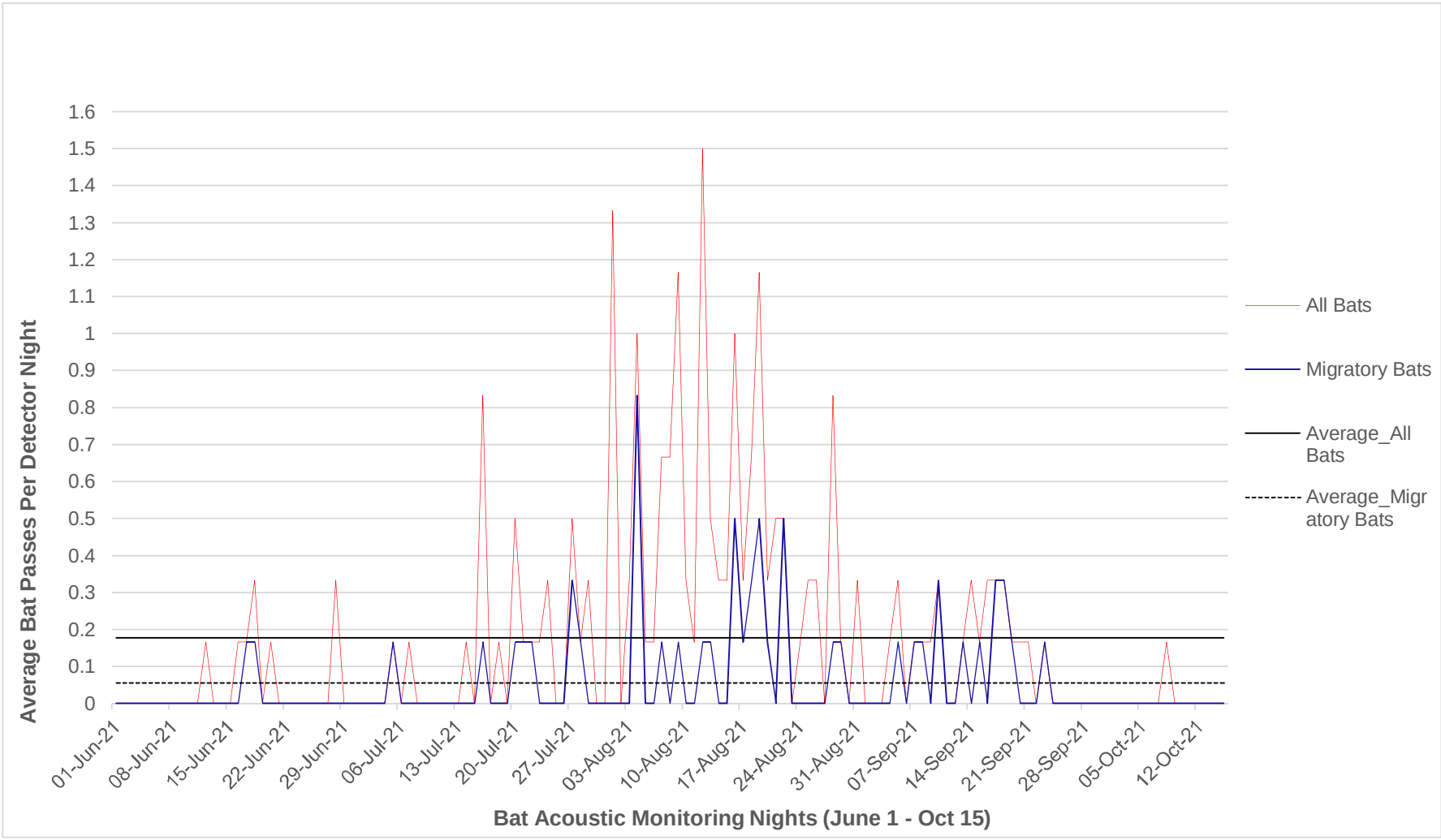


FIGURE 18: AVERAGE NUMBER OF BAT PASSES PER NIGHT

Figure 18 illustrates the number of bat passes (illustrated as All Bats and Migratory Bats) per detector night throughout the survey period, as well as the average number of bat passes per detector night for the entire monitoring period (illustrated as Average_All Bats and Average_Migratory Bats). The average "All Bats" passes per detector night for the duration of survey period was calculated at 0.18 bat passes, whereas the average "Migratory Bats" passes per detector night for the duration of the survey period was calculated at 0.06 bat passes. If we assume a breeding period of June 1 through July 31, and a fall migration period of August 1 through Oct 15, than the average "All Bats" and "Migratory Bats" passes per detector night for those period equates to 0.08 and 0.03 bat passes, and 0.25 and 0.08 bat passes, respectively.

Based on Dillon's experience on similar bat acoustic programs throughout the country, both the total number of bat passes and the average bat passes per detector night (during the breeding period, fall migration, and entire survey period) are considered very low.

6.2.3.3 Bat Species at Risk

As mentioned previously, species associated with the MYOTID species group of bats (which include Little Brown Myotis, Northern Myotis, and Tri-Colored Bats) were detected during the 2021 bat surveys. These bats are known to inhabit much of Nova Scotia, and all three are listed provincially and federally as endangered.

6.2.4 Aquatic Environment

6.2.4.1 Fish and Fish Habitat

The proposed Project is situated within the Avon River secondary watershed (1DE-2, NSE 2011) which encompasses a drainage area of 460 square kilometers and includes three main river branches (South, West, and Southwest (Isaacman, 2005). The mapped watercourses that fall within the area of the proposed Project include the Mint River, Levy Meadow Brook, and Five Island Brook. Lakes in the vicinity of the Project Area include Five Island Lake, Bennett Lake, Duck Ponds, Pine Lake, and Splash Dam Lake. According to Department of Fisheries and Oceans (DFO) SAR mapping review, Atlantic salmon, Inner Bay of Fundy population (Salmo salar) are identified throughout the Avon River watershed (DFO, 2021). Although suitable Atlantic salmon habitat was not identified during initial field studies, watercourses that may be impacted by the final design will undergo additional detailed assessments to ensure that potential impacts to the species are considered and appropriately mitigated.

A baseline fish habitat survey was conducted in October 2021 and the methods and results are presented in Appendix K, Table K-1. Twenty-three watercourses and waterbodies intersect with the proposed or existing access roads, though none of the turbine locations intersect watercourse (since these locations were selected to avoid encroachment of watercourses). Mapped water features within the LAA are shown above on Figure 6. The results of the aquatic habitat assessment are summarized in the following sections.

There were no watercourses (mapped or unmapped) identified within the assessment area of any of the proposed turbine locations. Table 18 lists the watercourses, presented on Figure 6, that were observed within the assessment area surrounding the proposed access roads

TABLE 18 WATERCOURSES WITHIN THE AQUATIC LAA

Watercourse	Mapped	Characterization	Fish habitat Possible
Unnamed Tributary - Watercourse 1 (WC 1)	Yes	A permanent defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest	Likely provides direct fish habitat
Unnamed Tributary - Watercourse 2 (WC 2)	Yes	Intermittent, defined channel with fine substrate and stable banks. The channel flows through shrubs and grasses.	May provide seasonally accessible fish habitat.
Unnamed Tributary - Watercourse 3 (WC 3)	Yes	Permanent, defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest	Likely provides direct fish habitat
Unnamed Tributary - Watercourse 4 (WC 4)	Yes	Permanent, defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest.	Likely provides direct fish habitat
Unnamed Tributary - Watercourse 5 (WC 5)	Yes	Permanent, defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest.	Likely provides direct fish habitat
Gleason Brook - Watercourse 6 (WC 6)	Yes	Intermittent, defined channel with boulder substrate and stable banks. The channel flows through mature mixed forest	May provide seasonally accessible fish habitat.
Unnamed Tributary - Watercourse 7 (WC 7)	Yes	Intermittent, defined channel with fine substrate and stable banks. The channel flows through shrubs and grasses	Yes
Unnamed Tributary - Watercourse 8 (WC 8)	Yes	Permanent, defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest with evidence of beaver activity within the watercourse	Likely provides direct fish habitat
Unnamed Tributary - Watercourse 9 (WC 9)	Yes	Permanent, defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest	Likely provides direct fish habitat
Unnamed Tributary - Watercourse 10 (WC 10)	No	Ephemeral watercourse with intermittent subsurface flow through a wetland	Unlikely that due to the subsurface and ephemeral flow.
Unnamed Tributary - Watercourse 11 (WC 11)	Yes	Permanent, defined channel with fine substrate and stable banks. The channel flows through mature mixed forest	Likely provides direct fish habitat
Unnamed Tributary - Watercourse 12 (WC 12)	Yes	Intermittent, defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest.	May provide seasonally accessible fish habitat
Unnamed Tributary - Watercourse 13 (WC 13)	Yes	Permanent, defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest	Likely provides direct fish habitat
Unnamed Tributary - Watercourse 14 (WC 14)	Yes	Permanent, defined channel with fine substrate and stable banks. The channel flows through mature mixed forest. High gradient cascades may act as an impediment to upstream fish passage	Likely provides direct fish habitat

Watercourse	Mapped	**Characterization**	Fish habitat Possible
Unnamed Tributary - Watercourse 15 (WC 15)	No	Ephemeral drainage feature	Does not provide direct fish habitat
Unnamed Tributary - Watercourse 16 (WC 16)	No	Ephemeral drainage feature	Does not provide direct fish habitat
Unnamed Tributary - Watercourse 17 (WC 17)	No	Ephemeral drainage feature	Does not provide direct fish habitat
Unnamed Tributary - Watercourse 18 (WC 18)	Yes	Permanent, defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest	Likely provides direct fish habitat
Unnamed Tributary - Watercourse 19 (WC 19)	Yes	Permanent, defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest	Likely provides direct fish habitat
Unnamed Tributary - Watercourse 20 (WC 20)	Yes	Permanent, braided channel with fine substrate and stable banks. The channel flows through mature mixed forest	Likely provides direct fish habitat
Unnamed Tributary - Watercourse 21 (WC 21)	Yes	Intermittent, defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest.	May provide seasonally accessible fish habitat.
Unnamed Tributary - Watercourse 22 (WC 22)	Yes	Intermittent, defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest	May provide seasonally accessible fish habitat.
Unnamed Tributary - Watercourse 23 (WC 23)	Yes	Intermittent, defined channel with fine substrate and stable banks. The channel flows through mature mixed forest.	May provide seasonally accessible fish habitat.

Of the watercourses surveyed within the assessment area, five watercourses are ephemeral and do not provide seasonal or permanent direct fish habitat. The remaining watercourses may provide habitat for freshwater species that have been documented within the Avon River watershed (Daborn and Brylinsky, 2004; see Table 19 below). All of the assessed watercourses were acidic, with pH levels below the Canadian Council of Ministers of the Environment (CCME) recommended range for the protection of aquatic life (i.e., 6.5-9.0). Watercourses with a pH of 5.0, as was the case with Fourteen of the assessed watercourses, are expected to have low fish densities and little to no acid-sensitive species (including juvenile salmon and cyprinids) (Lacroix, 2011). Based on the aquatic habitat present and watercourse acidity throughout the Assessment Area, the dominant fish species expected within the watercourses are likely to be acid-tolerant species, such as white sucker (Lacroix, 2011).

TABLE 19: SUMMARY OF FRESHWATER FISH SPECIES DOCUMENTED IN THE AVON RIVER WATERSHED

Scientific Name	Common Name
Gasterosteus aculeatus	Three Spine Stickleback*
Apeltes quadracus	Four Spine Stickleback
Pungitius pungitius	Nine Spine Stickleback
Fundulus diaphanus	Banded Killifish
Perca flavescens	Yellow Perch*
Micropterus dolomieu	Smallmouth Bass*
Catostomus commersonii	White Sucker*
Chrosomus eos	Northern Redbelly Dace
Couesius plumbeus	Lake Chub*

*Indicates an acid-tolerant species

According to the ACCDC records review, there are no records of aquatic SAR or SOCC that have been historically observed within 10 km of the proposed project area. However, according to DFO SAR mapping review, Atlantic salmon, Inner Bay of Fundy population (Salmo salar) are identified throughout the Avon River watershed (DFO, 2021). Although suitable Atlantic salmon habitat was not identified during initial field studies, any watercourses that may be impacted by the final design will undergo additional detailed assessments to ensure that potential impacts to the species are considered and appropriately mitigated.

6.2.5 Species at Risk

The proposed Project is located in primarily forested area that has the potential to provide habitat for some species at risk (SAR) and species of conservation concern (SoCC) wildlife populations. Natural Forces is committed to protecting SAR, SoCC, and their habitat as important features and VECs related to the proposed Project.

Priority species and habitats for targeted species surveys were identified through a desktop analysis following the recommendations described in "A Guide to Addressing Wildlife Species and Habitat in an EA Registration Document". Surveys were conducted between April and October 2021 to characterize site-specific environmental conditions for wildlife and vegetation. For this EA, the following definitions of SAR and SoCC apply:

- Species at Risk (abbreviated SAR): A species that is determined to be Endangered, Threatened, or Vulnerable/Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), Nova Scotia Endangered Species Act (NSESA), or the federal Species at Risk Act (SARA); and,
- **Species of Conservation Concern** (abbreviated SoCC): those species that are not SAR but are identified as regionally vulnerable or imperilled by the Atlantic Canada Conservation Data Centre (ACCDC) (i.e., those species with ACCDC S-ranks of S1: Critically imperiled in province; S2: Imperiled in province; and S3: Vulnerable in province of Nova Scotia.

Dillon reviewed readily-available information from reputable sources. The information was reviewed to evaluate the potential for flora and fauna SAR and SoCC within 100 km of the Project. Dillon completed a review of the following sources and data lists for the purpose of characterizing existing conditions at the Project site:

- A custom ACCDC report (ACCDC 2021; refer to Appendix L);
- The federal SAR registry;
- The provincial Endangered Species registry;
- Publicly-available governmental Geographic Information Systems (GIS) map layers and databases;
- High resolution aerial photography; and
- Nova Scotia Provincial Landscape Viewer mapping resource.

Other available background information sources and mapping reviewed to identify and assess SAR and SoCC and their habitats within the LAA included:

- Provincial Parks and Protected Areas mapping;
- Environmentally Sensitive Areas (ESAs) database;
- Atlas of Breeding Birds of the Maritime Provinces (MBBA);
- Important Bird Areas (IBAs) of Canada;
- Federally-designated Migratory Bird Sanctuaries;
- Provincially-identified Deer Wintering Areas (DWAs); and
- Identified Protected Natural Areas and Wildlife Management Zones (WMZ).

Following a review of the ACCDC and the results of the 2021 biological VEC surveys, a list of historical SAR and SoCC flora and fauna detected at or within 10 km of the Project site were compiled. Tables 20 and 21 present the SAR and SoCC reported, respectively. SAR or SoCC within 100 km of the Project site are included in Appendix L.

TABLE 20: SPECIES AT RISK DETECTED OR REPORTED WITHIN 10 KM OF THE PROJECT SITE

Common Name	Scientific Name	Legal Protection Status	S-RANK	Observations
MAMMALS				
Little Brown Myotis	Myotis lucifugus	SARA: E COSEWIC: E NSESA: E	S1	Bat hibernaculum or bat species occurrence ACCDC report within 10 km.
Moose	Alces americanus	NSESA: E	S1	ACCDC report within 10 km.
Northern/ Long-eared Myotis	Myotis septentrionalis	SARA: E COSEWIC: E NSESA: E	S1	Bat hibernaculum or bat species occurrence ACCDC report within 10 km.

Common Name	Scientific Name	Legal Protection Status	S-RANK	Observations
Tri-colored Bat	Perimyotis subflavus	SARA: E COSEWIC: E NSESA: E	S1	Bat hibernaculum or bat species occurrence ACCDC report within 10 km.
REPTILES				
Eastern Painted Turtle	Chrysemys picta picta	SARA: SC COSEWIC SC COSEWIC: SC	S4S5	ACCDC report within 10 km.
BIRDS				
Bank Swallow	Riparia riparia	SARA: T COSEWIC: T NSESA: E	S2S3B	ACCDC report within 10 km.
Barn Swallow	Hirundo rustica	SARA: T COSEWIC: SC NSESA: E	S2S3B	ACCDC report within 10 km.
Bobolink	Dolichonyx oryzivorus	SARA: T COSEWIC T NSESA: V	S3S4B	ACCDC report within 10 km.
Canada Warbler	Cardellina canadensis	SARA: T COSEWIC: SC NSESA: E	S3B	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Chimney Swift	Chaetura pelagica	SARA: T COSEWIC: T NSESA: E	S2B,S1M	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Common Nighthawk	Chordeiles minor	SARA: T COSEWIC: SC NSESA: T	S2B	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Eastern Wood-Pewee	Contopus virens	SARA: SC COSEWIC SC NSESA: V	S3S4B	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Evening Grosbeak	Coccothraustes vespertinus	SARA: SC COSEWIC SC NSESA: V	S3S4B,S3N	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Olive-sided Flycatcher	Contopus cooperi	SARA: T COSEWIC: SC NSESA: T	S2B	Observed during the 2021 surveys. ACCDC report with 10 km.
Peregrine Falcon - anatum/tundrius	Falco peregrinus pop. 1	SARA: SC NSESA: V	S1B SNAM	Observed during the 2021 bird surveys.
Rusty Blackbird	Euphagus carolinus	SARA: SC COSEWIC: SC NSESA: E	S2B	Observed during the 2021 bird surveys in wetlands. ACCDC report within 10 km.
PLANTS and LICHENS				
Frosted glass-whiskers	Sclerophora peronella Atlantic pop.	SARA: SC COSEWIC: SC	S1?	2021 Observance on a hardwood tree in a mixed-wood forest.

Common Name	Scientific Name	Legal Protection Status	S-RANK	Observations
Wrinkled Shingle Lichen	Pannaria lurida	SARA: T COSEWIC: T NSESA: T	S1S2	ACCDC report within 10 km.

Notes:1 Atlantic Canada Conservation Data Centre (ACCDC) S-Ranks as follows: S1: Critically imperiled in province; S2: Imperiled in province; S3: Vulnerable in province; S4: Apparently secure, uncommon but not rare in province; S5: Secure: Common, widespread and abundant in province S#S# = a numeric range rank used to indicate any range of uncertainty about the status of the species or community. B= Breeding, N = Nonbreeding, M = Migrant, U = Unrankable. (ACCDC 2021)2 Species at risk are those species that are listed as E: Endangered, T: Threatened, V: Vulnerable or SC: Special Concern on Schedule 1 of the federal Species at Risk Act (SARA), the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or the Nova Scotia Endangered Species Act (NSESA) and species of conservation concern are those species not listed as SAR and ranked as S1-S3 by the ACCDC.

TABLE 21: SPECIES OF CONSERVATION CONCERN DETECTED OR REPORTED WITHIN 10 KM OF THE PROJECT SITE

Common Name	Scientific Name	S-Rank	Observations
INVEREBRATES			
Eastern Tailed Blue	Cupido comyntas	S3?	ACCDC report within 10 km.
Juvenal's Duskywing	Erynnis juvenalis	S3S4	ACCDC report within 10 km.
Pepper and Salt Skipper	Amblyscirtes hegon	S2S3	ACCDC report within 10 km.
MAMMALS			
Fisher	Martes americana	S3	Observed on a Benjamins Mill logging road in May 2021.
BIRDS			
American Kestrel	Falco sparverius	S3B	Observed during the 2021 bird surveys. ACCDC report within 10 km.
American Robin	Turdus migratorius	S5B, S3N	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Baltimore Oriole	Icterus galbula	S2S3B	ACCDC report within 10 km.
Bay-breasted Warbler	Setophaga castanea	S3S4B	Observed during the 2021 bird surveys in. ACCDC report within 10 km.
Black-backed Woodpecker	Picoides arcticus	S3S4	ACCDC report within 10 km.
Black-billed Cuckoo	Coccyzus erythropthalmus	S3B	Observed during the 2021 bird surveys.

Common Name	Scientific Name	S-Rank	Observations
Blackpoll Warbler	Setophaga striata	S3S4B	Observed during the 2021 bird surveys.
Boreal Chickadee	Poecile hudsonicus	S3	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Brown-headed Cowbird	Molothrus ater	S2B	ACCDC report within 10 km.
Canada Jay	Perisoreus canadensis	S3	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Cape May Warbler	Setophaga tigrina	S2B	Observed during the 2021 bird surveys.
Cliff Swallow	Petrochelidon pyrrhonota	S2S3B	ACCDC report within 10 km.
Eastern Kingbird	Tyrannus tyrannus	S3B	ACCDC report within 10 km.
Gray Catbird	Dumetella carolinensis	S3B	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Indigo Bunting	Passerina cyanea	S1?B	ACCDC report within 10 km.
Killdeer	Charadrius vociferus	S3B	ACCDC report within 10 km.
Nelson's Sparrow	Ammospiza nelsoni	S3S4B	ACCDC report within 10 km.
Northern Goshawk	Accipiter gentilis	S3S4	Observed during the 2021 surveys. ACCDC report within 10 km.
Northern Harrier	Circus hudsonius	S3S4B	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Pine Siskin	Spinus pinus	S2S3	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Purple Finch	Haemorhous purpureus	S4S5B,S3S4N	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Red Crossbill	Loxia curvirostra	S3S4	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Red-breasted Nuthatch	Sitta canadensis	S3	Observed during the 2021 bird surveys. ACCDC report with 10 km.
Rose-breasted Grosbeak	Pheucticus ludovicianus	S2S3B	ACCDC report within 10 km.
Ruby-crowned Kinglet	Regulus calendula	S3S4B	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Scarlet Tanager	Piranga olivacea	S2B	ACCDC report within 10 km.
Spotted Sandpiper	Actitis macularius	S3S4B	ACCDC report within 10 km.
Swainson's Thrush	Catharus ustulatus	S3S4B	Observed during the 2021 bird surveys. ACCDC report within 10 km.

Common Name	Scientific Name	S-Rank	Observations
Turkey Vulture	Cathartes aura	S2S3B	Observed during the 2021 bird surveys.
Veery	Catharus fuscescens	S3S4B	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Wilson's Snipe	Gallinago delicata	S3B	ACCDC report within 10 km.
Yellow-bellied Flycatcher	Empidonax flaviventris	S3S4B	Observed during the 2021 bird surveys. ACCDC report within 10 km.
PLANTS and LICHENS			
Drummond Moss	Drummondia prorepens	S3?	ACCDC report within 10 km.
Acadian Jellyskin Lichen	Leptogium acadiense	S3S4	2021 Observance on a hardwood tree in hardwood and mixed-wood forests.
Black Rock-wafer Lichen	Phylliscum demangeonii	S2?	ACCDC report within 10 km.
Blistered Tarpaper Lichen	Collema nigrescens	S3	2021 Observance on a hardwood tree in a mixed-wood forest.
Blue Vervain	Verbena hastata	S3	ACCDC report within 10 km.
Dwarf Bilberry	Vaccinium cespitosum	S3	ACCDC report within 10 km.
Eastern Candlewax Lichen	Ahtiana aurescens	S2S3	ACCDC report within 10 km.
Large Round-Leaved Orchid	Platanthera macrophylla	S2	ACCDC report within 10 km.
Lesser Sulphur-cup Lichen	Cladonia deformis	S2S3	ACCDC report within 10 km.
Mixed-up Pixie-cup	Cladonia mateocyatha	S2S3	ACCDC report within 10 km.
Muehlenbeck's Bryum Moss	Bryum muehlenbeckii	S1?	ACCDC report within 10 km.
Salted Shell Lichen	Coccocarpia palmicola	S3S4	ACCDC report within 10 km.
Shaggy Fringed Lichen	Anaptychia palmulata	S3S4	2021 Observance on a hardwood tree in a mixed-wood forest.
Silvery-flowered Sedge	Carex argyrantha	S3S4	ACCDC report within 10 km.
Triangular-valve Dock	Rumex triangulivalvis	S2	ACCDC report within 10 km.
Valley Oakmoss Lichen	Evernia prunastri	S3S4	ACCDC report within 10 km.
Hooker's Orchid	Platanthera hookeri	S3	ACCDC report within 10 km.
Powdered Fringe Lichen	Heterodermia speciosa		2021 Observance on a hardwood tree in a mixed-wood forest.

Common Name	Scientific Name	S-Rank	Observations

Notes:
Atlantic Canada Conservation Data Centre (ACCDC) S-Ranks as follows: S1: Critically imperiled in province; S2: Imperiled in province; S3: Vulnerable in province; S4: Apparently secure, uncommon but not rare in province; S5: Secure: Common, widespread and abundant in province S#S# = a numeric range rank used to indicate any range of uncertainty about the status of the species or community. B= Breeding, N = Nonbreeding, M = Migrant, U = Unrankable. (ACCDC 2021)
Species at risk are those species that are listed as E: Endangered, T: Threatened, V: Vulnerable or SC: Special Concern on Schedule 1 of the federal Species at Risk Act (SARA), the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or the Nova Scotia Endangered Species Act (NSESA) and species of conservation concern are those species not listed as SAR and ranked as S1-S3 by the ACCDC.

With respect to SAR or potential SAR that has the potential to be present at the Project site, the following section provides a brief description of the preferred habitat for SAR that have historically been reported at or near the Project site.

Mainland Moose (Alces americanus) are listed as Endangered by the NS ESA. Moose can reside in a variety of forest habitats; however, they require an abundance of mature forest for security and thermal cover, as well as areas of interspersed young deciduous trees and shrubs for browsing (NSDNRR 2021). Although not encountered, mainland moose were reported by the ACCDC as being observed within 10 km of the Project site and potential habitat is available at the site.

Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*) and Tri-colored Bat (*Perimyotis subflavus*) are listed as Endangered (SARA, COSEWIC and NSESA) and ranked by the ACCDC as S1 for critically imperiled in Nova Scotia. The bats were detected using acoustic bat monitors and, although the exact species of bat could not be determined, it is likely that all were Myotid bats. The Little Brown Myotis is the most common bat species in Nova Scotia and is the most likely species to occur the area; however, Northern Myotis may also be present, but in lower numbers. Both species are expected to occur with patchy distribution reflecting favourable habitat conditions and, in particular, available insect food sources. Habitat requirements for these bats include winter hibernacula such as caves or old mine openings that maintain a relatively stable temperatures (2-10°C) and high humidity levels (>80 %) throughout the winter, as well as summer day-roosting and maternity-roosting habitat such as abandoned woodpecker cavities, loose bark, knot holes, cracks or hollows. Bats exhibit high site fidelity to known hibernacula in the region, although, there are no known hibernacula within the LAA for the Project. Summer day-roost and maternity-roost sites may occur in suitable tree features, such as abandoned woodpecker cavities, loose bark, knot holes, cracks or hollows. Additionally, bats may also use cavities and crevices in or on human infrastructure as roosting sites. However, most of the time roost sites are mature trees (dead or alive) with a large hollowed-out cavity or cavities.

Canada Warbler (Wilsonia canadensis) is listed as threatened (SARA), special concern (COSEWIC), endangered (NSESA) and ranked by the ACCDC as S3B for vulnerable in Nova Scotia for the breeding population. Canada Warblers typically breed throughout Maritimes and southeastern Canada. This species prefers wet mixed forests with well-developed shrub layers, as well as regenerating areas. Canada Warblers were detected within the Project site and suitable nesting habitat does exist within the

PDA. Most observations of Canada Warblers were reported during the spring and summer surveys with 8 and 15 reported observations, respectively; however one observation was noted early during the fall migratory period (late August). Detections were noted as at Point Count (PC) locations that spanned the site and multiple habitat types.

Bobolink (Dolichonyx oryzivorus) is listed as threatened (SARA and COSEWIC), vulnerable (NSESA) and ranked by the ACCDC within Nova Scotia as S3S4B for apparently secure to vulnerable for the breeding population. Bobolinks typically occur in grassland habitats. This species was detected within 10 km of the Project site according to ACCDC records; however no observances were reported during the 2021 surveys. Suitable habitat for Bobolink was limited and they are not expected to occur frequently at the site.

Chimney Swift (Chaetura pelagica) is listed as threatened (SARA and COSEWIC), endangered (NSESA), special concern (COSEWIC) and ranked by the ACCDC within Nova Scotia as S2B for imperiled for the breeding population and S1M as critically imperiled for the migratory population. Historically, the Chimney Swift used mainly large hollow trees for nesting sites but have adopted chimneys as preferred nesting sites. They are generally associated with urban and rural areas where chimneys are available for nesting and roosting. Chimney Swifts are aerial foragers and tend to concentrate near water where insects are abundant. This species was detected within the Project site in 2021 and is likely to use the site for foraging purposes. Suitable nesting habitat for chimney swifts was not observed on the Project site. Most observations of Chimney Swift were reported during the fall migration with 5 reported observations on September 24, 2021 from a single location in a previously forested area of the site. One additional bird was observed during a summer breeding survey on June 3, 2021.

Common Nighthawk (Chordeiles minor) is listed as Threatened (SARA and NSESA), Special Concern (COSEWIC) and ranked by the ACCDC as S2B for imperiled in Nova Scotia for the breeding population. They typically nest on the ground in open or sparsely vegetated habitats. This species was detected within the Project site and suitable nesting habitat does exist. Most observations of common nighthawks were reported during the summer surveys with 9 reported observations between June 3 and 24, 2021; however one bird was observed during a spring migratory survey (May 28, 2021) and an additional two were observed early during the fall migration period (on August 12, 2021).

Eastern Wood-Pewee (Contopus virens) is listed as Special Concern (COSEWIC/SARA) and Vulnerable (NSESA) and ranked by the ACCDC as S3S4B for vulnerable to apparently secure in Nova Scotia for the breeding population. Eastern Wood-pewee breed throughout Nova Scotia during the summer months before migrating to northern South America for wintering. This species breeds in open woodland of all types in Nova Scotia, but shows a preference for forests with a dominance of deciduous trees. The Eastern wood-pewee forages on flying insects in the middle canopy. This species was detected within the Project site in 2021 and is likely to use the site for foraging and nesting purposes.

Evening Grosbeak (*Coccothraustes vespertinus*) is listed as Special Concern (SARA and COSEWIC), Vulnerable (NSESA) and ranked by the ACCDC as S3S4B S3N in Nova Scotia for vulnerable to apparently secure for the breeding population and vulnerable for the non-breeding population. Evening grosbeaks tend to nest in older growth and second-growth conifer-dominated forests. They primarily prey on insects and their larvae during the breeding season, on a wide variety of seeds and the leaf buds of many deciduous tree and shrub species over winter. Evening grosbeaks were identified during the 2021

late-winter, spring summer and fall bird surveys. Potential breeding habitat for the evening grosbeak does exist in forested areas with mature trees present on the Project site.

Olive-sided Flycatcher (Contopus cooperi) is listed as Threatened (SARA and NSESA), Special Concern (COSEWIC) and ranked by the ACCDC as S2B for imperiled in Nova Scotia for the breeding population. This species nests in open, forested areas, often with many conspicuous perches. Olive-sided Flycatchers were detected within the Project site and suitable nesting habitat does exist. Most observations of olive-sided flycatchers were reported during the spring and summer surveys with 20 and 21 reported observations, respectively; however 5 observations were noted early during the fall migratory period (late August) at locations that spanned the site and multiple habitat types.

Peregrine Falcon - anatum/tundrius (Falco peregrinus) is listed as Special Concern (SARA), Vulnerable (NSESA) and ranked by the ACCDC as S1B for critically imperiled in Nova Scotia for the breeding population. They typically nest on cliff ledges along coasts, and major rivers and are known to reuse nesting location. This species has been known to nest on tall buildings, apparently finding them suitable replacements for cliffs. Two Peregrine Falcons were observed at the Project site during the fall migratory surveys. Although this species was not detected during the breeding season, there are numerous bedrock outcroppings that could provide potential nesting habitat for Peregrine Falcons.

Rusty Blackbird (Euphagus carolinus) is listed as special concern (SARA and COSEWIC), endangered (NSESA) and ranked by the ACCDC as S2B for imperiled in Nova Scotia for the breeding population. Rusty blackbirds nest in conifer-dominated forests, wetlands, bogs and wet meadows. This species may occur within the Project site as suitable nesting habitat does exist. During the 2021 bird surveys, 2 Rusty Blackbirds were detected during the spring migration window in wetlands (i.e., on May 5, 2021).

Bank Swallow (Riparia riparia) is listed as threatened (SARA and COSEWIC), endangered (NSESA) and ranked by the ACCDC as S2S3B for vulnerable to imperilled in Nova Scotia for the breeding population. Bank swallows are a colonial breeder that is found across Nova Scotia in lowlands along rivers, streams and ocean coasts and nest around vertical, or near vertical cliffs or banks. These birds are aerial insectivores catching nearly all their prey in flight which requires open areas. This species was detected within 10 km of the Project site according to ACCDC records; however no observances were reported during the 2021 surveys. Suitable habitat for bank swallows is limited and they are not expected to occur frequently at the site.

Barn Swallow (Hirundo rustica) is listed as threatened (SARA and COSEWIC), endangered (NSESA) and ranked by the ACCDC as S2S3B for vulnerable to imperiled in Nova Scotia for the breeding population. Barn Swallows typically inhabit open areas near human settlements and land uses including parks, ball fields, golf courses and agricultural fields where they forage for flying insects. These birds will typically construct their nests on human-made structures, and rarely in more natural locations such as cliffs, caves or hollowed trees. Barn swallows are migratory and winter in Central and South America. This species was detected within 10 km of the Project site according to ACCDC records; however no observances were reported during the 2021 surveys. Suitable habitat for bank swallows is limited and they are not expected to occur frequently at the site.

Eastern Painted Turtle (Chrysemys picta picta) is listed as Special Concern (SARA and COSEWIC) and ranked by the ACCDC as S4S5. Painted Turtles prefer wetland and water bodies habitats with slow

moving, relatively shallow and abundant vegetation, as well as basking sites (COSEWIC 2018). Suitable nesting habitat includes open sloped areas with sandy-loamy and/or gravel substrate that is generally within 1200 m of a waterbody (COSEWIC 2018). Suitable overwintering habitat requires shallow water bodies with deep sediment (COSEWIC 2018). This species was detected within 10 km of the Project site according to ACCDC records; however no observances were reported during the 2021 surveys. Suitable habitat for nesting, basking and overwintering was observed on the Project site during the 2021 surveys.

Two lichen SAR were observed on the Project site during the 2021 field surveys. Both lichens are typically found growing on the bark of mature hardwood trees. Frosted Glass Whiskers Atlantic population (Sclerophora peronella) is listed as Special Concern (SARA and COSEWIC) and ranked by the ACCDC as S1? for potentially critically imperiled in Nova Scotia; however the numeric rank is considered to be inexact or uncertain. Wrinkled Shingle Lichen (Pannaria lurida) is listed as Threatened (SARA, COSEWIC and NSESA) and ranked by the ACCDC as S1S2 for imperiled to critically imperiled in Nova Scotia. Suitable habitat for lichen SAR is limited to areas of the list that have not been previously harvested such as the Crown land at the north of the Project site.

6.2.5.1 Environmentally Sensitive or Managed Areas

Based on a desktop review, the following is a summary of environmentally sensitive or managed areas with 10 km of the Project site:

- The ACCDC report identified three managed areas and one environmentally sensitive area within 10 km of the Project Site, which are:
  - The Falmouth Municipal Water Supply and the Falmouth Water Supply are located to the north and Mill Lakes Watershed is located to the north east of the Project, approximately seven and five kilometers from the nearest proposed WTG locations, respectively.
  - The Southern Bight Minas Basin Important Bird Area is located north west of the Project site and is approximately 4.1 km away from the nearest proposed WTG. Details of bird surveys are presented in **Section 6.2.**2 and in Appendix H.
- Falls Lake and Mockingigh Lake of the Avon River Watershed are designated as habitat for significant habitat for a species of concern. Falls Lake is located approximately 2 km southeast of the nearest proposed WTG.
- The nearest Provincial Park (Falls Lake Provincial Park) is 4.3 km from the nearest proposed WTG.
- The nearest Provincially Protected Nature Reserves (Panuke Lake Nature Reserve) and Wilderness Areas (South Panuke Wilderness Area); are located >5 km from the nearest proposed WTG locations.
- There are no provincially identified Deer Wintering Areas (DWAs) or Protected Natural Areas (PNAs) within the Project site.
- Lastly, no part of the Project site was identified as Core Habitat or federally identified Critical Habitat with respect to species listed as Endangered or Threatened under either the federal SARA or provincial NSESA.

6.3 Socioeconomic VECs

The Project is located in the West Hants area of Hants County, approximately 13 km southwest of Windsor, Nova Scotia. Impacts and benefits from the Project will be attributed to communities across the West Hants Municipal District, shown on Figure 19. The latest Statistics Canada data was reviewed to obtain information on the population and local economy of the West Hants Municipal District, as well as an overview of the tourism/recreation industry within the area. This allows the Proponent to evaluate how the Project may affect the community and local economy. Background on the area and populations of the municipal district and nearby centres are summarized below.

Demographic Overview

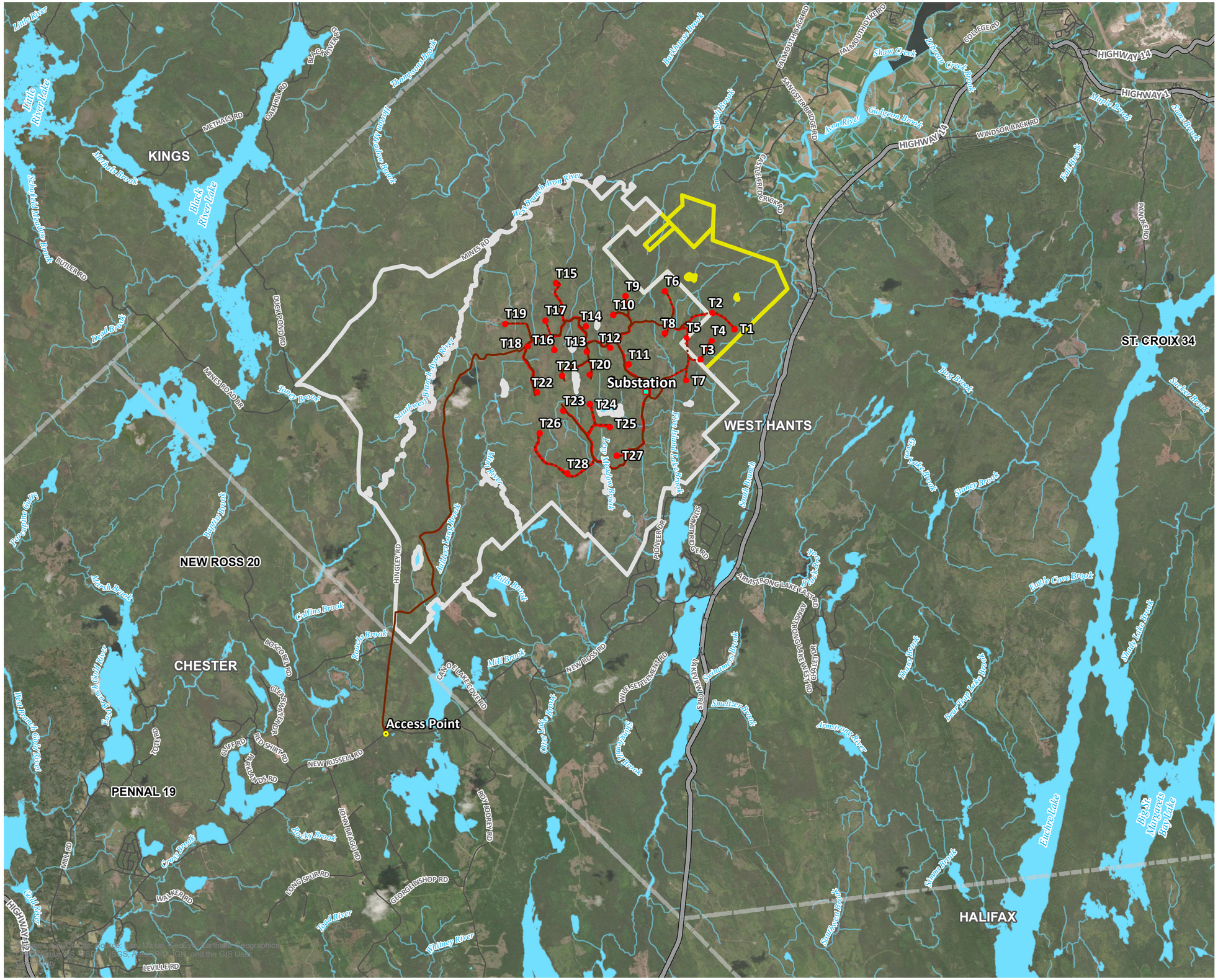
In 2016, the population of the West Hants Municipal District Census Subdivision (CS) was 15,368 (Statistics Canada 2017). Overall, the population of West Hants is growing at a rate of 0.77% per year over the past 15 years of census data (from 2001 to 2016). Statistics on the population and demographics of the West Hants Municipal District and Nova Scotia are presented in Table 22.

TABLE 22: POPULATION AND DEMOGRAPHICS FOR WEST HANTS CS AND NOVA SCOTIA

	West Hants CS	Nova Scotia
Population in 2016	15,368	923,598
Population in 2011	15,324	921,727
2011-2016 Population Change (%)	0.3	0.2
Total private dwellings (2016)	7,175	458,568
Total number of households (2016)	6,426	401,990
Population density per square km (2016)	12.4	17.4
Land area (square km) 2016	1,244.09	52,942.27
Median Age of the Population (2016)	46.6	45.5

The population of the West Hants Municipal District is similar to the provincial median age of 45.5, with a median age of 46.6. This data is in line with the Province of Nova Scotia's trends of urbanizing and aging populations. The population by age cohort in West Hants is presented in Figure 20.

Police and hospital services are available in West Hants to service the needs of the community. The West Hants Detachment of the RCMP is located in Windsor Nova Scotia. The nearest hospital with emergency services to the Project site is the Hants Community Hospital, also located in Windsor, NS.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Substation
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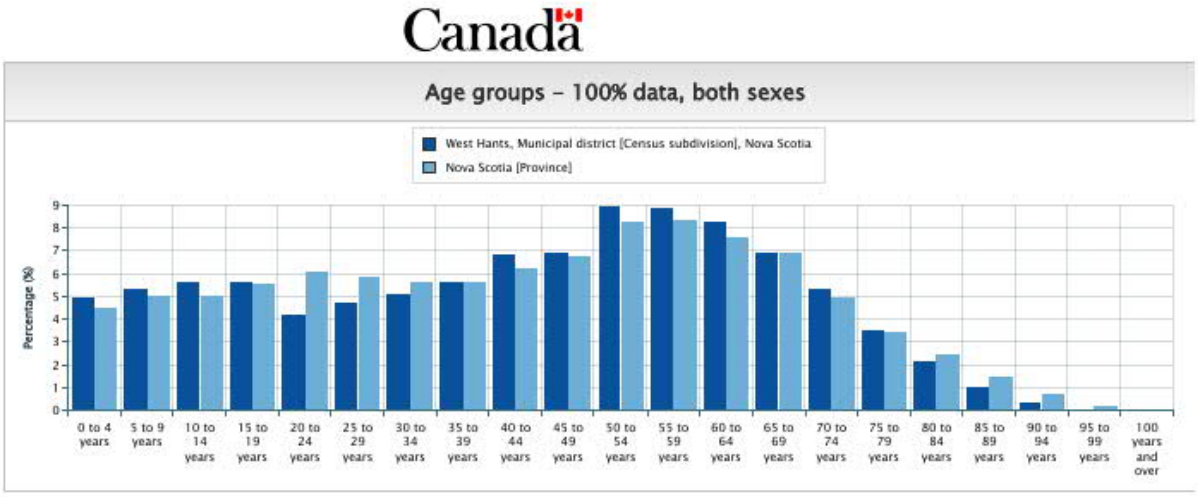
T26
T25
T27
T28
Access Point
KINGS
WEST HANTS
ST. CROIX 34
NEW ROSS 20
CHESTER
PENNAL 19
HALIFAX
HIGHWAY 14
HIGHWAY 1
METHALS RD
OAK HILL RD
MINES RD
BUTLER RD
DUBE POND RD
MINES ROAD BR
FALMOUTH BACK RD
FALMOUTH DYKE RD
COLLEGE RD
SANGSTER BRIDGE RD
WINDSOR BACK RD
COLLEGE ROAD
PARK RD
HINGLEY RD
BOSCOBEL RD
CLEVERDALE RD
RED SHIRT RD
CLIFF RD
NEW RUSSELL RD
JOHN BRAGG RD
ROY JODREY RD
LONG SPUR RD
GEORGE BISHOP RD
WALKER RD
MILL RD
LEVILLE RD
CANOE LAKE COVE RD
NEW ROSS RD
VALE SETTLEMENT RD
ARMSTRONG LAKE CAMP RD
ARMSTRONG LAKE WEST RD
ARMSTRONG LAKE EAST RD
ADMIRAL RIDGE RD
PIONEER DR
Little River
Little River Lake
Black River Lake
Shubenacadie Meadow Brook
Meshek Brook
Dead Brook
Tony Brook
Thompsons Brook
Meadow Brook
Bar House Brook
Shaw Creek
Gudgeon Brook
Avon River
Ledrew Creek Brook
Maple Brook
Sumac Brook
Pull Brook
Bog Brook
Straker Brook
Stoney Brook
Eagle Cove Brook
Shady Lake Brook
Bear Trap Lake Brook
Three Brook
Smeltzer Brook
Armstrong River
Sandpiper Brook
Sawmill Brook
Otter Lake Brook
Mill Brook
Collins Brook
Hogsbs Brook
Marsh Brook
Baptist Brook
Ardoise Loop Brook
Bills Brook
Lake Pleasant
Lake Thomas
Lake Lamont
Lake Mary Ann
Lake Pemberton
Lake Ellenwood
Lake Lawrencetown
Lake Charlotte
Lake Echo
Lake Fletcher
Lake Banook
Lake Micmac
Lake Major
Lake Susan
Lake Loon
Lake Wentworth
Lake Williams
Lake Thomas
Lake Rosemary
Lake Lamont



Source: Statistics Canada 2016 Census of Population Community Profiles

FIGURE 20: POPULATION BY AGE COHORT, WEST HANTS CS AND NOVA SCOTIA

6.3.1 Economy

The Project is located within the Province's West Hants Economic Region (the Region) which includes Benjamins Mill, Mill Section, Vaughan, and Windsor Forks Counties. Statistics Canada identified that there are approximately 7000 residents actively employed, representing a participation (employment) rate of 59.5% (Statistics Canada 2017). This participation rate is slightly lower than the provincial average of 61.3%.

The West Hants employment profile is dominated by work in the trades, transport and equipment operators, sales and service occupations, and business, finance, and administration occupations. These industries account for more than 58% of the total employment in the Region. Labour Force by Industry statistics are provided for the West Hants Municipal District in Table 23.

TABLE 23: LABOUR FORCE BY INDUSTRY, WEST HANTS MUNICIPAL DISTRICT

Industry	Total (%)
Agriculture, forestry, fishing and hunting	3.5
Mining, quarrying, and oil and gas extraction	0.8
Utilities	0.7
Construction	13.1
Manufacturing	9.0
Wholesale trade	4.4
Retail trade	10.7
Transportation and warehousing	4.4
Information and cultural industries	0.9

Industry	Total (%)
Finance and insurance	2.7
Real estate and rental leasing	0.9
Professional, scientific and technical services	5.5
Management of companies and enterprises	0
Administrative and support, waste management and remediation services	6.4
Educational services	7.7
Health care and social assistance	13.6
Arts, entertainment and recreation	1.9
Accommodation and food services	4.9
Other services (except public administration)	4.3
Public administration	6.2

Natural Forces remains committed to engaging local service providers where possible during each phase of the Project. The Project has the potential to stabilize costs for Nova Scotia Power customers and increase property tax revenues for the Windsor-West Hants Regional Municipality.

6.3.2 Land Use and Value

The Project area is proposed on predominantly privately-owned land parcels with a smaller footprint located on provincial Crown lands. The privately owned site lands have been recently and historically used for forestry activities and have a network of existing forestry roads. Crown land in the area, which is open to a variety of uses, is predominantly composed of mature forest growth. Existing development in the area is concentrated along Highway 14 and is generally limited to the small communities in the areas of Smiths Corner (southeast of the Project area) and Windsor Forks (northeast of the Project area). There are various land uses to consider on the Project lands and Natural Forces remains committed to working with land owners and users to maintain safe use and enjoyment of these lands. Further details on the public consultation completed is detailed in Section 4.0.

The primary building type in the West Hants Municipal District is residential dwellings. There are 6,425 private dwellings in the district, of which 5,750 are single-detached homes. According to Statistics Canada (2017), the average value of a property within the West Hants Census Subdivision in 2016 was $219,394, the majority of which are single detached houses. Property value in the CS is slightly lower than the provincial average of $230,441. The Project is not expected to impact property values based on a review of the available literature which found that there were no correlating negative associations between wind farms and property value. In 2010 a study in the Municipality of Chatham-Kent, Ontario was prepared to assess the effects of wind energy on real estate values. This report was prepared in accordance with the Canadian Uniform Standards of Professional Appraisal Practice for the Appraisal Institute of Canada (Canning et al. 2010). The study found that it was highly unlikely that a relationship exists between wind farms and the market values of rural residential real estate. Additionally, a study analyzing more than 7,000 home and farm sales from 2002 to 2010 in the Melancthon Township and 10

surrounding counties found that Ontario's first and largest wind farm (133 turbines) had "no statistically significant effect" on property values (Vyn and McCullough 2014). Further, the study found a lack of significant effect is similar across both rural residential properties and agricultural properties (Vyn and McCullough 2014).

There are existing radiocommunication systems near the Project lands. Of the various types of radiocommunication towers, the three that are within 20 km of the Project are fixed (point-to-point), broadcast, and land mobile towers. The point-to-point (PTP) towers within 20 km of the Project have three links that cross or come near to the proposed turbine locations. The nearest broadcast tower is approximately 13 km away from the closest wind turbine. The nearest land mobile tower is approximately 2.5 km away from the closest wind turbine. These distances are illustrated on the maps included in the Radiocommunication System Impact Study included in Appendix M.

The center of the Project area is approximately 5 km from both the communities of Smiths Corner and those surrounding Falls Lake, and the community of Windsor Forks. These communities are composed of various residential, agricultural, industrial and commercial properties. The nearest structure to the site is a single-detached residential dwelling located approximately 1.6 km from the nearest proposed turbine location.

6.3.3 Transportation

Delivery of materials and equipment will be phased throughout the construction period depending upon the specific construction activity. The vehicles likely to be involved include:

- Large trucks with trailers for delivery of materials, earth-moving equipment and cargo containers for storage of tools and parts;
- Dump trucks to deliver and/or move stone for constructing the internal site road;
- Concrete trucks for constructing WTG foundations;
- One 600 tonne main lift crane;
- One 500 tonne base and mid install crane;
- One 60 tonne pre-assembly crane;
- WTG component delivery vehicles; and
- Miscellaneous light vehicles including cars and pickup trucks.

Of these predicted vehicle movements, some will be oversized loads associated with the delivery of the WTG component parts (towers, blades, nacelles) and the cranes required for erection. These deliveries will be subject to movement orders and permits as agreed upon with governing authorities.

In addition to private roads on private land, publicly managed roads will be used for transportation to the Project site and any potential modifications to intersections for access to the Project Area will follow appropriate traffic controls and permitting. The site is currently accessed via Hingley Road, a one lane gravel forestry road that branches out into a network of other forestry roads throughout the Project area. Access to Hingley Road is located on the north side of New Russell Road, approximately 8.5 km

southwest of the site. Existing access roads will need to be widened to support heavy equipment and material movements and turning radii.

The construction delivery route will be decided after a review of the local road network and through consultation with local authorities in each jurisdiction. Roads used for the construction phase of the Project will comply with intermediate and maximum weight road restriction lists (provided online on the Nova Scotia *Roads Designation* website). If required, a Transportation Plan will be provided to the Nova Scotia department of transportation.

Wind turbines are required to be setback from public highways, roads, and streets, which includes roads and streets within boundaries of a city, designated highways, and areas designated for those purposes in a community plan. The Project layout does not infringe on the minimum setbacks from public roads or transportation routes.

6.3.4 Recreation and Tourism

Nova Scotia markets itself as a tourism destination, with a tourism industry that generated an estimated $2.7 billion in tourism revenues in 2017. The province also contributed more than $2.2 billion to tourism-related GDP, and generated 39,500 direct and spinoff jobs in 2017. In 2017, tourism revenues were an estimated $2.7 billion for the province as a whole (Tourism Nova Scotia 2018). The Nova Scotia tourism industry has a goal of reaching $4 billion in tourism revenues by 2024.

West Hants Municipal District falls into the Annapolis Valley tourist region, which accounts for approximately 15% of the province's tourism revenues (Tourism Nova Scotia 2018). Tourism in the southern part of the county, which encompasses the Project site, includes a variety of lakes and recreational cottaging areas (Annapolis Valley Tourism 2019). There are no recreational parks or areas on or adjacent to the Study Area. Recreational activities associated with the forestry related land use in the area include hunting, snowmobiling, and ATV use. It is assumed that these activities may be occurring within the Project area.

Falls Lake, located approximately 5 km from the centre of the Project, is a popular tourist destination that provides various recreational activities such as boating, swimming, canoeing, and sport fishing. Numerous cottages, campgrounds and a provincial park also reside on this lake.

Interactive mapping from Nova Scotia Trails was reviewed for recreational trails that may be locally present. The mapping does not show any trails on the Project area, but it does show hiking trails in the area surrounding the Project lands, including Moses Mountain Trail, Falls Lake Municipal Land Trail, the Falls Lake Provincial Park Trail, and the Castle Frederick Farms recreational trails.

Federal, provincial, and local recreational sites, tourism features, and parks within a 5 km radius of the Project site are provided below in Table 24.

TABLE 24: RECREATIONAL AND TOURISM FEATURES NEAR THE PROJECT SITE

Feature	Distance to nearest WTG
Moses Mountain Trail	1.9 km
Falls Lake Cottages and Campground	2.1 km
Falls Lake Provincial Park	4.3 km
Ski Martock	5.3 km

6.3.5 Human Health and Safety

A review of possible health and safety concerns has been included in this assessment. Effects to human health associated with construction, operation, or decommissioning of wind turbines are considered minimal or non-existent due to the size and location of the Project, mitigation, and setback distances.

The wind turbine models under consideration have been selected in order to comply with international wind class standards, and to help reduce the risk of ice build-up, lightning strikes and general malfunctions. Natural Forces has an in-house construction manager who oversees construction activities and will encourage safe practices for worker safety. A copy of the Occupational Health and Safety (OHS) Act will also be located on site at all times.

Many of the mentioned assessments are conducted to ensure the construction and operation of the Project will occur in the safest manner possible and will often reduce many of the concerns and risks before construction begins such as possible noise and shadow flicker annoyance.

The public can be concerned about the potential for impacts to human health from wind turbines. Common concerns include:

- Risk of ice throw (addressed in **Section** 8.3);
- Sound (addressed in **Section** 7.1.1.4);
- Shadow flicker (addressed in **Section** 7.1.3.1);
- Infrasound;
- Electromagnetic fields (EMF); and
- Effects to air quality from dust and air emissions (addressed in **Section** 7.1.1.3).

Low frequency sound is defined as sound with a frequency less than 200 Hertz (Hz) or cycles per second. Infrasound, also referred to as low-frequency sound, is sound that is not audible to humans, which is typically below a frequency of 20 Hz (MOE, 2010).

Infrasound levels created by wind turbines are often comparable to the ambient levels prevalent in the natural environment, such as levels created by the wind itself. In terms of health, at sufficiently high levels, infrasound can be dangerous; however, it is inaccurate to conclude that infrasound from wind turbines causes health risks (MOE, 2010).

A recent study conducted by the Massachusetts Institute of Technology found that infrasound near wind turbines does not exceed audibility thresholds. Epidemiological studies have shown a relationship between living near turbines and annoyance. Annoyance appears to be strongly related to individual characteristics rather than noise from turbines. However, infrasound and low-frequency sound do not present unique health risks. (McCunney et. al., 2014).

Electromagnetic fields (EMFs) are a type of energy that occurs naturally and is created through the use of electrical appliances and equipment (City of Toronto 2011). A guidebook to Wind Energy Development was produced in 2011 and identified transmission lines, wind turbine generators, generator transformers and underground cables as the four potential sources of EMFs as a result of wind farm operations (Canadian Wind Energy Association [CanWEA] 2011). The guidebook goes on to suggest that EMF exposure is not significant due to low emission levels produced by wind farm operations and indicates that generator transformers likely generate the highest levels of EMFs, although still low levels, relative to all other wind farm operational components. Similar conclusions have been made by Health Canada and the World Health Organization (Chief Medical Officer of Health of Ontario 2010).

6.4 Cultural and Heritage VECs

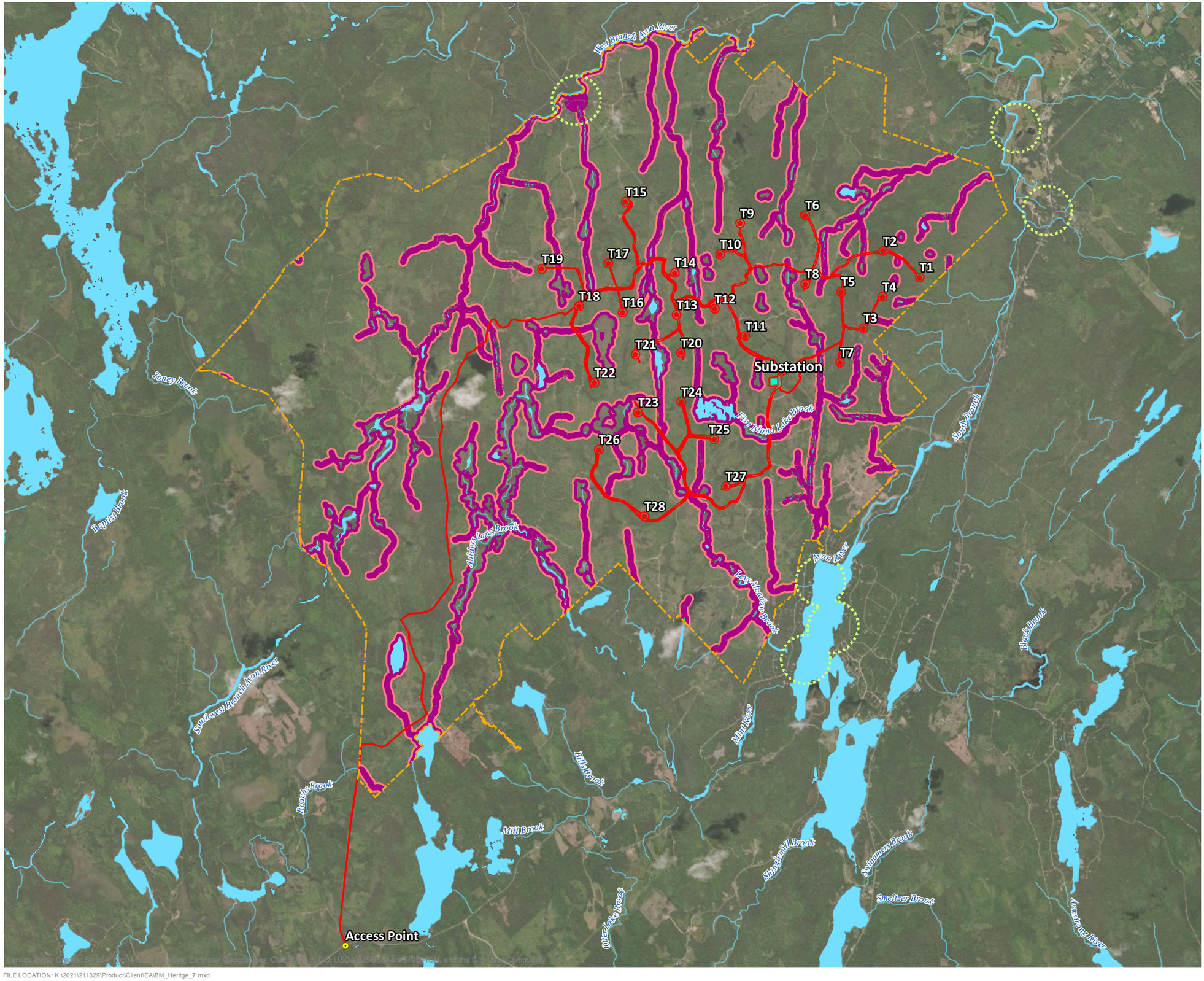
Based on the proximity to the Avon River (approximately 2 km), there is potential for Indigenous cultural heritage resources (both pre-contact and historic) or Euro-Canadian resources to exist within the Project area, despite their disturbed nature. However, the Project area has been described as having a low potential for encountering archaeological resources (Appendix N). Areas with higher potential for archaeological and cultural resources may be found along the shoreline of waterbodies such as the Avon River.

6.4.1 Archaeological and Cultural Resources

An Archaeological Resource Impact Assessment (ARIA) was conducted by Cultural Resource Management (CRM) Group Limited. The purpose of the assessment was to determine the potential for archaeological resources within the Project area and to provide recommendations for further mitigation if required.

According to the 2021 ARIA conducted for the Project in October 2021, there is one registered archaeological site within the proposed Project area. The registered site is of an isolated ground slate point recovered near a tributary of the Avon River, near the northernmost portion of the study area, shown on Figure 21. Despite the site being registered as an isolated find, its full extent is currently unknown; therefore, the 200 metre buffer has been established out of an abundance of caution. The isolated find, including the 200 m buffer are located outside of the PDA. In addition, 13 registered sites are located within a one-kilometre radius of the Project lands, all of which are Historic or Mi'kmaq in nature (CRM Group 2021; Appendix N). Background research of the Project Area yielded no evidence of National Historic Sites, Special Places, Protected Areas, National or Provincial Parks within the PDA.

Historical mapping from approximately 1871 revealed that no historic period settlement or development has occurred within the study area, aside from possible sawmill activity along the northern boundary in the late nineteenth to early twentieth centuries and the creation of modern logging roads.



Natural Forces

BENJAMINS MILL WIND PROJECT

FINDINGS WITHIN THE CULTURAL AND HERITAGE LOCAL ASSESSMENT AREA

FIGURE 21

- Proposed Access Point
- Proposed Turbine Location
- Substation
- Project Development Area
- Local Assessment Area
- Watercourse
- Waterbody
- 200 m Buffer of a Registered Archaeological Site

Areas of Moderate Archaeological Potential

- Moderate
- High

0 0.25 0.5 1 km

SCALE 1:60,000

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY DILLON CONSULTING, GEONB, NATURAL FORCES

MAP CREATED BY: MEC
MAP CHECKED BY: KB
MAP PROJECTION: NAD 1983 UTM ZONE 20N

DILLON CONSULTING

PROJECT: 21-1329
STATUS: DRAFT
DATE: 2022-01-10

FILE LOCATION: K:\2021\211329\Product\Client\EA\BM_Heritge_7.mxd

The study area was therefore ascribed low potential for encountering early Euro-Canadian archaeological resources (CRM Group 2021).

An Archaeological Reconnaissance consisting of a walkover of portions of the Project Area with a specific focus on proposed turbine locations and impact areas is recommended by CRM Group prior to any ground disturbance activity.

6.4.2 Existing and Historic Land Uses

Archaeological records indicate that the proposed Project area and vicinity were utilized and occupied by the Mi'kmaq from at least the Archaic Period to the historic period (10,000 B.P. to present) and by European settlers from at least the second half of the seventeenth century. From 1896 to 1911, businessman S.P. Benjamin operated a sawmill on the West Branch Avon River. As part of the history of forestry in the region, in 1937, several woodlots within the Project Area were transferred from the Windsor Lumber Company to the Crown (CRM Group 2021).

Today, the Project Area consists of both privately-owned lands and Crown Lands owned by the Province of Nova Scotia. Presently, the privately-owned lands are used for forestry activities and Crown Lands are open to a variety of uses.

7.0 Effects of the Undertaking on the Environment

The potential interactions with the surrounding environment have been considered in terms of each distinct Project phase and corresponding activities associated with the Project as planned. Interactions due to accidents, malfunctions and unplanned events can be found in **Section** 7.5.

The initial screening (i.e., project interaction matrix) provided in Table 25 assists in determining if an interaction between the activities being carried out in each Project phase and the VEC. A qualitative rating system was used to evaluate the potential for interactions is possible between the Project and the environment. One of the following two ratings was prescribed for each individual VEC:

- An interaction between the Project and the environment could occur (which is identified with as 'x' in the matrix below), which are carried forward for further assessment; or
- No interaction occurs between the Project and the environment (which is identified by a blank cell in the matrix below), and therefore no further assessment is required and the interaction is not discussed further.

Based on the Project description (refer to **Section 2.0**), the VECs (refer to **Section 6.0**), and the scope of the EA, the potential interactions between the Project and the environment are summarized in Table 25 below.

TABLE 25: POTENTIAL PROJECT INTERACTIONS WITH VALUED ENVIRONMENTAL COMPONENTS

Valued Environmental Components		Site Preparation and Construction						Operations and Maintenance		Decommissioning		Accidents, Malfunctions and Unplanned events
		Clearing and Grubbing	Turbine Foundation	Electrical Works	Turbine Installation	Commissioning	Restoration of the site	Turbine Operation	Inspection and Maintenance	Infrastructure Removal	Site Reclamation	
Atmospheric Environment	Weather Conditions											
	Climate and Climate Change							x				
	Ambient Air Quality	x	x								x	x
	Ambient Noise Levels	x	x		x		x	x		x	x	
Physical Environmental Setting	Geology	x										x
	Surface Water	x		x						x	x	x
	Groundwater	x		x							x	x
Visual Environment	Shadow Flicker							x				x
	Visual Aesthetics	x						x				x
Terrestrial Environment	Vegetation	x	x	x			x			x	x	x
	Wildlife	x		x				x		x	x	x
	Wetlands	x	x	x			x			x	x	x
Birds	Birds and Bird Habitat	x		x				x			x	x
Bats	Bats and Bat Habitat	x		x				x				x
Aquatic Environment	Fish and Fish Habitat	x		x			x				x	x
SAR	SAR and SOCC	x		x			x	x			x	x
Socioeconomic Environment	Economy	x	x	x	x	x	x	x	x	x	x	
	Land Use and Value	x						x		x	x	x
	Transportation	x			x					x	x	x
	Recreation and Tourism							x				
	Human Health and Safety											x
Cultural and Heritage Resources	Archaeological and Cultural Resources;	x	x	x				x			x	x
	Existing and Historical Land Uses	x	x	x	x		x	x		x	x	x

7.1 Physical VECs

7.1.1 Atmospheric Environment

The potential interactions between the Project activities during all phases and the atmospheric environment are assessed in this section.

7.1.1.1 Weather Conditions

WTGs take up a very small space within the troposphere, the layer of the atmosphere which creates the local weather (NOAA 2021). Although the Project will harness some of the energy produced by the predominant winds at the Project site, the Project itself is not anticipated to interact, or change, the current average weather conditions at the Project site.

7.1.1.2 Climate and Climate Change

Potential Interactions and Mitigation

The purpose of the Project is to provide renewable energy to the Province of Nova Scotia to help reach goals of producing 80% of electricity from renewables by the year 2030. By reaching these targets, there will be a significant reduction in greenhouse gas emissions through the reduction of fossil fuel use in the energy sector. This reduction in greenhouse gas emissions will help global efforts of slowing climate change and will help mitigate the associated risks.

The potential interactions of the Project in relation to climate change and proposed mitigative measures are summarized in Table 26.

TABLE 26: POTENTIAL INTERACTIONS AND PROPOSED MITIGATIVE MEASURES FOR CLIMATE AND CLIMATE CHANGE

Potential Interactions with Climate	Proposed Mitigative Measures
The electricity produced from this Project will supply Nova Scotia with clean renewable energy, reducing fossil fuel use.	• Reducing reliance on fossil fuels is a positive impact. No mitigation is proposed.
The Project will help the province in achieving renewable energy goals in an attempt to reduce emissions and slow climate change and associated risks.	• Reducing reliance on fossil fuels is a positive impact. No mitigation is proposed.

Significance of Residual Effects to Climate

The Project will help global long-term efforts to slow climate change and as such, the significance of residual effects on climate is to be considered beneficial. No negative effects of the Project on climate are anticipated.

7.1.1.3 Ambient Air Quality

Potential Interactions and Mitigation

As with any construction project, some emissions to the atmospheric environment are anticipated due to the operation of heavy mobile equipment and vehicles and the release of fugitive dust particles. These emissions are expected during Project activities that require the use of heavy machinery, particularly within the construction (e.g., civil, electrical, install and site restoration) and decommissioning phases of the Project. Potential temporary changes to the local air quality may occur as a result of the generation of emissions of fugitive dust and particulate matter from material movement as well as combustion emissions associated with the heavy equipment. The potential interactions of the Project with the ambient air quality and proposed mitigative measures are summarized in Table 27.

TABLE 27: POTENTIAL INTERACTIONS AND PROPOSED MITIGATIVE MEASURES FOR AMBIENT AIR QUALITY

Potential Interactions with Ambient Air Quality	Proposed Mitigative Measures
Vehicle traffic and the use of equipment associated with on-site work and transport of materials on- and off-site could increase emissions of combustion gases and greenhouse gases to the atmosphere during construction and decommissioning phases.	• Vehicles and equipment will be maintained in proper working order; • All vehicles and machinery will comply with current emission standards and will be used efficiently, minimizing distances travelled when possible; • Vehicle idling will be minimized where possible; • A speed limit will be enforced to reduce unnecessary emissions and enhance safety; • Contractor car-pooling will be encouraged; and • Low sulphur fuel will be used in combustion engines, when possible.
Local air quality may be affected through fugitive dust from the access road and earth work activities during construction and decommissioning	• Fugitive dust during dry weather conditions may be controlled with the application of water or an environmentally benign dust suppression product; • Water used to minimize fugitive dust will be obtained from a clean source and, if available, within the local watershed; • Proper air quality control measures following the Environmental Management and Protection Plan (Appendix O) will be instated; and • Earth work activities will be paused, where possible, during periods of significant winds.

Significance of Residual Effects to the Ambient Air Quality

It is noted that current equipment is, and will continue to be used in the Project area due to the ongoing forestry operations. As for the Project, not all equipment will be operated at the same time during the difference project phases. Fugitive emissions of particulate matter (including dust) and those associated with fuel combustion in heavy equipment will largely be localized to the construction and decommissioning activities within the immediate area and within the Project site. Due to the limited footprint of the Project, the temporary nature of the activities, the composition of the materials being handled (i.e., soil and gravel) in addition to the rural setting of the Project with the nearest residential receptor being approximately 1.6 km away, fugitive emissions, if any, are expected to be minimal, very localized, and are not anticipated to negatively contribute to local or regional air quality. In addition, given the relatively low magnitude of emissions associated with the Project, greenhouse gas emissions are expected to be low and unsubstantial for the scale of the Project.

The Project will help global long-term efforts to slow climate change by producing emission free electricity and as such, the significance of residual effects on ambient air quality is to be considered beneficial.

Given anticipated limited interactions with the ambient air quality, no follow-up or monitoring is proposed to monitor environmental interactions.

7.1.1.4 Ambient Sound Levels

Potential Interactions and Mitigation

The Proponent has conducted an operational sound level impact assessment of a 2.0 km area surrounding the proposed turbine locations. This was completed in alignment with the Guide to Preparing an EA Registration Document for Wind Power Projects in Nova Scotia and by modelling the turbine locations, turbine model, receptor locations and local topography using the Decibel module of the WindPRO software v3.5. This assessment includes a total of 64 receptors representing dwellings within 2.0 km of the proposed turbine locations.

Prior to this assessment, careful siting of the turbines has reduced the majority of sound impacts to neighbouring residents. Based on the Guide to Preparing an EA Registration Document for Wind Power Projects in Nova Scotia, the maximum allowable sound level from wind turbines at a receptor is 40 dB[A] in Nova Scotia.

The results of the sound level prediction model are summarized in Appendix C. The sound levels at all 64 receptors comply with the Guide to Preparing an EA Registration Document for Wind Power Projects in Nova Scotia. As such, the modelled sound levels emitted by the Project are less than the maximum of 40 dB[A]. The maximum sound predicted by the Decibel module of windPRO v3.5 at a nearby receptor was 32.3 dB(A) based on the worst-case scenario sound assessment. The worst-case sound assessment followed a conservative methodology in calculating sound levels by assuming downwind propagation is occurring simultaneously in all directions of the wind turbines. Sound propagation in an upwind direction would result in a significant reduction of sound levels at any receptor located upwind from the turbine. A detailed list of the sound assessment assumptions and methodology is included in Appendix C.

Infrasound describes sounds with a frequency less than 20 Hz and can occur when large masses are in motion (Leventhall, 2007). The movement of wind turbine blades has generated infrasound in the local environment in some cases (Bolin et al., 2011). An additional assessment was completed through the Finland Low Frequency module of windPRO v3.5. This assessment showed a minimum frequency of 80 Hz observed at all receptors within 2 km of the Project. The results of the infrasound modeling show that the infrasound is not expected at the receptors since the lowest frequency created by the Project is expected to be much higher than the frequency designated as infrasound (20 Hz or less).

In addition to modelling for infrasound, research was conducted to evaluate its impact on local residents living near wind turbines. The results of this research lead to the review of a study conducted by the Massachusetts Institute of Technology which found that infrasound near wind turbines does not exceed audibility thresholds. However, epidemiological studies have shown a relationship between living near turbines and annoyance. Annoyance seems strongly related to the individuals' characteristics rather than noise from turbines. The studies also established that infrasound and low-frequency sound do not present unique health risks. (McCunney et. At., 2012)

Construction noise is not always constant and can produce impulsive and variable sounds at different noise levels, which could create heightened annoyance levels in the surrounding community. The construction noise assessment has considered the maximum noise levels produced by various

construction equipment to determine maximum sustained noise levels when all expected equipment is running.

General construction activities include those associated with vegetation clearing, road building, foundations, and turbine erection or decommissioning. These activities will likely involve the use of backhoes, concrete mixers and pumps, cranes, dump trucks, excavators and light-duty pick-up trucks with the associated sound levels predicted in Table 28.

TABLE 28: SOUND POWER LEVELS ASSOCIATED WITH CONSTRUCTION EQUIPMENT (WSDOT 2017).

Equipment	Max Sound Power Level (dB{A})
Backhoe	78
Concrete Mixer	79
Concrete Pump	81
Crane	81
Dump Truck	76
Excavator	81
Pick-up Truck	75

It is not expected that all equipment would be running at the same time, but to determine maximum expected sound levels during construction, the WSDoT (2017) guidelines for decibel addition were used to conclude that 86 dB[A] is the highest expected sound level during combined construction activities.

The environment in which the Project construction will occur is considered a soft environment with normal unpacked earth. The normal unpacked earth and topography will facilitate attenuation of noise emissions at shorter distances. Table 29 identifies the sound levels predicted to be observed at various distances from the construction site determined using WSDoT (2017) guidelines.

TABLE 29: WORST-CASE SOUND LEVELS IN THE SURROUNDING ENVIRONMENT CALCULATED USING WSDOT (2017) GUIDELINES*

Distance	Construction Sound Level (dB[A])
50 ft. (15.2 m)	86
100 ft. (30.5 m)	78.5
200 ft. (61 m)	71
400 ft. (122 m)	63.5
800 ft. (244 m)	56
1600 ft. (488 m)	48.5
3200 ft. (975 m)	41

* Assumes Sound Levels in Soft Environment Attenuates at -7.5 dB[A] per Doubling of Distance

Many sound level scales refer to 70 dB[A] as an arbitrary base of comparison where levels above 70 dB[A] can be considered annoying to some people (Purdue University 2017). As indicated in Table 29, at

61 m from the construction site, noise levels are approximately 70 dB[A], similar to that of a car travelling at 100 km/h and just at the threshold of possible annoyance (Purdue University 2000). Also indicated in Table 29, sound levels from the construction site reach approximately 40 dB[A] at 1 km from the site. With the nearest dwelling located approximately 1.6 km from a proposed turbine, construction noise is not expected to impact dwellings in the area. Further, the construction noise is not expected to be annoyingly high beyond 61 m from the construction site as sound levels at this distance have already attenuated to approximately 70 dB[A].

Additionally, this site has been chosen due to its excellent wind resource. Wind generally increases ambient sound levels in an area and in combination with the vegetative cover will aid in making construction noise less noticeable at even shorter distances (WSDoT 2017). Dense vegetation is estimated to reduce noise levels by as much as 5 dB for every 100 ft (30.5 m) and wind is estimated to reduce noise levels by as much as 20-30 dB at long distances (USDOT 1995).

The potential interactions of the Project with the ambient sound levels and the proposed mitigative measured are summarized in Table 30.

TABLE 30: POTENTIAL INTERACTIONS AND PROPOSED MITIGATIVE MEASURED FOR AMBIENT SOUND LEVELS

Potential Interactions with Ambient Sound Levels	Proposed Mitigative Measures
Sound levels generated during operation of the wind turbines has the potential to disturb the surrounding area.	• A sound level impact assessment has been conducted that shows the worst-case scenario sound levels that can be expected at nearby dwellings are below provincial guidelines of 40 dB{A}; • A complaint resolution plan has been developed to address sound level concerns; • Turbine locations have been sited in order to comply with provincial wind turbine sound level guidelines; • The wind turbine model selected for the Project will incorporate noise reduction technologies to mitigate sound levels generated by the moving blades, if feasible; and • Clearing of flora on the Project site will be minimized to aid in attenuation of sound levels.
Sound levels generated during site preparation and construction, and decommissioning activities by the use of equipment and machinery has the potential to disturb the surrounding area.	• Site preparation, construction, and decommissioning activities will be limited to daytime hours, when feasible; • A complaint resolution plan has been developed for handling sound level concerns; • Proper sound level management measures following the Environmental Management and Protection Plan (Appendix O) will be instated; • Clearing of flora on the Project site will be minimized to aid in attenuation of sound levels; and

Potential Interactions with Ambient Sound Levels	Proposed Mitigative Measures
	• Construction schedules will be provided to nearby residents and posted on the signage at the entry to the site prior to the commencement of construction activities.
Infrasound from the wind turbines during operation has the potential to disturb the surrounding area.	• Infrasound from wind turbines is not anticipated to be a concern based on the project modeling and given the distance the wind turbines are located relative to dwellings.

Significance of Residual Effects

Elevated sound levels caused by the construction and decommissioning phases will be temporary, during the day when possible, and short term. Sound level production from the turbines during operation have been mitigated by setback distances and confirmed by a sound level impact assessment. By using the mitigation identified above, the Project is not anticipated to have any significant residual environmental effect on sound levels for humans or wildlife outside the Project site. While any effect on ambient noise will be negative, the significance of residual effects on ambient noise is considered negligible and no follow up monitoring post-construction is recommended.

7.1.2 Physical Environment

7.1.2.1 Geology

Potential Interactions and Mitigation

The construction of the Project will require the excavation of material in order to support the turbine foundations, and the grading and filling for the crane pads and access roads. The geophysical conditions will be disturbed for the construction and installation of the Project.

The potential interactions of the Project with geology and the proposed mitigative measures are summarized in Table 31.

TABLE 31: POTENTIAL INTERACTIONS AND PROPOSED MITIGATION FOR GEOLOGY

Potential Interactions with Geology	Proposed Mitigative Measures
Soil and ground conditions may need to be altered or blasted for construction.	• A geotechnical survey will determine the ground conditions and any potential limitations to construction; and • A designated professional will provide recommendations for design and construction of the Project based on the geotechnical surveys.
Excavation and transportation of material will be required for turbine foundations, crane pads and access roads.	• Topsoil will be stored separately from excavated material; • Topsoil and excavated material will be backfilled in a manner that does not result in soil inversion; • Areas susceptible to erosion will be stabilized and erosion will be minimized through the use of control measures (i.e. hay bales, coco mats, etc.);

Potential Interactions with Geology	Proposed Mitigative Measures
	• Soil compaction will be limited to the Project footprint; • Soil and aggregate mixing will be minimized; and • Soil will be visually and olfactory inspected during earth moving activities and identification of any contaminated soils will be reported to NSE and managed utilizing Nova Scotia Contaminated Site Regulations.

Significance of Residual Effects

It is expected that there will be disturbance to the local geophysical conditions for each WTG, the substation and at localized areas for the access roads. The impact is predicted to be of small magnitude and within the immediate area of the site infrastructure. The significance of residual effects on geology after applied mitigation measures is considered to be negligible and no follow up monitoring is recommended unless contaminated soil is encountered in which case, it will be managed utilizing Nova Scotia Contaminated Site Regulations.

7.1.2.2 Surface Water

Potential Interactions and Mitigation

Potential interactions with surface water from physical alterations of the Project areas during the construction phase are anticipated. The main interaction will be changes in the flow of surface water across the Project areas due to road construction and expansion activities that occur in or next to streams and that change the topography of the area. Interaction may occur during clearing and grubbing, and access road and laydown area construction, as well as during eventual infrastructure removal and site reclamation activities.

The potential interactions of the Project with surface water and the proposed mitigative measure are summarized in Table 32.

TABLE 32: POTENTIAL INTERACTIONS AND PROPOSED MITIGATION FOR SURFACE WATER

Potential Interactions with Surface Water	Proposed Mitigative Measures
Vegetation clearing, grubbing, ground stripping, excavation and machinery traffic during the construction, road widening and construction, and decommissioning phases might induce a change in hydrology or sediment input into surface water.	• A plan for handling fill and construction materials for the site will be communicated to the contractor (i.e., if stockpiling is required, materials will be stored away from any watercourse or removed from site to a predetermined location) with an intent to minimize soil stockpiled, and the duration that soil is stockpiled at the site; • Fill and excavated materials will not be stockpiled for long periods of time to reduce the likelihood of sedimentation; • Weather will be monitored and additional erosion control measures such as the installment of hay bales and check dams/silt fences will be employed, as appropriate, should stockpiled fill be present in unexpected heavy rain events;

Potential Interactions with Surface Water	Proposed Mitigative Measures
	• Work will not be conducted during heavy rain events to minimize the movement of exposed soils, where practical; • Exposed soils will be stabilized as soon as practical to minimize emissions of fine particulate matter and soil erosion; • A NSECC watercourse alteration permit will be obtained prior to any work within a watercourse; • A Request for Review will be submitted to DFO under the Fisheries Act where necessary; • Work will be completed away from watercourses where possible and water course crossings will be minimized where possible • Earth work activities will be conducted in such a way that general overland flow directions are maintained and surficial flow during high storm events does not direct water to new areas; and, • Where possible, exiting roads that cross water courses will not be widened.

Significance of Residual Effects

Construction activities during the Construction and Decommissioning Phases have the potential to result in changes to surface water without the proper mitigation. Interactions are not expected during the Operation and Maintenance phase due to the passive nature of that phase. Construction activities are not anticipated to occur in watercourses, however if required will be minimized to the extent possible. With the implementation of the planned mitigation indicated above, including obtaining a Watercourse Alteration permit for activities with the potential to alter the watercourse, interactions between the Project and surface water are not anticipated to be substantive and are limited to the local environment temporarily during the construction and decommissioning phases.

Should Project activities be required directly within watercourses, either further assessment or follow-up or monitoring may be required to monitor environmental interactions with the physical environment.

7.1.2.3 Groundwater

Potential Interactions and Mitigation

Potential interactions with groundwater may occur during the clearing and grubbing activities for the construction of the access roads and infrastructure areas, as well as during eventual Project decommissioning and site reclamation activities. In addition, excavations to below ground level during the construction phase of the Project for turbine foundations may result in interactions with groundwater.

A geotechnical investigation will be conducted for the Project and if shallow groundwater is encountered during these surveys, depth to groundwater will be recorded. In light of the considerable distance between the Project site, Wellhead Protection Areas, Protected Water Areas, and residential areas, there are expected to be no impacts of the Project on the Wellfield or drinking water supplies.

The disturbance of bedrock potentially containing uranium has the ability to introduce or increase uranium into the groundwater. The potential for this interaction to occur is currently being studied and potential mitigation strategies may be employed following this assessment.

The potential interactions of the Project with groundwater and the proposed mitigative measures are summarized in Table 33.

TABLE 33: POTENTIAL INTERACTIONS AND PROPOSED MITIGATION FOR GROUNDWATER

Potential Interactions with Groundwater	Proposed Mitigative Measures
Vegetation clearing, grubbing, ground stripping, excavation and machinery traffic during the construction and decommissioning phases might induce a change in ground water.	• Where possible, clearing shall take place in the winter months on frozen ground; • Where water must be pumped out of excavation pits, it will not be discharged into a wetland, watercourse or defined channel. If pumped water contains total suspended solids the water will be pumped to vegetated land with gentle slope to allow sediment to filter, or the water will be filtered before release with a filter bag; and • Used oil filters, grease cartridge containers and other products associated with equipment maintenance shall be collected and disposed of in accordance with regulatory guidelines.
Construction activities may disturb uranium deposits in the bedrock and increase uranium in groundwater.	• Geotechnical studies will be carried out to assess the composition of the ground and bedrock; and • A study is being carried out to assess the potential of this interaction and the appropriate prevention and mitigation techniques.

Significance of Residual Effects

After employing the proposed mitigative strategies, should any bedrock disturbance occur during construction or decommissioning it will be temporary, of small magnitude and contained. While any direct release into ground water would be a negative effect, it will be of small magnitude, of short duration and local. The significance of residual effects on groundwater is considered minor.

Given that no known potable water wells are located on the Project site, no follow-up or monitoring is proposed to monitor environmental interactions with the groundwater, unless required under permit from NSECC.

7.1.3 Visual Environment

7.1.3.1 Shadow Flicker

Potential Interactions and Mitigation

The Proponent has conducted an operational visual impact assessment of a 2.0 km area surrounding the proposed turbine locations. Prior to this assessment, careful siting of the turbines has reduced the

majority of visual impacts to neighbouring residents by applying sufficient setbacks. The visual assessment included a shadow flicker study. The study was carried out assuming the largest turbine model under consideration for the Project to model a worst case scenario.

A total of 64 receptors were included in the shadow flicker assessment representing the 64 dwellings located within 2.0 km of a proposed turbine. This assessment was completed in alignment with the Guide to Preparing an EA Registration Document for Wind Power Projects in Nova Scotia and by modelling the turbine locations, turbine model, receptor locations and local topography using the Shadow module of the WindPRO software v3.5 .The shadow flicker levels at every receptor complies with the Guide to Preparing an EA Registration Document for Wind Power Projects in Nova Scotia. As such, the modelled shadow flicker emitted by the Project is less than the maximum of 30 hours per year and 30 minutes a day at any receptor. The maximum shadow flicker predicted was 10 hours and 13 minutes per year and 24 minutes per day based on the worst-case scenario shadow flicker assessment. The worst case scenario contemplates that the sun is not obstructed by any cloud cover and that the wind is blowing such that the blades are facing all 64 receptors during all daylight hours throughout the year. A detailed list of the assumptions made for this conservative assessment are detail in Appendix D.

As summarized in Appendix D, Natural Forces is confident that receptors will not receive excessive amounts of shadow flicker and will work closely with the homeowners and businesses to observe occurrences of real-case shadow flicker impact during operation and apply mitigation as mentioned.

The potential interactions of the Project on shadow flicker and the proposed mitigative measures are summarized in Table 34.

TABLE 34: POTENTIAL INTERACTIONS AND PROPOSED MITIGATION FOR THE VISUAL ENVIRONMENT

Potential Interactions with Shadow Flicker	Proposed Mitigative Measures
Shadow flicker may occur during certain weather conditions and times of the year.	• The potential negative effect of shadow flicker has been largely mitigated at the design stage through responsible turbine siting; • A shadow flicker assessment has been completed for dwellings within 2.0 km of the proposed turbines; • Compliance with industry standard guidelines on shadow flicker has been achieved. All dwellings will experience less than 30 hours of shadow flicker per year and 30 minutes of shadow flicker on the worst day; • If shadow flicker occurrences during operation are found to be exceeding guidelines and annoying to surrounding houses and buildings, screening receptors may be considered as detailed in Appendix D; and • A Compliant Resolution Plan has been developed for residents to refer to if they have concerns about any shadow flicker observed during operation.

Significance of Residual Effects

During Project operation, shadow flicker concerns from local residents is expected to be limited due to the distance between the Project site and nearest potential receptor, which is approximately 1.6 km.

While any effect from shadow flicker could be negative, the significance of residual effects is anticipated to be minor due to such short amounts of shadow flicker expected at nearby receptors under worst-case scenario conditions. No cumulative effects are expected to occur with respect to shadow flicker and no further monitoring or modelling are recommended.

7.1.3.2 Visual Aesthetics

Potential Interactions and Mitigation

The Proponent has conducted an operational visual impact assessment of a 2.0 km area surrounding the proposed turbine locations. Prior to this assessment, careful siting of the turbines has reduced the majority of visual impacts to neighbouring residents by applying sufficient setbacks. The visual assessment includes a Zone of Visual Influence (ZVI) assessment and a photomontage. These studies were carried out assuming the largest turbine model under consideration for the Project to model a worst case scenario.

The Zone of Visual Influence study acts to determine the locations in the surrounding area where the Project will be visible and to what extent. The ZVI assessment considers the impact on the existing landscape and shows the expected number of turbines visible from a point. The mapping shows that while the turbines will be largely visible from much of the surrounding landscape, there are areas where the receptors have a lower number of turbines visible compared to the surrounding area according to the ZVI assessment. A map showing the results of this assessment are included in Appendix D.

The Photomontage study demonstrates how the Project will be visible on the landscape from a nearby location used by community members. The photomontage photo was taken from the Bent Ridge Winery. On the current photomontage of the 28-turbine layout, 21 turbines are visible from the selected location. This number includes turbines in full and partial view. The photomontage is included in Appendix D.

While the wind project is operational, lighting could be visible on top and mid-way up the turbine tower during the night. The lighting intensity and flashes will be minimized, as allowable by Transport Canada; and the exterior turbine maintenance lights will be turned off prior to maintenance staff leaving the site.

The potential interactions of the Project on shadow flicker and the proposed mitigative measures are summarized in Table 35.

TABLE 35: POTENTIAL INTERACTIONS AND PROPOSED MITIGATION FOR VISUAL AESTHETICS

Potential Interactions with Visual Aesthetics	Proposed Mitigative Measures
While the wind project is operational, lighting could be visible on top and mid-way up the turbine tower during the night.	• LED lighting will be used to minimize light throw; • Only the minimum amount of pilot warning and obstruction avoidance lighting will be used; • Only lights with short flash durations and the ability to emit no light during the 'off phase' of the flash (i.e. as allowed by strobes and modern LED lights) will be installed on turbine structures;

Potential Interactions with Visual Aesthetics	Proposed Mitigative Measures
	• Lights will operate at the minimum intensity and minimum number of flashes per minute (longest duration between flashes) allowable by Transport Canada; and • Exterior turbine maintenance lights will be turned off prior to maintenance staff leaving the site.
During the construction period, lighting required during construction activities in the dark could temporarily alter the night-time visual landscape.	• Construction activities will be limited to the day time when possible. It is noted that the turbine may be erected during the evening as the activity must be completed when the wind is less than 8 m/s as a safety measure. These conditions are commonly seen in the early evening.
Community members may have a negative reaction towards the aesthetics of the wind turbines during operation.	• The Proponent considered landscape aesthetics when deciding on specific siting of the turbines; • The paint on the turbines will be selected such that it does not contrast sharply with the environment and minimizes blade glint; and • Policies regarding responsible siting of wind turbines were followed to minimize the potential impact on the landscape aesthetics during siting.

Significance of Residual Effects

The potential for impacts during project construction from work lighting, if necessary, will be temporary and of short duration. Impacts to the visual landscape during the construction phase are not anticipated.

During Project operation, lighting concerns from local residents is expected to be limited due to the distance between the project site and nearest potential receptor, which is approximately 1.6 km.

The perception of landscape aesthetics is a subjective matter. The Proponent recognizes the development of the proposed wind turbines may have a negative effect within the perception of the community however through siting and construction materials has mitigated the potential impact to the visual landscape as much as is feasible.

While any effect on the visual aesthetics of the land could be negative, the significance of residual effects is anticipated to be minor. No cumulative effects are expected to occur with respect to visual aesthetics and no further monitoring or modelling are recommended.

7.2 Biophysical VECs

7.2.1 Terrestrial Environment

7.2.1.1 Vegetation

Potential Interactions and Mitigation

Protecting vegetation and plant biodiversity is an important and integral aspect of maintaining a diverse ecosystem. In an effort to preserve local flora species and to ensure flora species of conservation

concern remain unharmed, vegetation has been identified as a VEC. The Project's impact on vegetation is predicted to be minor in terms of significance of environmental effect. A significant environmental effect would result if a considerable change to vegetation was the result of Project activities.

The proposed Project is located within the South Mountain Ecodistrict, which is generally dominated by Acadian forest tree species. The majority of the site is covered by Spruce Hemlock Pine Hummocks and Hills in locations with well drained soils and Red and Black Spruce Hummocks in areas with wet imperfectly drained soils (NSDLF 2019).

Information collected during field surveys has covered all habitat types. Habitat types are outlined in **Section 6.**2.1. One SAR and four SoCC lichens were identified in the Terrestrial LAA. As a result of the field survey findings, the PDA was modified so that no clearing within 100 m of the identified SAR lichen will occur, as recommended by NSDRR (NSDRR 2018).

It is unlikely that the identified SAR and SoCC species will be directly disturbed due to their locations with respect to the PDA. However, if additional species are located, a buffer an appropriate setback will be applied surrounding the plant of SoCC or SAR. The setback distance will be determined based on the species habitat requirements and applicable guidance under the SARA and NSESA.

There will be some loss of vegetation for the construction of turbines and the upgrading, widening and construction of access roads but any areas of disturbance not required for the operations of the Project will be revegetated upon site clean-up.

The potential interactions of the Project on vegetation and the proposed mitigative measures are summarized in Table 36.

TABLE 36: POTENTIAL INTERACTIONS AND PROPOSED MITIGATION FOR VEGETATION

Potential Interactions with Vegetation	Proposed Mitigative Measures
Earth works (clearing and grubbing) will result in the disturbance of vegetation and habitat during construction and reclamation.	• Proper vegetation management measures following the Environmental Management and Protection Plan (Appendix O) will be instated; • Through the site selection process, the Project footprint has been sited predominantly in areas previously disturbed via clear cutting through forestry activities, creating a highly fragmented habitat and the project footprint is limited, to the extent possible, in areas of undisturbed habitat; • The area to be disturbed by the Project will be minimized to the extent possible (i.e., limited to the area that is required to accomplish the Project objectives); • Following the construction and decommissioning phases of the Project, natural revegetation of the site will be promoted; • There will be minimal land/habitat loss attributable to the construction phase as determined by desktop and field studies; • The access roads have been optimized to make use of existing roads at the Project site to reduce the amount of flora to be cleared; and,

Potential Interactions with Vegetation	Proposed Mitigative Measures
	• Areas of disturbance will be revegetated at the earliest opportunity.
There is a risk of introducing invasive species through plant matter attached to construction equipment.	• Heavy equipment will be properly cleaned and visually inspected prior to mobilizing to site to avoid potential introduction of exotic and invasive species.
Project activities have the potential to impact rare plants from direct disturbance if they are present in the Project site.	• Vegetation control measures during the operational phase will be minimized to the extent possible; • Efforts will be made to maintain mature vegetation along the edges of the development area, particularly in riparian areas; and • During Project activities, should a new SAR/SOCC be identified, a buffer will be maintained and additional mitigation will be developed in consultation with applicable regulatory authorities.

Significance of Residual Effects

The Project will be developed in such a way as to minimize the area of disturbance within the Project site and natural revegetation of the site will be promoted at the earliest opportunity. The majority of the area of disturbance is in the regeneration phase due to previous site activities, including forestry, which are unrelated to the Project.

Given current knowledge as informed by the desktop assessment, biophysical assessments, and previous site activities, significant potential impacts to vegetation communities is not anticipated as a direct result of the Project with the appropriate implementation of the mitigation measures presented.

Project siting has minimized the flora footprint from the access roads, crane pads, turbine foundation and substation by making use of existing infrastructure and disturbed areas. While the construction phase presents potential for negative impact, land that has been cleared and is not needed for operation will be encouraged to naturally regenerate. Additionally, once the decommissioning phase occurs, land reclamation will restore the Project site to its previous state. With the proposed mitigation measures employed, the significance of residual effects on flora is predicted to be minor and further monitoring or biophysical assessments are not recommended.

7.2.1.2 Wildlife

Potential Interactions and Mitigation

In an effort to preserve wildlife habitat and ensure wildlife species remain unharmed, terrestrial wildlife has been identified as a VEC. The Project's impact on terrestrial wildlife (excluding birds and bats, which are evaluated in the sections below) is predicted to be negligible in terms of significance of environmental effect. A significant environmental effect would result if a considerable change to wildlife populations was a result of project activities.

The proposed Project is located within an area that has been extensively used for forestry practices. The PDA was selected to incorporate previously harvested areas (clear-cuts or strip-cuts) that are now in different stages of natural regeneration and avoid (to the extent possible) undisturbed forest habitat. Information collected during field surveys on the presence or potential presence of terrestrial wildlife is presented in **Section 6.2.**1.2. The encountered wildlife species at the Project site have populations in Nova Scotia that are considered secure according to the ACCDC (2021) with the exception of one fisher (i.e., a SoCC ranked S3/Vulnerable by the ACCDC) which was observed during the spring while crossing one of the site access roads. In addition, and as discussed in Section 6.2.5, potential habitat exists within the terrestrial LAA for two SAR species which have been historically observed and recorded within the ACCDC database within 10 km of the PDA (i.e., Eastern Painted Turtle and mainland moose).

Fishers can be found in mixed forests throughout Nova Scotia with a preference for forests with large areas of continuous overhead cover and suitable denning sites (e.g., hollow trees, brush and rock piles) (Sabean 1989). Suitable habitat is available within the site, however, the proposed Project layout was designed to minimize the alteration of forest habitats. As a result of careful Project planning, along with the mitigation measures presented, a significant environmental effect on Fishers as a result of project activities is considered to be negligible.

Although targeted surveys were undertaken and no turtles were discovered, potential habitat within the terrestrial LAA for Eastern Painted Turtles is present within wetlands and waterbodies with slow moving, relatively shallow and abundant vegetation, as well as basking sites (COSEWIC 2018). As previously discussed, the proposed Project layout was designed to minimize interactions with wetlands and water bodies. The locations of the WTGs are not within 30 m of wetlands or waterbodies, therefore, potential project impacts during the operational phase of the Project is considered to be negligible. Potential interactions with suitable Eastern Painted Turtle habitat during the construction and site restoration project phases are possible. The potential for a significant environmental effect on Eastern Painted Turtles as a result of project activities is considered to be negligible following the mitigation measures presented in Table 37, along with mitigations measures to protect wetland habitat (presented below in **Section 7.2.1.3**).

Mainland Moose have the potential to be present within the Terrestrial LAA, as they can reside in a variety of forest habitats. The potential for interactions with Mainland Moose is unlikely within the PDA because moose require an abundance of mature forest for security and thermal cover, (NSDNRR 2021) and the PDA is located mainly within fragmented and previously forested landscape. The potential for a significant environmental effect on Mainland Moose as a result of project activities is considered to be negligible; however, if a moose is observed during any phase of the Project, mitigation measures presented in Table 37 will be followed.

Overall, the Project will decrease some wildlife habitat from the access roads and crane pads. While the construction phase presents potential for negative impact, once the decommissioning phase has started, land reclamation will restore the Project site to its previous state.

The potential interactions of the Project on wildlife and the proposed mitigative measures are summarized in Table 37.

TABLE 37: POTENTIAL INTERACTIONS AND PROPOSED MITIGATION FOR WILDLIFE

Potential Interactions with Wildlife	Proposed Mitigative Measures
Temporary disturbance of foraging fauna and loss of breeding and foraging habitat during Project activities due to increased human presence, noise and Project footprint.	• Proper wildlife interaction measures following the Environmental Management and Protection Plan (Appendix O) will be instated • Vegetation will be retained where possible to maintain wildlife habitat; • The Project footprint will be limited to that which is necessary to enable the Project to be carried out; • Existing roads and trails will be utilized to limit disturbance outside the Project footprint and minimize the interactions with wildlife and wildlife habitat; • To minimize wildlife encounters, the site and working areas will be kept clean of food scraps, and garbage will be removed from the site daily and traffic will be limited to roadways; • In the case of wildlife encounters, the following will be implemented: (1) no attempt will be made by any worker at the Project site to chase, catch, divert, follow or otherwise harass wildlife by vehicle or on foot; (2) equipment and vehicles will yield the right-of-way to wildlife; and (3) if a SAR or a nest of any bird is encountered during activities, work around the SAR or nest shall cease until a biologist is dispatched to assess the situation and appropriate mitigation is applied; • To minimize disruptions with wildlife activity at night, the Project construction activities will be limited to daylight hours when possible; and • All workers will adhere to the provincial Nova Scotia Endangered Species Act and federal Species at Risk Acts.

Significance of Residual Effects

The effects of the Project activities on wildlife are expected to be limited to the Project footprint that is required to meet Project objectives. Disturbance of fauna habitat as a result of this Project will be minimized by employing the proposed mitigation measures. With the proposed mitigation, the residual interactions of the Project with fauna species are anticipated to be short in duration are not anticipated to be substantive because they are limited to the construction and reclamation phases and are occurring already in highly fragmented habitat that has ongoing forestry activities.

7.2.1.3 Wetlands

Potential Interactions and Mitigation

Wetlands were assessed as part of the Terrestrial Environment VEC because they may perform many important functions and services in landscapes (e.g., improving water quality, controlling floods, providing critical habitat for rare and endangered species, and many others). In addition to performing important landscape functions, wetland ecosystems are typically some of the most productive

ecosystems encountered in Nova Scotia. As such, in Nova Scotia (and elsewhere), many VECs (e.g., SAR and SoCC, birds, as well as culturally significant flora) are hosted within wetland ecosystems. The Project's impact on wetlands is predicted to be minor in terms of significance of environmental effect. A significant environmental effect would result if a considerable change to wetlands or wetland functions was the result of project activities. As previously discussed, the proposed Project layout was designed to minimize interactions with wetlands. The locations of the WTGs are not within 30 m of wetlands, therefore, potential project impacts during the operational phase of the Project is considered to be minor. A change in wetland size or function could occur during the construction for access roads or site restoration in the areas of the wetlands may require clearing. This could alter the vegetation, increase erosion rates or alter natural drainage patterns in proximity to the aquatic receptors. Loss of wetland area or function (i.e., hydrological regime, habitat and water quality maintenance) could occur due to clearing of trees and vegetation within the wetlands.

Information gathered on wetlands within the Terrestrial LAA during the preliminary wetland assessment is outlined in **Section 6.2.1**.3. Over 100 wetlands (totaling approximately 286 ha of land) were assessed within the LAA, comprising of treed and shrub swamps with lesser areas of bogs and fens. Approximately 94 of the identified wetlands, primarily swamps, within the LAA are located adjacent to existing roads (i.e., within 30 m) and would likely already be seeing some level of impacts from the ongoing forestry activities onsite. Of the >280 ha wetlands identified within the LAA, only 32 ha are located within the PDA, noting that the proposed turbine locations are not located within 30 m of wetlands.

Prior to the construction phase of the Project, a functional assessment of wetlands within or downstream of the PDA that may be impacted will be conducted. The functional assessment will provide valuable baseline information for wetland monitoring should it be required following the avoidance of wetlands through the Project planning and the mitigation measures laid out in Table 38.

The potential interactions of the Project on wetlands and the proposed mitigative measures are summarized in Table 38.

TABLE 38: POTENTIAL INTERACTIONS AND PROPOSED MITIGATION FOR WETLANDS

Potential Interactions with Wetlands	Proposed Mitigative Measures
During the construction phase, Project activities, such as clearing, grubbing, infilling, and excavation, have the potential to impact wetlands. Such activities might induce silt run-off, alter flow into the wetlands or see them become repositories of significantly increased water flow, nutrients or sediments.	• Wetlands within the PDA will be functionally assessed and delineated prior to disturbance; • Avoiding work within wetlands with current setbacks of 30 m from wetlands for WTGs where possible; • Where avoidance is not possible, disturbances will be minimize as much as feasible (i.e., limited to the area which is required to accomplish the Project objectives); • A wetland alteration permit will be obtained for work in any wetland, noting that work within wetlands will be avoided or minimized to the extent possible during the Project design phase;

Potential Interactions with Wetlands	Proposed Mitigative Measures
	• Appropriate sediment erosion and run-off control measures (e.g. silt fencing, hay bales) will be implemented as required; • Natural regeneration of the site will be promoted to aid in storm water retention and reduce run-off; • No stockpiling of materials will occur within 30 m of a wetland; • Vehicle traffic in the wetlands will be minimized by using alternate techniques (e.g. hand cutting vegetation) where possible; • Mats and other means to avoid disruption of the wetlands will be used during necessary tree clearing; • Wetland within the PDA of collector or transmission lines will be spanned with electrical poles; • Refueling equipment won't happen within 30 m of a wetland; • Avoiding contamination in wetlands by making sure equipment is routinely inspected for leaks; • Spill response kits will be in each piece of equipment; and • Proper wetland protection and erosion and sediment control measures following the Environmental Management and Protection Plan (Appendix O) will be installed and checked regularly during the construction phase and prior to, and after, storm events to ensure they are continuing to operate properly to minimize potential effects to adjacent habitat.

Significance of Residual Effects

The Project will be developed in such a way as to avoid wetlands, minimize disturbance to the wetlands where avoidance is not possible and minimize the area of disturbance within the Project site. As well, natural revegetation of the site will be promoted at the earliest opportunity. Avoidance through site design has been completed to the extent possible, (i.e., spanning wetlands using overhead collection lines, use of existing roads, and avoiding wetlands where possible). Given current knowledge as informed by the desktop assessment, biophysical assessments, and previous site activities, significant potential impacts to wetlands is not anticipated as a direct result of the Project with the appropriate implementation of the mitigation measures presented. Wetland monitoring during the construction phase for wetlands within the PDA will be carried out as required by NSECC. Due to locations of wetlands in proximity to site infrastructure, as well as avoidance of impact to wetlands with infrastructure no further monitoring will be conducted during operations.

7.2.2 Birds and Bird Habitat

Potential Interactions and Mitigation

Birds and their habitats have been identified as one of the biophysical VECs. Throughout the construction, operation, and decommissioning of the Project, the potential negative impacts on birds can be classified into four categories: collision, displacement due to disturbance, barrier effects, and habitat loss. As a result, birds have been identified as a VEC. The Project's impact on birds, overall, is predicted to be minor in terms of significance of environmental effect. A significant environmental effect would result if a considerable change to migratory and breeding birds was the result of project activities.

During the 2021 bird field surveys, over 7,000 individual birds of over 90 different species were recorded within the local assessment area. In addition, radar and acoustic monitoring confirmed that migration was focused on a few nights during the season when tailwinds were light to moderate. Information on the existing state of birds and bird habitat based on information gathered and data collected during field surveys, as well as radar and acoustic monitoring is outlined in **Section** 6.2.2.Specifically, eight SAR and 20 SoCC birds were observed during the birds surveys. The SAR birds observed in 2021 within the bird LAA are summarized below, more information in bird SAR and SoCC is further detailed in Sections 6.2.2 and 6.2.5.

- Potential breeding Canada Warbler were mainly observed during the spring and summer surveys within the bird LAA. Suitable nesting habitat, such as wet mixed forests with well-developed shrub layers, as well as regenerating areas is widly available within the LAA.
- Chimney Swift was detected within the Project site in 2021 and is likely to use the site for foraging purposes. Most observations of Chimney Swift were reported during the fall migration, however, one bird was observed during a summer breeding survey. Chimney Swifts are aerial foragers and tend to concentrate near water where insects are abundant. Chimney Swift have adopted chimneys as preferred nesting sites and suitable nesting habitat for chimney swifts was not observed in the PDA.
- Common Nighthawks were detected mainly during the summer surveys within the Project site. They typically nest on the ground in open or sparsely vegetated habitats and suitable nesting habitat does exist within the LAA for birds.
- Eastern Wood-Pewee (Contopus virens). This species was detected within the Project site in 2021 and is likely to use the site for foraging and nesting purposes The Eastern wood-pewee breeds in open woodlands with a dominance of deciduous trees and typically forages on flying insects in the middle canopies of forests. Due to existing site disturbance, suitable habitat for Eastern Wood Peewee within the PDA is very limited but exists mainly within the non-forested land within the PDA
- Evening Grosbeaks were identified during the 2021 late-winter, spring summer and fall bird surveys. Suitable breeding habitat for Evening Grosbeaks within the PDA is very limited but exists mainly within the non-forested land within the PDA
- Olive-sided Flycatchers were detected within the Project site and suitable nesting habitat, such as open, forested areas, often with many conspicuous perches does exist within the bird LAA. Most observations of olive-sided flycatchers were reported during the spring and summer surveys;

however a few observations were noted early during the fall migratory period (late August) at locations that spanned the site and multiple habitat types.

- Two Peregrine Falcons were observed at the Project site during the fall migratory surveys. Although this species was not detected during the breeding season, there are numerous bedrock outcroppings that could provide potential nesting habitat for Peregrine Falcons.
- During the 2021 bird surveys, 2 Rusty Blackbirds were detected during the spring migration window in wetlands. Rusty Blackbirds nest in conifer-dominated forests, wetlands, bogs and wet meadows. This species may occur within the Project site as suitable nesting habitat does exist.

During the construction and decommissioning phases interactions are possible as a result of disturbance caused by noise and the loss of habitat within the Project footprint. The Project layout was designed to minimize the disruption to terrestrial habitats. In addition, mitigation measures outlines in Table 39 with minimize the disturbance to birds and loss of bird habitat during the construction and decommissioning phases.

During operation there is a possibility that migrating birds could collide with the wind turbines and Project infrastructure. In addition, birds may alter their migration flyways and/or local flight paths to avoid wind turbines. The data from the radar and acoustic monitoring suggest that while the proposed turbines for the Project are taller than previous generations of turbines constructed in Nova Scotia, the majority of migration will be above the rotor sweep area (RSA). Although the predicted mortality rate of birds due to collision and/or habitat loss cannot be accurately predicted prior to the operational phase, technology and more robust biophysical assessments have improved understanding of the potential interactions between wind projects and wildlife. Further mitigation measures and monitoring, as outlined in Table 39, will minimize the effects of the project on birds.

The potential interactions of the Project with birds and bird habitat and the proposed mitigative measures are summarized in Table 39.

TABLE 39: POTENTIAL INTERACTIONS AND PROPOSED MITIGATION FOR BIRDS AND BIRD HABITAT

Potential Interactions with Birds and Bird Habitat	Proposed Mitigative Measures
During construction vegetation might be cleared and areas disturbed that may be habitat to migratory and breeding birds.	• Desktop and field studies conducted suggest a minimal loss of bird habitat due to clearing. The clearing footprint is minimized by using existing access roads and areas previously cleared from forestry activities; • The Proponent will endeavor to conduct construction activities such as clearing and grubbing during a time period that does not coincide with the time period in which migratory and breeding birds would be in the area; • Should clearing and grubbing be required during the region's breeding bird season, the Project area will be visually checked on a daily basis for nesting migratory birds. Should a nesting migratory bird be identified within the work area, ECCC/Canadian Wildlife Service (CWS) will be notified and an

Potential Interactions with Birds and Bird Habitat	Proposed Mitigative Measures
	appropriate no-work buffer zone (in consultation with ECCC/CWS) will be applied around the nest until the nest has been fledged. No flagging of the nest will occur to minimize chances of predation; • Stockpiling of fill and excavated materials will be minimized to deter the potential for nesting by bank swallows or other ground nesting species (e.g., common nighthawk). Fill/excavation material piles will be at low angles, if left standing for long durations; • All workers will adhere to the Migratory Birds Convention Act, 1994 and the Migratory Birds Regulations; and • All workers will adhere to the provincial Nova Scotia Endangered Species Act and federal Species at Risk Acts.
Construction lighting may alter the behavior of birds.	• To minimize disruptions with wildlife activity at night, the Project construction activities will be limited to daylight hours when possible; • Necessary construction lighting will be pointed downwards; and, • Instruction will be given to maintenance staff to ensure all work lights are turned off upon leaving the site particularly during foul weather events.
During operation there is a possibility that migrating birds could collide with the wind turbines and Project infrastructure.	• A follow up avian mortality survey will be planned and conducted in consultation with NR&R and CWS after the Project commissioning. • Should unexpected negative impact to migration flyways occur, appropriate actions will be taken in consultation with CWS and NR&R; • Non-operational towers shall be dismantled if not expected to be put back into operation; and • A comprehensive Adaptive Management Plan will be developed and implemented in consultation with CWS and NR&R.
Birds may alter their migration flyways and/or local flight paths to avoid wind turbines.	• A follow up avian mortality survey will be conducted after the Project commissioning and appropriate actions will be taken in consultation with CWS and NR&R.
Lighting on turbines can result in adverse impacts on birds. The Proponent recognizes that nocturnal migrant and night-flying seabirds are the birds most at risk of attraction to lights.	• Lighting requirements will meet ECCC standards to minimize the potential impacts to migratory birds; • Only the minimum amount of pilot warning and obstruction avoidance lighting will be used; • Only lights with short flash durations and the ability to emit no light during the 'off phase' of the flash (i.e. as allowed by strobes and modern LED lights) will be installed on tall structures; • Lights will operate at the minimum intensity and minimum number of flashes per minute (longest

Potential Interactions with Birds and Bird Habitat	Proposed Mitigative Measures
	duration between flashes) allowable by Transport Canada; • Instruction will be given to wind farm maintenance staff to ensure all work lights are turned off upon leaving the site particularly during foul weather events; and • A follow up avian mortality survey will be conducted after the wind farm commissioning, and appropriate actions will be taken in consultation with CWS and NR&R.
Fog events can impair avian visibility, increasing the likelihood of mortality from collision with wind turbines.	• Instructions will be given to wind farm maintenance staff to ensure all work lights are turned off upon leaving the site particularly during foul weather events.

Significance of Residual Effects

The predicted mortality rate of birds due to collision and/or habitat loss cannot be accurately predicted prior to the operation of the Project, however, it is expected that the mortality rate of birds from collision or habitat loss during Project operation, if at all, will be low. Mabee et al. (2006) reported that migration altitudes averaged 410 m a.g.l within the ground to 1.5 km altitude range, and nightly averages ranged from 214 to 769 m. It is important to note that the percent of targets detected in that study was relatively uniform between 0 and 500 m a.g.l., which would indicate that there isn't a greater risk of avian collision if turbine heights were increased to 200 m.

Horton (2016) indicates average heights of birds flight paths during migration recorded from multiple studies ranged between 119.8 m and 1135.6 m. As these are averages, night migrants were found both above and below these levels suggesting current wind energy facilities are already within this migration corridor and thus, using turbines with a maximum height range of 200 m does not pose a new risk. Erickson et al. (2014) indicated that bird mortality at wind energy facilities in North America account for at most 0.043 % of the population estimates for the species most affected by collision mortality; turbine collision mortality accounted for a lower rate than this for all other species and does not pose a threat to populations.

The avian nocturnal migration survey found that, while some level of migration was observed on most nights, a large proportion of the migratory activity observed in each season was only limited to only a few nights. When examining nights when large numbers of targets were detected (i.e., when most of the migration occurred) the bulk of the migratory movements were detected at around 500 m altitude and there tended to be fewer of targets at lower altitudes (i.e., within the Rotor Sweep Area [RSA]).

The Proponent does not anticipate significant mortality rates for the proposed turbines at a maximum height of 200 m. The recommended post-construction monitoring for bird mortality during operation will verify the impact the Project has on migratory and breeding birds. With the proposed mitigation measures employed, the significance of residual effects on migratory and breeding birds is predicted to be minor. Should the post-construction surveys indicate something different,

the Proponent will follow the Adaptive Management Plan and engage regulatory authorities in applying additional mitigative measures.

7.2.3 Bats and Bat Habitat

Potential Interactions and Mitigation

Throughout all phases of the Project, the potential impacts on bats can be classified into two categories: collision and habitat disturbance.

The predicted mortality rate of bats due to collision and/or habitat loss cannot be accurately predicted at the time of EA registration. However, industry standards, technology and more robust biophysical assessments have improved understanding of the potential interactions between wind projects and wildlife.

Bat activity was surveyed in the field using acoustic bat monitors, as discussed above in **Section 6.2.**3. The average total bat passes and migratory bat passes per detector night for the breeding period spanning June 1 through July 31 and a fall migration period of August 1 through October 15, equates to 0.08 to 0.03 bat passes, and 0.25 to 0.08 bat passes, respectively. Based on Dillon's experience on similar bat acoustic programs throughout the country, both the total number of bat passes and the average bat passes per detector night (during the breeding period, fall migration, and entire survey period) are considered very low.

The potential interactions between bats and bat habitat with the project include the loss of habitat, or displacement from surrounding habitat, due to construction activities; fatalities due to collisions with turbine towers or blades or the transmission line infrastructure during operation; and modifications to existing flight paths as bats avoid the project area or are attracted to the area by tower lights. The potential interactions of the Project on bats and bat habitat and the proposed mitigative measures are summarized in Table 40.

TABLE 40: POTENTIAL INTERACTIONS AND PROPOSED MITIGATION FOR BATS AND BAT HABITAT

Potential Interactions with Bats and Bat Habitat	Proposed Mitigative Measures
Clearing and construction activities have the potential to cause disturbance to bat habitat.	• The Project site has been designed to minimize the amount of land cleared. This reduces the ecological impact of the Project Footprint and minimizes the potential impact to bat habitat; and, • The area of disturbance will be vegetated as soon as feasible.
During operation there is a possibility that bats could collide with the wind turbines or succumb to barrotrauma.	• A follow up bat mortality survey will be conducted after the Project commissioning and appropriate actions will be taken in consultation with the appropriate authorities should there be a significant negative impact to bats; • Non-operational towers shall be dismantled if not expected to be put back into operation; and • A comprehensive Adaptive Management Plan will be developed and implemented in consultation with CWS and NR&R.

Significance of Residual Effects

Disturbance of bat habitat during construction has the potential to occur, however due to the low number of bat passes recorded at the Project site, limited predicted impacts to the habitat, and with the implementation of planned mitigation and careful development and implementation of contingency and emergency response plans, it is anticipated that effects related to the Project will not be substantive. Should follow up surveys indicate something different, the Proponent will engage regulatory authorities in applying additional mitigative measures.

Post-construction monitoring for bat mortality during operation will also verify the effect the Project has on bats. Should a significant amount of bat mortality be observed following the post construction surveys, the Proponent will follow the Adaptive Management Plan and engage regulatory authorities in applying additional mitigative measures.

7.2.4 Aquatic Environment

7.2.4.1 Fish and Fish Habitat

Potential Interactions and Mitigation

Water crossings of watercourses that have suitable fish habitat exist within the PDA and were included at VECs. The PDA was selected to minimize interactions with watercourse crossings by avoiding development in locations with watercourses to the extent possible. As a result of careful Project planning, the locations of the WTGs are not within 30 m of watercourses, however, 23 watercourses were identified within 50 m of existing forestry roads to be upgraded or proposed new access roads, including 13 that are considered likely to be fish-bearing. The Project's impact on fish and fish habitat, overall, is predicted to be minor in terms of significance of environmental effect. A significant environmental effect would result if a considerable change to fish and fish habitat was the result of project activities.

Potential temporary interactions with fish and fish habitat may occur from physical alterations of the aquatic environment (i.e. watercourse crossings) during the construction phase. Interaction may primarily occur during clearing and grubbing and access road widening, as well as during eventual infrastructure removal and site reclamation activities in the decommissioning phase. The mitigation measures, outlines in Table 41, will minimize the potential for runoff from the Project areas to reach fish-bearing watercourses.

The proposed Project is situated within the Avon River secondary watershed named watercourses within or downstream of the PDA include the Mint River, Levy Meadow Brook, and Five Island Brook. Lakes in the vicinity of the Project Area include Five Island Lake, Bennett Lake, Duck Ponds, Pine Lake, and Splash Dam Lake. According to Department of Fisheries and Oceans (DFO) SAR mapping review, Atlantic salmon, Inner Bay of Fundy population (Salmo salar) are identified throughout the Avon River watershed (DFO, 2021). Although suitable Atlantic salmon habitat was not identified during initial field studies, watercourses that may be impacted by the final design will undergo additional detailed assessments to ensure that potential impacts to the species are considered and appropriately mitigated.

Information and data collected during field surveys on potential fish-bearing watercourses is presented in **Section 6.2**.4.

The potential interactions of the Project on fish and fish habitat and the proposed mitigative measures are summarized in Table 41.

TABLE 41: POTENTIAL INTERACTIONS AND PROPOSED MITIGATION FOR FISH AND FISH HABITAT

Potential Interactions with Fish and Fish Habitat	Proposed Mitigative Measures
Loss or damage to fish and fish habitat during watercourse alteration and erosion.	• Limit the removal of riparian zone vegetation; • Minimize the use of heavy equipment within 30 m of a watercourse; • All construction activities near watercourses will comply with the applicable regulations and guidelines such as the *Fisheries Act* and will be carried out strictly in accordance with NSECC and DFO Approvals, Terms and Conditions, and Letters of Advice; • Any necessary watercourse crossings will be located in areas that exhibit a stable soil type where grades approaching the crossings will not be too steep, and will span the watercourse where possible; • Proper erosion and sediment control measures will be installed and checked regularly during the construction phase and prior to, and after, storm events to ensure they are continuing to operate properly to minimize potential effects to adjacent habitat; • Sufficient staff and equipment to manage erosion and sediment control during storm events and other emergencies; • In stream work will be timed to occur in the dry season and not during significant rainfall Culverts will be designed and installed to prevent the creation of barriers to fish movement and maintain bankfull channel functions and habitat functions to the extent possible; and • Runoff shall be controlled, and sediment will be prevented from leaving the Site at all times; and • Visual monitoring of silt or sedimentation within watercourses will occur during construction after heavy weather events.

Significance of Residual Effects

Interactions between the Project and the aquatic environment are expected to be primarily related to the operation of heavy mobile equipment and vehicles as well as the transport of materials on- and off-site. These construction activities may require the installation of watercourse crossings or widening of existing crossings which could impact fish and their ability to use and/or access upstream habitat. Sediment laden runoff from the Project can harm fish and damage their habitat by entering watercourses that flow through the Project site. By limiting the timing of soil disturbance activities to avoid high precipitation events, working within the dry season, and installing sediment control

measures, these interactions will be limited and controlled. With the implementation of these mitigation measures, interactions between the Project and the fish and fish habitat are not anticipated to be substantive and no follow-up or monitoring is recommended unless required under permit from NSECC or DFO.

7.2.5 Species at Risk

Potential Interactions and Mitigation

The proposed Project is located in a primarily forested area that has the potential to provide habitat for some SAR and SoCC. The Proponent is committed to protecting SAR, SoCC and their habitat as important features and VECs related to the proposed Project. A significant effect would include the loss of SAR, SoCC and their habitats.

SAR and SoCC either confirmed or that have the potential to be present within the PDA are listed in **Section 6.2.**5. A buffer of 100 m has been applied to a SAR lichen species identified within the PDA. Although the site provides suitable habitat for several SAR fauna species, no critical habitat SAR was identified within the PDA.

Surveys for birds and bats were conducted in 2021 and confirmed the presence of SAR and SoCC birds and SAR bats within the assessed area. These potential interactions and mitigation for birds and bats through the operational phase of the project are discussed in Sections 7.3.3 and 7.3.5, respectively.

The Project layout was designed to avoid plant SAR and additional mitigation protecting other VECs would also protect SAR. The potential interactions of the Project on species at risk and the proposed mitigative measures are summarized in Table 42.

TABLE 42: POTENTIAL INTERACTIONS AND PROPOSED MITIGATION FOR SPECIES AT RISK

Potential Interactions with Species at Risk	Proposed Mitigative Measures
Project activities have the potential to impact SAR from direct disturbance if they are present in the Project site.	• During Project activities, should a SAR/SOCC be identified, a buffer will be maintained and additional mitigation will be developed in consultation with applicable regulatory authorities specific to the SAR/SOCC species identified; and • Proper wildlife interaction measures following the Environmental Management and Protection Plan (Appendix O) will be instated.

Significance of Residual Effects

The effects of the Project activities on species at risk are expected to be limited to the Project footprint that is required to meet Project objectives. Disturbance of flora and terrestrial fauna (excluding birds and bats) species at risk and their potential habitat as a result of this Project will be avoided or minimized by employing the proposed mitigation measures. With the proposed mitigation, the residual interactions of the Project with species at risk are anticipated to be short in duration are not anticipated to be substantive because they are limited to the construction and reclamation phases.

Residual effects of the Project during the operational phase are possible for Bird and bat species at risk, especially migratory species. The Proponent does not anticipate significant mortality rates for the proposed turbines at a maximum height of 200 m. The recommended post-construction monitoring for bird and bat mortality during operation will verify the impact the Project has on these species. With the proposed mitigation measures employed, the significance of residual effects on bird and bat SAR is predicted to be minor. Should the post-construction surveys indicate something different, the Proponent will follow the Adaptive Management Plan and engage regulatory authorities in applying additional mitigative measures.

7.3 Socioeconomic VEC

7.3.1 Economy

Potential Interactions and Mitigation

The Project is expected to provide jobs to the local community through the use of accommodations and services during onsite work and through local hiring of contractors. This is expected to be beneficial for the area. Additionally, the Project will produce economic benefits to the municipality through the payment of property taxes. The installation of the Project may also provide tourism benefits for the area as people may come through to view the Project.

As the Proponent is committed to utilizing the local labor force where possible, the Project is not anticipated to add strain to the community services already in place.

The potential interactions of the Project on the economy and the proposed mitigative measures are summarized in Table 43.

TABLE 43: POTENTIAL INTERACTIONS AND PROPOSED MITIGATION FOR THE ECONOMY

Potential Interactions with the Economy	Proposed Mitigative Measures
The Project will provide employment opportunities to the local community during construction, operation, and decommissioning phases.	• Where possible the local workforce will be sourced to fill the employment opportunities.
The Project will provide economic development opportunities for the Mi'kmaq, local communities, West Hants Regional Municipality, and Nova Scotia.	• The proposed Project will support community economic development through hiring local consultants and contractors, when possible, the use of local services such as accommodations, restaurants and fuels, and will be required to pay municipal taxes; • The proposed Project will support a stable long term revenue source to the 13 Mi'kmaq bands in Nova Scotia; and • Community economic development is a positive impact: no mitigation is required.

Significance of Residual Effects

The Proponent will, when appropriate, make every effort to utilize local services and products, which is in line with the Proponents' ideology of community-based projects. The predicted effects of this Project

on the local economy are positive and as a result of the municipal taxes and economic spinoff, the significance of residual effects on local economy is expected to be beneficial.

7.3.2 Land Use and Values

Potential Interactions and Mitigation

The Project is located in a fairly remote area of the West Hants Regional Municipality on a mix of privately-owned and provincial Crown land. The private land has been used for forestry and is, therefore, a disturbed area with a network of existing access roads. The land is currently used for some recreational purposes, such as hunting and snowmobiling. A wind project is considered a compatible use for these existing land uses.

A review of the available literature found that there were no correlating negative associations between wind farms and property value. In 2010 a study in the Municipality of Chatham-Kent, Ontario was prepared to assess the effects of wind energy on real estate values. This report was prepared in accordance with the Canadian Uniform Standards of Professional Appraisal *Practice* for the Appraisal Institute of Canada (Canning et al. 2010). The report is widely recognized in the wind industry as a thorough study and demonstrates what many other studies also indicate. The study found that it was highly unlikely that a relationship exists between wind farms and the market values of rural residential real estate (Canning et. al. 2010).

A study by the University of Guelph analyzed more than 7,000 home and farm sales that occurred between 2002 and 2010 in Melancthon Township, Ontario, which saw 133 turbines erected between 2005 and 2008. Of the 7,000 homes and farms, 1,000 were sold once, and some multiple times. Co-authors, Richard Vyn and Ryan McCullough conclude that the turbines in question have not impacted the value of the surrounding properties. Further, the nature of the results, which indicate a lack of significant effect, is similar across both rural residential properties and farm properties (Vyn McCullough 2014).

There is the potential that the turbine rotor may interfere with the transmission and receipt of telecommunication signals from radiocommunication towers. A Radiocommunication Impact Study has been completed to locate the communication towers in the area and assess the potential for the Project to impact them. Appropriate buffers have been applied to all radiocommunication towers and their signal corridors according to the Radio Advisory Board of Canada (RABC) guidelines.

There is no anticipated interference to the existing radiocommunication infrastructure and systems as a result of the Project as none of the turbines are sited within the consultation zones outlined by the Radio Advisory Board of Canada and the Canadian Wind Energy Association (RABC-CanWEA) (2020). The Radiocommunications System Impact Study in Appendix M demonstrates adherence to these standards.

Transport Canada and Navigation Canada have been consulted in regards to the Project. Aeronautical Obstruction Evaluations and Land Use Proposal Forms have been submitted for evaluation of the proposed location and have received approval. The Department of National Defence has also been notified about the proposed project and location and no objections have been received.

The potential interactions of the Project on land use and values and the proposed mitigative measures are summarized in Table 44.

TABLE 44: POTENTIAL INTERACTIONS AND PROPOSED MITIGATION FOR LAND USE AND VALUES

Potential Interactions with Land Use and Values	Proposed Mitigative Measures
Temporary noise and/or light disruption from construction equipment.	• Local residents have been notified of the Project, including planned activities and planned schedule; • Adjacent residents will be re-notified immediately before the commencement of construction activities (i.e., when the contractor is retained and the schedule is finalized); and • Construction activities will be limited to daytime hours unless absolutely necessary.
Wind turbine operation may interfere with telecommunication and/or radar communication infrastructure	• Consultation was completed as recommended by the CanWEA and RABC's guidance document – Technical Information and Guidelines on the Assessment of the Potential Impact of Wind Turbines, on Radio Communications, Radar and Seismoacoustic Systems; • A desktop radiocommunication impact assessment was conducted by the Proponent in line with the RABC guidelines. The results of the assessment show that the turbine locations will not interfere with the telecommunication corridors of nearby towers; • Approval has been received from Navigation Canada, ensuring that the Project does not pose any hazard to the navigational systems; and • Transport Canada and Department of National Defence have also approved the Project location.
Land use of the project site where the turbine is proposed will change from clear-cut, fragmented habitat to a source of renewable energy.	• The land use changes are predicted to be positive: no mitigation is proposed.
Current land use may be impacted during the construction and operation of the Project.	• Consultation with all current land users is ongoing; • Ongoing consultation with the local snowmobile club has and will continue to occur to ensure safe recreational use of the Project lands; • When forestry activities are occurring onsite, extra caution will be taken on roads; and • The zoning for the Project is appropriate with surrounding land uses, so incompatible land uses are not expected to occur.
Public concern that property value may decrease as a result of the Project	• Real estate value studies have consistently determined no correlation between proximity to wind farms and property devaluation (Canning et. al. 2010); and • Education through public consultation can be effective in providing factual, relevant information to alleviate the concerns of local residents.

Significance of Residual Effects

Based on consultation with the appropriate authorities, no impedance on communication infrastructure is to be expected. As a result, the significance of residual effects on telecommunication and radar communication is expected to be negligible.

Consultation with direct and adjacent land users will continue on an ongoing basis to ensure safe and compatible use on the Project site.

The significance of residual effects on land use and property value is expected to be negligible.

7.3.3 Transportation

Potential Interactions and Mitigation

During construction of the access roads and turbine foundations, there will be an increase in truck traffic on the roads leading to and from the Project site. During delivery of the turbine components, delivery of oversized loads may slow traffic flow.

Oversized loads will be associated with the delivery of turbine towers, blades, nacelles, and the cranes required for erection and decommissioning. These deliveries are anticipated to be subject to movement orders as agreed upon with governing authorities.

The potential interactions of the Project on transportation and the proposed mitigative measures are summarized in Table 45.

TABLE 45: POTENTIAL INTERACTIONS AND PROPOSED MITIGATION FOR TRANSPORTATION

Potential Interactions with Transportation	Proposed Mitigative Measures
Temporary traffic delays are possible during construction due to movement of equipment and materials to the Project site.	• Detour and other traffic control signs will be posted where necessary during construction to minimize traffic within the construction site; • Delivery of materials to site will be scheduled outside of peak traffic times, when possible; • Truck drivers will adhere to posted speed limits and warning signage and adjust driving to meet weather and road conditions; • All necessary permits will be obtained and industry best practices will be followed for special moves or traffic interruptions on public roads; • Any potential modifications to intersections for access to the Project Area will follow appropriate traffic controls and permitting; and • The construction schedule will be shared with nearby residents.

Significance of Residual Effects

The time frame in which an impact to traffic may occur will be temporary, and combined with the proposed mitigative measure of avoiding high traffic times; the significance of residual effects on vehicular traffic is expected to be negligible.

7.3.4 Human Health and Safety

Potential Interactions and Mitigation

Public health and safety are of great importance in the development of the Project. During all Project phases, the protection of worker and the public health and safety is protected under the provincial OHS (Occupational Health and Safety) Act.

Proper setbacks have reduced the risk to public health and safety from noise and shadow flicker impact, possible fires, ice throw and malfunction. Technological considerations, including a built-in system to detect ice on the blades, to reduced ice throw will be implemented. Further, a lightning protection system will conduct electrical surges away from the nacelle to prevent fires. This system includes wiring around and throughout the turbine to transport and dissipate the surge to the ground.

Consultation with applicable aviation authorities has occurred, and the turbine lighting will conform to Transport Canada requirements for aviation safety. Safe work practices will be encouraged onsite during the construction phase.

Over the past few years, there has been growing concern over public safety in relation to possible exposure to electromagnetic fields (EMFs) from wind turbines. Electric fields are generated by a difference in voltage while magnetic fields are generated when there is a flow of electric current. A higher voltage and greater the current will result in a larger EMFs (WHO, 2017).

EMFs can also occur naturally in the environment and are generated from every electrical distribution line that connects to homes and from all household electronic devices. A study conducted in 2014 (McCallum et al.) found that EMFs around wind turbines do not present a health concern to the public and that levels surrounding wind turbines are found to be lower than levels found around homes from use of common household electrical devices.

EMFs generated from wind turbines are not considered to pose health concerns and are not considered a potential impact to public health and safety.

Ice accumulation on wind turbine blades can occur during the winter months when the appropriate conditions of temperature and humidity exist, or during certain extreme weather conditions, such as freezing rain (Seifert et al., 2003). In the event that ice builds up on the wind turbine blades, there are two types of risks possible: the first is ice throw from an operating wind turbine, and the second is ice fall from a wind turbine that is not in operation.

Ice throw was investigated to determine the risk probability for an individual to be struck by ice thrown from an operating wind turbine The results of the statistical analysis by LeBlanc et al., 2007), as discussed further in Section 8.3, found that individual risk probability for an individual is incredibly low,

The potential interactions of the Project on human health and the proposed mitigative measures are summarized in Table 46.

TABLE 46: POTENTIAL INTERACTIONS AND PROPOSED MITIGATION FOR HUMAN HEALTH.

Potential Interactions with Human Health	Proposed Mitigative Measures
During cold weather there is the potential for ice to build up on the turbine blades and be thrown.	• Turbines will be equipped with ice-detection systems on each blade; • Turbines will be designed to shut down in the case of ice-buildup and/or activate the de-icing system, if available; and • Signage will be posted on site to indicate the risk of ice throw to any land users and to require Personal Protection Equipment to be worn when near the turbines.
During extreme weather events, there is the potential for electrical fires within the turbine nacelle through lightning strikes.	• Turbines will be equipped with lightning protection that, in the unlikely event of a lightning strike, will dissipate the lightning current to the ground.
Potential aviation hazard to low flying aircraft.	• Approval has been received from Navigation Canada and Transport Canada for the turbine locations, ensuring that the Project does not pose any hazard to the navigational systems.
Increase in vehicular traffic may have the potential to affect public safety.	• Every effort will be made to ensure that oversized loads are delivered during times of lowest traffic to mitigate road traffic.; • Speed limit signs will be posted across the site and roads onsite will be maintained in good working order.
Shadow flicker may affect human health.	• This potential impact has been addressed in the Shadow Flicker Section 7.2.3.
Sound levels may affect human health.	• This potential impact has been addressed in Section 7.2.1.
Potential for accidents and malfunctions pose a risk to workers and the public's health and safety.	• The OHS Act will be followed.

Significance of Residual Effects

The development of the Project has the potential to interact with human health through temporary disturbance such as increases to traffic. However, the construction phase of the Project will be temporary and the ongoing operation of the Project is expected to result in minimal to no disruptions. Furthermore, the Project will provide a clean and renewable source of electricity generation that will ultimately help to mitigate climate change and reduce the amount of greenhouse gas emissions, which are positive environmental interactions. Therefore, with proposed mitigation, the residual interactions of the Project with human health are not expected to be substantive.

Throughout Project planning and design, the top priority has been health and safety. This is to make every reasonably effort to eliminate any negative potential impacts the Project may have on public health and safety. By following the proposed mitigative measures as well as regulatory guidelines pertaining to health and safety, the significance of residual effects on health and safety is expected to be negligible.

7.4 Cultural and Heritage VECs

7.4.1 Archaeological and Cultural Resources

Potential Interactions and Mitigation

The Project has the potential to interact with heritage resources via accidental discovery of archaeological resources during excavation activities. However, it is unlikely that heritage resources will be encountered in the Project areas because the Project is largely located on previously disturbed land, but as with any ground moving activity, such as excavation, the potential to uncover previously undiscovered heritage resources exists. Without mitigation, environmental effects include the potential permanent destruction of any previously undiscovered archaeological or palaeontological resources that might be present within the Project areas.

The potential interactions of the Project on archaeological and cultural resources and the proposed mitigative measures are summarized in Table 47.

TABLE 47: POTENTIAL INTERACTIONS AND PROPOSED MITIGATION FOR ARCHAEOLOGICAL AND CULTURAL RESOURCES

Potential Interactions with Archaeological and Cultural Resources	Proposed Mitigative Measures
Direct impact to cultural resources during construction activities, such as blasting and excavation.	• Avoidance is the preferred method of mitigation in all instances where archaeological resources are present; • An archaeologist will walk over recommended Project areas prior to construction; • Ground intrusive work activities will not exceed the predefined Project areas; • Construction workers working within 80 m of a watercourse will be advised of the higher potential for archaeological resources; • Should archeological resources be encountered by chance during construction, all work in the area will cease immediately and the Archaeology and Heritage Branch of Nova Scotia Communities, Culture, Tourism and Heritage will be contacted at (902) 424-6475 for further mitigation; • Until a qualified archaeologist arrives at the scene, no one shall disturb, move or re-bury any uncovered artifact; • Activities at the site may resume only when authorized by Archaeological Services and once mitigation measures have been completed; • If bones or human remains are found, work in the area must cease, and the RCMP shall be immediately notified;

Potential Interactions with Archaeological and Cultural Resources	Proposed Mitigative Measures
	• No one shall disturb, move or rebury any uncovered human remains; • If the discovered resources are related to Indigenous culture, the Nova Scotia Office of L'nu Affairs will be contacted to determine how best to proceed with respect to repatriation of the resources; and • The Nova Scotia Museum of Natural History will be notified at (902) 424-7353, should fossils be encountered during the ground intrusive work.

Significance of Residual Effects

Given the history of the Project area, the potential to encounter previously undiscovered heritage resources during the construction phase of the Project is low, despite the proximity of the Project areas to several watercourses and lakes (note: all areas within 80 m of a watercourse are considered to have elevated archaeological potential until an ARIA determines those areas to be of low potential). As described above, no interactions are anticipated during the operation and maintenance phase or the decommissioning phase. In addition, results of the ARIA indicated that there are no known cultural heritage or archaeological resources located within the Project Development Area. It is recommended that any proposed impact areas for the Project be subjected to the Archaeological Reconnaissance phase of the ARIA prior to any ground disturbance activity. With the mitigation proposed, the significance of residual effects on archaeological resources is expected to be negligible as it is expected that should any resources be found onsite, that they can be successfully avoided.

7.5 Assessment of Potential Project Interactions with the Environment as a Result of Accidents, Malfunctions, and Unplanned Events

Potential Interactions and Mitigation

There is a potential for accidents, malfunctions, or unplanned events related to any project, particularly during the construction and decommissioning phases. Without proper mitigation, the Project could interact with many of the VECs as a result of accidents, malfunctions, or unplanned events associated with the Project activities. To limit accidents, malfunctions, and unplanned events during the Project, mitigation measures will be followed.

The potential interactions of the Project with VECs as a result of accidents, malfunctions, and unplanned events and the proposed mitigative measures are summarized in Table 48.

TABLE 48: POTENTIAL INTERACTIONS AND PROPOSED MITIGATION FOR UNPLANNED EVENTS, MALFUNCTIONS AND ACCIDENTS

Potential Interactions due to Unplanned Events, Malfunctions and Accidents	Proposed Mitigative Measures
The accidental release of a hazardous materials through spills and vehicle traffic could affect soil, groundwater, surface water, wetlands, and fish and fish habitat through runoff or direct interactions at those VECs from a localized spill meandering into the receiving watercourses, potentially resulting in degradation of water quality or even mortality of fish during all Project phases.	• Loads of fill material will be thoroughly checked and secured for delivery to minimize potential for spillage and any spills will be promptly removed following applicable safety procedures; • Equipment shall be kept in good working order and maintained so as to reduce risk of spill/leaks and to avoid water contamination; • Spill response kits will be provided on site for each piece of equipment to ensure immediate response to a potential waste release and will be stocked with supplies to handle a worst-case scenario in surface or groundwater; • Onsite workers will be required to be knowledgeable of how to use spill kits; • Routine maintenance, refueling and inspection of machinery will be performed off-site or on level ground onsite; • Corrective measures will be implemented immediately; • Secondary containment and limited quantities of chemicals and fuels required to be stored on site shall be in an area away from the surrounding terrestrial environment, or direct pathways (i.e., ditches) to the surrounding environment; • If contaminated soil is encountered, it will be reported to NSE and managed utilizing the Nova Scotia Contaminated Site Regulations; • Refueling, oiling, and maintenance of equipment will be completed in specifically designated areas located at least 30 m away from any watercourse, wetland, or well to minimize potential effects that could arise in the event of a spill; and • Servicing of equipment will be completed off-site by a licensed mechanic; however if required to be completed on-site, the work will be completed over an impervious surface.
In the event of the failure of erosion and sediment control (ESC) measures, the discharge of runoff containing sediment to watercourses (i.e., surface water) and fish and fish habitat during storm events or spring runoff may result in the degradation of those VECs on a temporary basis.	• Construction of the ESC measures will be completed using quality materials and sound and proven construction practices in accordance with industry best practice; • Periodic inspection and maintenance (as required) of the ESC measures will be carried out, particularly prior to and following each major precipitation event; and • In the event of a significant ESC failure that results in noncompliance with a permit/approval, all work will

Potential Interactions due to Unplanned Events, Malfunctions and Accidents	Proposed Mitigative Measures
	be immediately stopped, and all available resources will immediately focus on mitigating the failure(s) in an effort to minimize negative impacts.
Several factors including but not limited to the accumulation of fill and materials for long periods of time, and minimizing disruptions at night (i.e., lights pointed up) can all increase the potential for interactions with wildlife (i.e., birds), potentially causing avoidance, sensory disturbance, or even mortality.	• Rubbish and waste materials will be kept at minimum quantities and burning of this material will be prohibited; • Waste materials will be collected on a regular basis and disposed of at an appropriate approved facility; and • If work is required at night, the area will be appropriately lit with shielded lights pointing downwards.
Fire may result in a loss of vegetation which has the potential to impact important habitats and food sources.	• Chemical and petroleum hydrocarbons will be stored in appropriate containers and in specifically designated areas to reduce potential for leaks. Where applicable, secondary containment of chemicals or petroleum hydrocarbons will be employed; • Oily rags will be stored in approved receptacles and disposed of at approved waste facilities; • No fires will be lit onsite; and • If fuel storage is required onsite, double walled fuel storage tanks will be required.
Harm to humans or wildlife as a result of collisions or accidents with equipment or vehicles throughout the project duration.	• Work entailing use of toxic or hazardous materials, chemicals, or otherwise creating hazard to life, safety of health, will be conducted in accordance with National Fire Code of Canada to minimize the potential for spills or fires; • Occupational health and safety measures will be in place throughout all phases of the Project; • Detour and other traffic control signs will be posted where necessary during construction to minimize traffic within the construction site; • Delivery of materials to site will be scheduled outside of peak traffic times, when possible; • Truck drivers will adhere to posted speed limits and warning signage and adjust driving to meet weather and road conditions; • All necessary permits will be obtained and industry best practices will be followed for special moves or traffic interruptions on public roads; • Any potential modifications to intersections for access to the Project Area will follow appropriate traffic controls and permitting; and • The construction schedule will be shared with nearby residents.

Significance of Residual Effects

With the implementation of the planned mitigation, and with the careful development and implementation of contingency and emergency response plans to be applied in the unlikely occurrence of an accident, malfunction, or unplanned event, interactions between the Project and the environment arising from an accidental event are not anticipated to be substantive.

7.6 Cumulative Effects

Cumulative effects are changes to the environment that are caused by an action in combination with other past, present and future human actions (Hegmann et al. 1999). Nearby wind energy projects to the proposed project include the South Canoe Lake Wind Energy Project, the Martock Ridge Wind Project and the Ellershouse Wind Project.

The South Canoe Lake Wind Energy Project is a 34-turbine project located approximately 8 km south-southwest of the Project. The Martock Ridge Wind Project (3 turbines) and the Ellershouse Wind Project (10 turbines) are located 8.6 km and 16 km east-northeast of the Project, respectively. The distances between these projects and the BMWP (i.e. outside of the LAAs for all VECs) suggests the potential for interaction between the residual effects of the combined projects is low. Regional population-wide effects due to the individual residual effects of each project could occur. However, population level impacts are unlikely, provided that highly sensitive or rare habitats, as well as concentration areas for species at risk, have been avoided by this Project.

The anticipated cumulative effects for this Project on migratory bats and birds are anticipated to be negligible and unmeasurable. In the context of other infrastructure that is also a source of collision effects, such as transmission/distribution lines, roads (Highway 14, Highway 101) and communication towers, the cumulative effect of these projects on wildlife, specifically on migrating birds is expected to be negligible (Zimmerling et al. 2013).

No other cumulative effects are anticipated.

7.7 Summary of Effects

Based on the assessment of the effects of the undertaking on the environment, the Project effects have been evaluated and a summary of the assessment is presented in Table 49 with the following criteria:

- Nature: positive (+), negative (-), or No Impact, where no impact is predicted;
- Magnitude: size of the potential impact – small, medium, or large;
- Reversibility: reversible (REV) impact or irreversible (IRR) impact;
- Timing : Duration of the anticipated impact – short or long-term;
- Extent: spatial extent of the impact – local, regional, provincial;
- Residual Effect: characterization of the residual effects – negligible, minor, significant, beneficial, or no impact.

TABLE 49: SUMMARY OF THE RESIDUAL EFFECTS FOR THE PROJECT

	Assessment of Potential Effects of Project on VECs					
VEC	Nature	Magnitude	Reversibility	Timing	Extent	Residual Effect
Physical Environment						
Weather Conditions	No Impact	small	N/A	Short	Local	Negligible
Climate and Climate Change	+	medium	N/A	Long	Provincial	Beneficial
Ambient Air Quality	-	small	REV	Short	Local	Negligible
Ambient Sound Levels	-	small	REV	Long	Local	Negligible
Geology	-	small	IRR	Short	Local	Negligible
Surface Water	-	small	REV	Short	Local	Minor
Groundwater	-	small	IRR	Long	Local	Minor
Shadow Flicker	-	small	REV	Long	Local	Minor
Visual Aesthetics	-	small	REV	Long	Local	Minor
Biophysical VECs						
Vegetation	-	small	REV	Long	Local	Minor
Wildlife	-	small	REV	Long	Local	Negligible
Wetlands	-	small	REV	Short	Local	Minor
Birds and Bird Habitat	-	small	REV	Short	Local	Minor
Bats and Bat Habitat	-	small	REV	Short	Local	Minor
Fish and Fish Habitat	-	small	REV	Short	Local	Minor
Species at Risk	-	small	REV	Short	Local	Negligible
Socioeconomic VECs						
Economy	+	Small	N/A	Short	Local	Beneficial
Land Use and Value	-	small	REV	Short	Local	Negligible
Transportation	-	small	REV	Short	Local	Negligible
Human Health and Safety	-	small	REV	Long	Local	Negligible
Cultural and Heritage VECs						
Archaeological and Cultural Resources	No Impact	N/A	N/A	N/A	N/A	No Impact

8.0 Effects of the Environment on the Undertaking

Effects of the environment on the Project are those effects related to risks of natural hazards and influences of the natural environment that might affect the normal execution of the Project or cause damage to infrastructure related to it. Potential effects of the environment on any project are a function of project or infrastructure design in the context of its receiving environment, and ultimately how the project is affected by the natural environment. These effects may arise from physical conditions, land forms, and site characteristics or other attributes of the environment which may act on the project such that the project components, schedule, and/or costs could be substantively and adversely changed.

Based on the nature of the undertaking, the following environmental attributes have been selected for consideration in this assessment:

- Climate and climate change;
- Severe weather events;
- Turbine Icing; and
- Forest fires resulting from causes other than the Project.

8.1 Climate Change

Climate is defined as the statistical averages of precipitation, temperature, humidity, sunshine, wind velocity, and other phenomena such as fog, frost and hail storms for a particular region and time period, generally taken over a 30 year period (NASA 2017). Climate change is an acknowledged change in climate that has been documented over two or more 30-year periods. According to the Intergovernmental Panel on Climate Change (IPCC), climate change may be due to natural internal processes or external forces, or to persistent anthropogenic changes in the composition of the atmosphere or in land use (IPCC 2014). The United Nations Framework Convention on Climate Change (UNFCCC) makes a distinction between climate change attributed to human activities and climate variability attributable to natural causes, by defining climate change as a change of climate directly or indirectly attributed to human activity that alters the composition of the global atmosphere, and which is in addition to natural climate variability observed over comparable time periods (IPCC 2014).

Climate change is important to consider as the project is expected to be operational for 25+ years. Some of the long-term effects of global climate change include rising temperatures, changes in precipitation patterns, increases in droughts and heatwaves, stronger and more intense hurricanes and in increase in sea level (NASA 2021). Climate change could impact the Project by impacting the ability of the WTG to function due to high temperatures. The Project site was selected in a location with an elevation greater than 100 m above sea level (ASL), therefore, the effects of sea level rise should not directly impact the operation of the WTGs. A summary of the ways climate change could impact the Project is presented in Table 50.

TABLE 50: POTENTIAL INTERACTIONS AND PROPOSED MITIGATION OF EXTREME WEATHER EVENTS ON THE PROJECT

Potential Interactions due to Climate Change	Proposed Mitigation
Increase in temperatures could impact the function of the WTG	• The WTGs are designed with incorporated technology to prevent damage from rising temperatures. Weather conditions will be monitored throughout the operational life of the project with SCADA systems in place to remotely monitor the WTGs and with the ability to halt operations if needed.

8.2 Severe Weather Events

Extreme precipitation and storms can occur in Nova Scotia throughout the year, but tend to be more common and severe during the winter season. Winter storms can generally bring high winds and a combination of snow, rain and ice.

In Nova Scotia, an extreme rainfall event is when 25 mm or more rain falls over a 24-hour period, ECCC issues a rainfall warning when this is forecasted to occur (ECCC 2020).

Significant ice storms have also affected Nova Scotia with an increased frequency. Ice buildup on power infrastructure during these storms has led to significant damage to equipment and transmission/ distribution infrastructure, as well as impassable roads, wide-spread power outages, and health emergencies.

Severe weather events could potentially damage the wind turbines due to conditions exceeding the operational design of the wind turbines. High winds, extreme temperatures and icing on blades all have the potential to shut down the wind turbines. Extreme weather events that could occur at the Project site are listed in Table 51.

TABLE 51: POTENTIAL INTERACTIONS AND PROPOSED MITIGATION OF EXTREME WEATHER EVENTS ON THE PROJECT

Weather Event	Potential Interaction with Project	Proposed Mitigation
Extreme wind	• Damage to blades	• Automated control system would initiate shut down.
Hail	• Damage to blades	• Appropriate wind turbine maintenance.
Heavy rain and flooding	• Flooding of road and project site	• The project has been sited on an elevated plateau in the landscape and the roads will be designed to maintain water flow where needed to prevent flooding and wash-outs from current precipitation levels and to mitigate risks associated with predicted increases in precipitation from climate change. Appropriate storm water management will also be implemented.

Weather Event	Potential Interaction with Project	Proposed Mitigation
Heavy snow	• Damage to wind turbine components	• Automated control system would initiate shut down.
Ice storms	• Icing on blades resulting in potential ice throw	• Automated control system would initiate shut down procedures until ice has melted.
Lightning	• Potential for fires within nacelle of wind turbines	• Lightning protection system would conduct electrical surge away from nacelle.

8.3 Turbine Icing

Ice accumulation on wind turbine blades can occur during the winter months when the appropriate conditions of temperature and humidity exist, or during certain extreme weather conditions, such as freezing rain (Seifert et al., 2003). In the event that ice builds up on the wind turbine blades, there are two types of risks possible: the first is ice throw from an operating wind turbine, and the second is ice fall from a wind turbine that is not in operation.

When a wind turbine is in operation, it is assumed that ice may collect on the leading edge of the rotor blade and detaches regularly due to aerodynamic and centrifugal forces (Seifert et al., 2003). The distance that the ice will be thrown from the moving wind turbine blade will vary depending on the wind speed, the rotor azimuth and speed, the position of the ice in relation to the tip of the blade, as well as characteristics of the ice fragment.

In a Canadian study titled *Recommendations* for Risk Assessments of Ice Throw and Rotor Blade Failure in Ontario (LeBlanc et al., 2007) ice throw was investigated to determine the risk probability for an individual to be struck by ice thrown from an operating wind turbine. The following parameters and assumptions were used:

- Rotor diameter of 80 m;
- Hub height of 80 m;
- Fixed rotor speed of 15 RPM (Rotations Per Minute);
- Ice fragment is equally likely to detach at any blade azimuth angle and 3 times more likely from the blade tip than the rotor;
- Ice fragments have a mass of 1 kg and frontal area 0.01 m^2;
- All wind directions are equally likely; and
- Ever-present individual between 50 m and 300 m (doughnut shaped buffer around WTG), individual equally likely in any given 1 square m within that area.

The statistical analysis found that individual risk probability for an individual is 0.000000007 strikes per year or, 1 strike in 137,500,000 years. For an individual to be ever-present in the defined area, this

assumes that the individual would be outside during the unpleasant weather necessary for icing conditions. This analysis does not take into account the presence of trees that could provide shelter from potential ice throw (Seifert et al., 2003). The wind turbines that will be used for the Project may have different specifications than used in this example; however, this should be used as a general example to understand the incredibly low probability of an individual being struck by ice throw.

As with trees, power lines, masts, and buildings, ice can accumulate on a stationary wind turbine, and will eventually be released and fall to the ground. Depending on the rotor position of the stationary rotor, different fall distances along the current prevailing wind will occur (Seifert et al., 2003).

8.4 Forest Fires

The Fire Weather Index is a component of the Canadian Forest Fire Weather Index System. The index provides a numeric rating of fire intensity, and is the general index of fire danger throughout the forested areas of Canada (Natural Resources Canada 2021c).

The mean Fire Weather Index in the West Hants area for July (i.e., normally the driest month of the year), when risk of forest fire is typically greatest, is rated from 5 to 10, as shown in Figure 22, which is the second lowest rating on the scale of possible fire risk. This risk is based on Fire Weather Normals data, representing the average value of a fire weather code or index over the 30-year period from 1981 to 2010 (Natural Resources Canada 2021c).

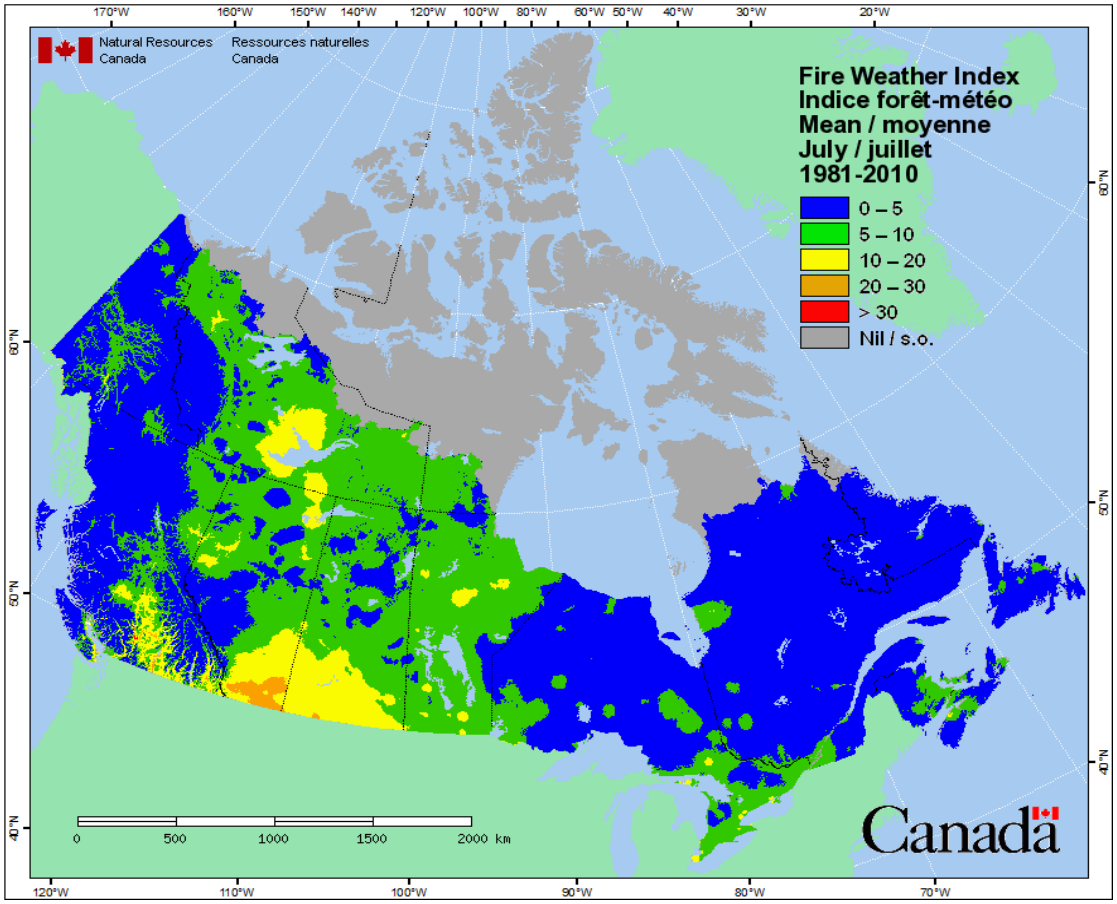


FIGURE 22: NATURAL RESOURCES CANADA FIRE WEATHER INDEX

8.5 Significance of Residual Effects

The Proponent recognizes the vulnerability of this project to impacts from the environment. However, careful design measures have been implemented based on the Project's location and the Project's technology to protect the Project from potential impacts from climate change, extreme weather and other environmental factors throughout the operational phase.

Extreme weather events have been considered while selecting the proper technology and the proper turbine model for its specific location. Using the most advanced technology will help ensure the turbine can withstand these events and that appropriate mitigation measures will be activated during the events. Examples of such mitigation measures include but are not limited to shutting down the turbine by pitching the blades, and rotating the hub to help avoid damage to the machinery.

Additionally, for extreme events occurring in the winter months, technology is now available that detects the formation of ice on the blades and shuts down the wind turbines until the ice has melted either passively or actively.

In the case of a forest fire or extreme weather event, the turbine can be shut down remotely if deemed necessary.

9.0 Greenhouse Gas Emissions

Operational wind projects reduce greenhouse gas (GHG) emissions by producing emission-free electricity that would have otherwise been produced by carbon-intensive energy sources, such as coal. This section details the methods and assumptions used to calculate the emission reductions the Project will cause over the operational lifetime.

9.1 Methodology

The methodology followed to complete the GHG emission analysis for the Project follows the international standard ISO 14064-1 and 14064-2. As is standard for this type of analysis, all emission values are presented in tonnes of carbon dioxide equivalent (tCO_2e).

Define Project Scenario

The Project consists of 28 wind turbines that collectively produce 150 MW of renewable energy. By supplying clean, renewable energy to the Nova Scotia Power Inc electrical grid, the Project is a GHG emissions reduction project within Nova Scotia. The operational term of the Project is assumed to be 25 years, from 2024 to the end of 2048.

Identify Project GHG Sources, Sinks and Reservoirs

The main sources of GHG emissions associated with the Project are during construction. This includes emissions related to manufacturing, installation, and commissioning for all Project components. A secondary source of GHG emissions will be during decommissioning, but this is not included in this analysis because it is difficult to estimate these sources so far in advance, especially since the Project could be retrofitted after the 25 years of assumed operation, rather than being decommissioned.

The main sink for GHG emissions, which reduces the emission rates, is the operational phase of the Project. This is when the Project is producing renewable, emission-free electricity that offsets emission-intensive sources of energy production.

There are no reservoirs associated with the Project.

Define Baseline Scenario

In order to quantify GHG emission reductions associated with the Project, a baseline scenario must be established as a reference point from which reductions can be made. In this case, the baseline scenario is a business-as-usual scenario in which the Project is not constructed and the Nova Scotia electricity emission intensities projected by the Government of Canada over what would have been the operational term of the Project are not offset (GoC, 2020).

This baseline scenario assumes that electricity imports have no emissions and that all fossil fuel based generation in Nova Scotia goes to domestic consumption.

Identify Baseline GHG Sources, Sinks and Reservoirs

The main source of GHG emissions associated with the baseline scenario is associated with the existing and projected electricity production sources in Nova Scotia.

There are no sinks or reservoirs associated with the baseline scenario.

Calculate Annual GHG Emissions Reduction for Project

Using standard emission factors from the Inventory of Carbon & Energy, Version 2.0; the Idemat App for Material Selection; and Canada's Greenhouse Gas Emissions Projections for Nova Scotia, the annual GHG emissions from each source and sink associated with the Project and the baseline scenarios was calculated. The emission factors are listed in Table 52. This calculation also used the following information:

- The expected annual production in MWh/yr from the Project based on wind data collected on site. This value is confidential at this time, so is not listed here.
- The following information about wind turbine manufacturing and transport:
    - Weight of steel for one wind turbine: 532,000 kg
    - Turbine tower distance traveled by marine cargo: 15,000 km
    - Weight of fibreglass for the blades of one wind turbine: 62,000 kg
    - Turbine blade distance traveled by marine cargo: 5,500 km
    - Weight of concrete for foundations of one wind turbine: 703,000 kg
    - Concrete distance traveled by road: 50 km

TABLE 52 CALCULATED ANNUAL GHG EMISSIONS REDUCTION FOR THE PROJECT

Input	Emission Factor
Electricity generated by wind turbines	0
Steel Production	1.50 kg CO_2e/kg
Marine Cargo	15.10 g CO_2e/tonne-km
Fibreglass Production	1.4 kg CO_2e/kg
Concrete Production	0.30 kg CO_2e/kg
Heavy Duty Diesel Truck	135.0 g CO_2/tonne-km
Average NS Electricity Production Emission Factor Projected from 2024 to 2048	0.243 t CO_2/MWh

The following steps were taken using this information to calculate the annual GHG emission reduction that will result from the Project:

1) Project Scenario:

a. Total emissions from Project manufacturing, installation, and commissioning were calculated. This value was then divided by 25 to get an emission value per year of Project operation. This value is 1,306 tCO2e/year.

b. Annual emissions from Project operation was calculated. This value is 0 tCO2e/year because it is a non-emitting, renewable source of electricity generation.

2) Baseline Scenario:

a. Annual emissions from the Nova Scotia grid from 2024 to 2048 based on the projected emission factor and the expected annual production from the Project were calculated.

3) GHG Emission Reduction

a. The annual Project scenario emissions were subtracted from the annual baseline scenario emissions.

9.2 Results

The Project is expected to reduce GHG emissions from the electrical grid in Nova Scotia by up to 128,000 tCO_2e/year.

10.0 Other Approvals Required

The Project also requires various other approvals, permits, and authorizations in order to proceed. The known requirements are summarized in Table 53, along with the relevant authority and current status.

TABLE 53: REQUIRED APPROVALS AND PERMITS FOR PROJECT COMPLETION

Approval/Permit	Agency	Jurisdiction	Status
Land Use Approval	Navigation Canada	Federal	Obtained
Aeronautical Assessment Approval	Transport Canada	Federal	Obtained
Radiocommunication Layout Authorization	Meteorological Services Canada, Environment, and Climate Canada Approval	Federal	Obtained
Radiocommunication Layout Authorization	National Radio Services, RCMP	Federal	Obtained
Radiocommunication Layout Authorization	Canadian Armed Forces, Department of National Defense	Federal	Obtained
Radiocommunication Layout Authorization	Canadian Coast Guard	Federal	Obtained
Development Agreement	West Hants Regional Municipality	Municipal	Submitted; ongoing

Approval/Permit	Agency	Jurisdiction	Status
Development Permit	West Hants Regional Municipality	Municipal	To apply upon Development Agreement approval
Building Permit	West Hants Regional Municipality	Municipal	To apply closer to construction start date
Watercourse and Wetland Alteration (WAWA) Permit	Nova Scotia Department of Environment and Climate Change	Provincial	To apply closer to construction start date when civil designs are complete, if required
Archaeology Field Research Permit	Nova Scotia Department of Communities, Culture, and Heritage	Provincial	Obtained
Special Move Permit	Nova Scotia Department of Transportation and Infrastructure Renewal	Provincial	To apply closer to construction start date, if required
Transportation Plan Approval	Nova Scotia Transportation and Infrastructure Renewal	Provincial	To submit closer to construction start date, if required

11.0 Funding

No government funding has been secured for the Project. If this changes, the Proponent will provide this information. Regardless of whether government funding is secured, the Proponent will fully fund the project through equity and financing.

12.0 Additional Information

All information necessary and relevant to this EA is included in the sections above.

13.0 Closure

Many adaptation and mitigation options can help address climate change; however, no single potion is sufficient alone. As discussed at COP26, substantial emissions reductions over the next few decades are required to limit climate warming to below 2 degrees Celsius relative to pre-industrial levels. The Benjamins Mill Wind Project and other similar projects represent an integral part of the global effort to reach these reduction targets, which the Province of Nova Scotia has recognized and integrated into legislation.

A thorough analysis of the Project components and activities has been carried out for all phases – construction, operation, and decommissioning – of the Project. Baseline existing environmental characteristics of the region have been documented and the VECs have been assessed. The Mi'kmaq in Nova Scotia have been and will continue to be engaged with and updated on Project activities, and a Mi'kmaq Ecological Knowledge study has been initiated. Consultation with the public and various stakeholders is ongoing to gauge the full range of impacts and concerns with regards to the Project,

which is integrated into planning efforts. The impact of the Project on the local environment has been evaluated based on these many criteria and mitigative measures have been presented and will be adopted to minimize the chance and reduce the significance of the potential residual impacts as a result of Project activity. Cumulative effects of the Project on the environment due to other regional Projects and activities have also been identified and assessed. From the data presented in the EA process, there are no significant residual environmental effects predicted for the construction, operation, and decommissioning phases of the Project.

The following benefits will result due to the Project and are considered as advantages of this development:

- Production of emission-free energy, which will displace energy produced from fossil fuels in Nova Scotia;
- Assist Nova Scotia in meeting the target of 80% renewable energy set in the Renewable Electricity Regulations made under Section 5 of the Electricity Act;
- Help decrease anthropogenic induced climate change, which is putting both human and environmental health at risk;
- Increase revenue to the West Hants Regional Municipality through the payment of annual property taxes;
- Increased revenue to local businesses due to activities associated with the construction, operation, and decommissioning of the Project; and
- Creation of additional employment in the region during all Project phases.

The Benjamins Mill Wind Project provides an excellent opportunity to transform fragmented habitat into a productive source of renewable energy, providing source diversity and helping to meet increasing energy demands in Nova Scotia. The Proponent is seeking to develop the proposed Project with the intent of helping Nova Scotia meet its renewable electricity targets while providing local economic benefits. The Proponent is pleased to provide this EA to the Policy, Planning & Environmental Assessment Branch of the Department of Environment and Climate Change and looks forward to working with provincial regulators to progress the Project to a construction ready stage.

14.0 Disclosure

This report was prepared by Natural Forces Developments Limited Partnership and Dillon Consulting Limited (Dillon). Both parties have used the degree of care and skill ordinarily exercised under similar circumstances at the time the work was performed by reputable members of the environmental consulting profession practicing in Canada. Dillon assumes no responsibility for conditions which were beyond its scope of work. There is no warranty expressed or implied by Dillon.

The material in the report reflects the Proponent's, and Dillon's, best judgment in light of the information available at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Dillon accepts no

responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Respectfully submitted,

Natural Forces Developments Limited Partnership

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