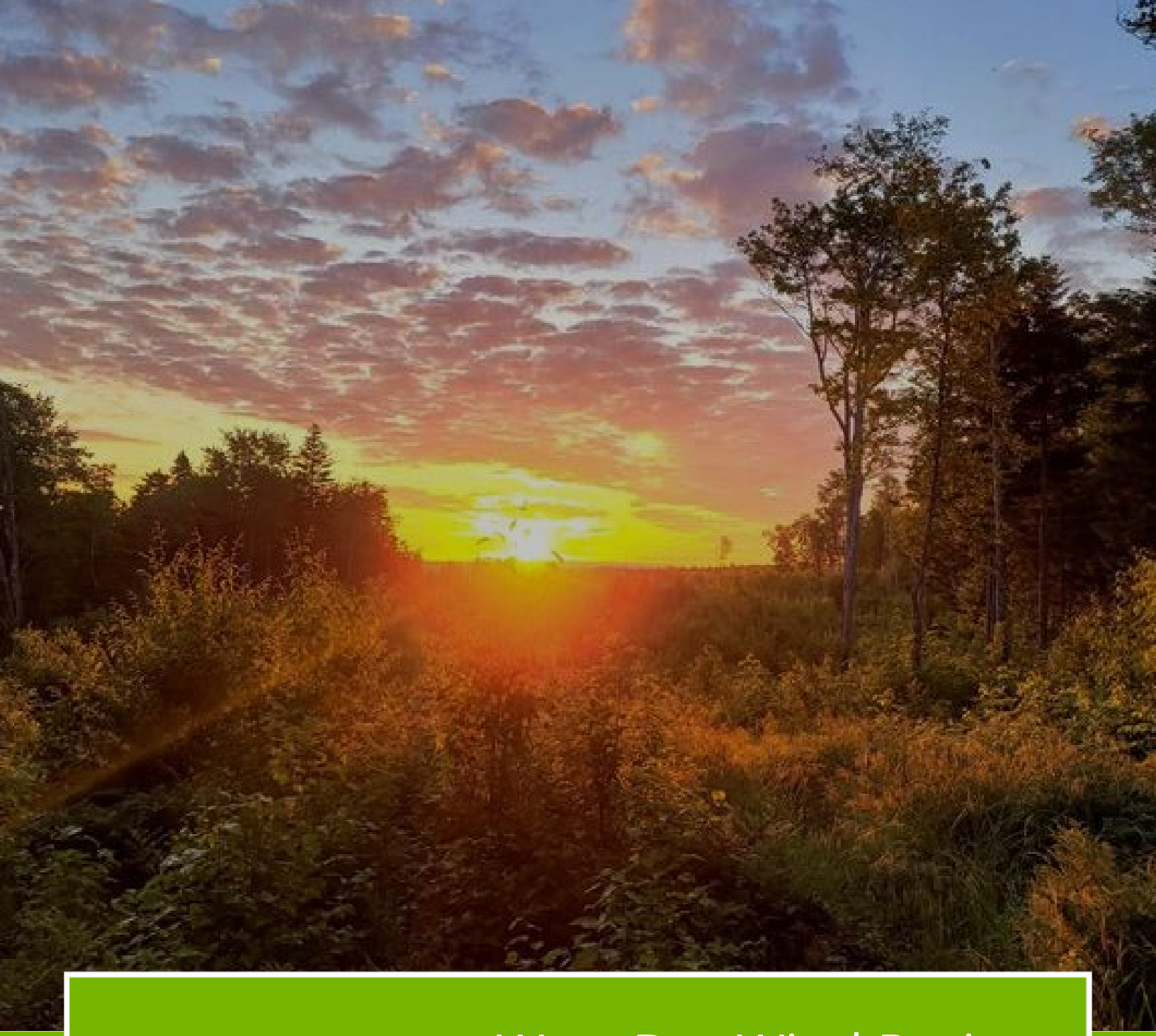


West Bay Wind Project

Environmental Assessment

Prepared for: West Bay Wind Inc.

CBCL

November 5, 2026

November 5, 2026

Mark McInnis
Nova Scotia Department of Environment & Climate Change
Environmental Assessment Branch
#2085 – 1903 Barrington Street
PO Box 442
Halifax, NS B3J 2P8

Dear Mr. McInnis,

RE: Environmental Assessment Registration Document
West Bay Wind Project

Please find enclosed the Environmental Assessment Registration Document for the West Bay Wind Project.

The undersigned approves and accepts the contents, as submitted to the Nova Scotia Environment & Climate Change, Environmental Assessment Branch.

Sincerely,

Chris Stanton
Director
West Bay Wind Inc.

Executive Summary

West Bay Wind Inc. (the Proponent), a wholly owned subsidiary of Northland Power Inc. (NPI) is proposing the construction and operation of the West Bay Wind Project (the Project). The Project is situated on Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq people, in the Municipality of the County of Cumberland, to the north of the community of Parrsboro, Nova Scotia.

The Project is a proposed onshore wind farm consisting of up to 25 wind turbines that will include associated infrastructure such as a substation, an operation and maintenance building, a transmission line to the Nova Scotia Power Incorporated (NSPI) interconnection point, power collection systems, access roads, and temporary laydown areas. The Project will have a maximum installed capacity of 150 megawatt (MW). If awarded through the province's Green Choice Program, it will supply renewable energy through the program to some of the province's largest energy consumers with up to 100% renewable energy. The proposed Project could generate enough electricity to power approximately 50,000 homes annually and reduce greenhouse gas emissions by approximately 259,600 tonnes per year, helping to meet Nova Scotia's growing energy needs while supporting the province's transition to a cleaner, more sustainable electricity system.

The Project is a Class I undertaking per Schedule A of the Nova Scotia Environmental Assessment (EA) Regulations under the provisions of the *Environment Act*, requiring registration with the Nova Scotia Department of Environment and Climate Change (NSECC). This EA registration document has been prepared by CBCL Limited (CBCL) according to guidance outlined in the province's document, *A Proponent's Guide to Environmental Assessment*, as well as the *Guide to Preparing an EA Registration Document for Wind Power Projects in Nova Scotia*.

The Proponent and consultants carried out consultation and engagement as part of the Project planning process. Key rightsholders and stakeholders involved in these discussions included the Mi'kmaq of Nova Scotia, regulatory agencies, municipal leadership, local and provincial organizations, and the public. The purpose of these engagement activities was to provide information, gather input, and understand concerns. In response to comments raised during the consultation and engagement, the Proponent has made the following key revisions to the design and layout of the Project:

- Revised layout to avoid sensitive ecological areas and minimize impact to local property owners and built infrastructure, and
- Revised the layout to limit the amount of new access road construction.

The Project will use approximately 43 kilometres (km) of existing roads and construct approximately 8 km of new access roads. A total of 15 permanent or intermittent watercourses may intersect with these access roads, with many requiring upgrades to culverts.

Most of the Project is situated on private lands that have experienced historical and ongoing disturbance from forestry, recreation, and quarrying activities. The detailed design of the Project has aimed to locate Project infrastructure in previously disturbed areas, whenever possible.

The potential impact of the Project on the following Valued Environmental Components (VECs) has been assessed:

- Climate and Weather
- Air Quality
- Ambient Light
- Acoustic Environment
- Topography and Landform
- Bedrock and Soils
- Subsidence and Sinkholes
- Groundwater
- Hydrology/Watersheds
- Fish and Fish Habitat
- Water Quality
- Flora
- Wetlands
- Terrestrial Wildlife
- Bats
- Birds
- Population and Economy
- Land Use and Value
- Visual Landscape
- Utilities
- Communication and Radar Systems
- Transportation
- Recreation and Tourism
- Human Health
- Indigenous Cultural Resources
- Archaeological Resources

To support the assessment of these VECs, baseline field and technical studies were completed in accordance with provincial guidance documents and applicable regulatory standards. These studies included multi-season field programs (e.g., wildlife, birds, bats, wetlands, watercourses, and vegetation), technical modelling (e.g., noise, shadow flicker, and habitat), and desktop analyses. The results of these studies informed the siting of turbines and associated infrastructure to avoid or minimize potential environmental effects.

The Proponent has incorporated environmental management approaches and strategies into Project planning and execution so that the Project complies with regulatory requirements and reduces or avoids potential adverse environmental effects. A Project-specific Environmental Protection Plan (EPP) will be developed before construction and will incorporate the EA Conditions of Approval. The EPP will include information on the following:

- Erosion and Sediment Control
- Blasting Management
- Fire Prevention and Control
- Surface Water Management
- Waste Management
- Dust Control
- Wildlife Management
- Vegetation Management
- Soil and Stockpile Management
- Hazardous Substances Management and Spill Prevention
- Decommissioning and Site Reclamation
- Environmental Emergency Response and Contingencies

In addition to providing renewable energy, the Project will provide the following benefits:

- Job creation and training opportunities
- Long-term employment opportunities
- A Community Benefits Fund
- Capacity-building funding and initiatives to support Mi'kmaw communities in the region
- Stimulus to local businesses
- Tax revenues
- Electricity generation sufficient to power up to 50,000 homes

Through Project planning and design, and applying effective mitigation and monitoring, the Project will not result in significant adverse residual effects to the environment. Furthermore, the Project will have a positive residual effect associated with minimizing the regional carbon footprint and contributing economic benefits for the Municipality of the County of Cumberland.

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List of Acronyms

Acronym	Defined
AADT	annual average daily traffic
AAIS	Advanced Anti-Icing System
AC CDC	Atlantic Canada Conservation Data Centre
ACSR	aluminum conductor steel reinforced
AOD	area of disturbance
APIA	Alternate Project Infrastructure Area
AQMS	Air Quality Management System
ARD	acid rock drainage
ARIA	Archaeological Resource Impact Assessment
ARU	autonomous recording unit
ATV	all-terrain vehicle
ATVANS	All-terrain Vehicle Association of Nova Scotia
CAAQS	Canadian Ambient Air Quality Standards
CanREA	Canadian Renewable Energy Association
CanWEA	Canadian Wind Energy Association
CAPE	convective available potential energy
CBCL	CBCL Limited
CCCR	Canada's Changing Climate Report
CCG	Canadian Coast Guard
CCME	Canadian Council of Ministers of the Environment
CEEP	Community Energy and Emissions Plan
CLC	Community Liaison Committee
cm	centimetre
CMM	Confederacy of Mainland Mi'kmaq
COD	commercial operation date
COMFIT	Community Feed-In Tariff
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CSP	carbon stock preservation
CWS	Canadian Wildlife Service
dBA	A-weighted decibel
dBC	C-weighted decibel
DBH	diameter at breast height
DEM	digital elevation model
DFO	Fisheries and Oceans Canada
DND	Department of National Defence
DO	dissolved oxygen

Acronym	Defined
EA	environmental assessment
EARD	Environmental Assessment Registration Document
ECCC	Environment and Climate Change Canada
ECCC-CWS	Environment and Climate Change Canada – Canadian Wildlife Service
EMF	electromagnetic field
EMI	electromagnetic interference
EPP	Environmental Protection Plan
EQS	Environmental Quality Standards
ESC	erosion and sediment control
FORCE	Fundy Ocean Research Centre for Energy
GHG	greenhouse gas
GIS	geographic information system
GW	gigawatt
ha	hectare
HADD	harmful alteration, disruption, or destruction of fish habitat
HRP	Heritage Research Permit
Hz	hertz
IAAC	Impact Assessment Agency of Canada
IBA	Important Bird Area
IBoF	Inner Bay of Fundy
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
ISED	Innovation, Science and Economic Development Canada
ISO	International Organization for Standardization
km	kilometre
km/h	kilometres per hour
KMK	Kwilmu'kw Maw-klusuaqn
km²	square kilometre
kV	kilovolt
L	litre
LAA	Local Assessment Area
LiDAR	Light Detection and Ranging
LMR	land mobile radio
LPI	Light Pollution Index
Lpm	litres per minute
m	metre
m/s	metres per second
MAC	maximum acceptable concentration
magl	metres above ground level
MARI	Maritime Archaeological Resource Inventory

Acronym	Defined
masl	metres above sea level
MBBA	Maritimes Breeding Bird Atlas
mbgs	metres below ground surface
MCANS	Moose Conservation Association of Nova Scotia
MEKS	Mi'kmaq Ecological Knowledge Study
MET	meteorological
mg/L	milligrams per litre
MGS	Membertou Geomatics Solutions
mm	millimetre
MOU	Memorandum of Understanding
MVA	megavolt-ampere
MW	megawatt
m^2	square metre
m^3	cubic metre
N/A	not applicable
NABat	North American Bat Monitoring Program
NBCC	National Building Code of Canada
NFC	nocturnal flight call
NOAA	National Oceanic and Atmospheric Administration
NOTAM	Notice to Airmen
NO_2	nitrogen dioxide
NRCan	Natural Resources Canada
NSCAF	Nova Scotia Civic Address File
NSCCTH	Nova Scotia Department of Communities, Culture, Tourism and Heritage
NSDLF	Nova Scotia Department of Lands and Forestry
NSDNR	Nova Scotia Department of Natural Resources
NSDPW	Nova Scotia Department of Public Works
NSECC	Nova Scotia Department of Environment and Climate Change
NSESA	Nova Scotia Endangered Species Act
NSGWDB	Nova Scotia Groundwater Database
NSPI	Nova Scotia Power Incorporated
NWA	National Wildlife Area
OLA	Office of L'nu Affairs
PDA	Potential Development Area
PGI	pellet group inventory
PID	property identification number
PM_{10}	particulate matter 10 micrometres or less
$PM_{2.5}$	particulate matter 2.5 micrometres or less
POI	point of interconnection
POL	petroleum, oils, and lubricants

Acronym	Defined
ppb	parts per billion
PPE	personal protective equipment
ppt	parts per thousand
RAA	Regional Assessment Area
RABC	Radio Advisory Board of Canada
RCMP	Royal Canadian Mounted Police
RES	Renewable Energy Systems Canada
RISC	Resources Inventory Standards Committee
RoW	right-of-way
RSZ	rotor-swept zone
SANS	Snowmobilers Association of Nova Scotia
SAR	species at risk
SARA	Species at Risk Act
SC	special concern
SDS	Safety Data Sheet
SNA	status rank not applicable
SoCC	species of conservation concern
SO_2	sulphur dioxide
StatCan	Statistics Canada
SWP	source water protection
t	tonne
TDS	total dissolved solids
TMR2	Trunked Mobile Radio 2
US	United States
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFS	United States Forest Service
UTM	Universal Transverse Mercator
VEC	Valued Environmental Component
VES	Visual Encounter Survey
VTT	Technical Research Centre of Finland
W/m^2	watts per square metre
WESP-AC	Wetland Ecosystem Services Protocol for Atlantic Canada
WHMIS	Workplace Hazardous Materials Information System
WHO	World Health Organization
WNS	white-nose syndrome
WSS	Wetland of Special Significance
°C	degrees Celsius
$\mu g/m^3$	micrograms per cubic metre

1 Introduction

West Bay Wind Inc. (the Proponent), a wholly owned subsidiary of Northland Power Inc. (NPI), is proposing to develop the West Bay Wind Project (the Project), a wind power project with a maximum installed capacity of 150 megawatts (MW) in the Municipality of the County of Cumberland, Nova Scotia. The Project is intended to supply renewable electricity to Nova Scotia consumers and support the province's renewable energy and greenhouse gas reduction objectives.

The Project will have a maximum installed capacity of 150 MW and will consist of up to 25 turbines (Figure 1.1, Appendix A). The Project will also include the following components:

- A network of upgraded and new access roads
- Aboveground and underground medium-voltage electrical collector lines
- An electrical substation
- An operation and maintenance building
- A transmission line for interconnection to the NSPI grid

Temporary laydown areas will be necessary during construction. Additionally, the Project is expected to include one or two long-term meteorological (MET) towers to assess and monitor the wind resource.

The Project is considered a Class I undertaking per Schedule A of the Nova Scotia Environmental Assessment (EA) Regulations under the provisions of the provincial *Environment Act*. On behalf of the Proponent, CBCL Limited (CBCL) has prepared this document, with contributions from other firms and consultants that carried out specialized studies, to serve as the EA Registration Document for submission to the Nova Scotia Department of Environment and Climate Change (NSECC).

1.1 Project Title and Proponent

Project Name:	West Bay Wind Project
Project Location:	Municipality of the County of Cumberland
Proponent:	West Bay Wind Inc.
Principal Proponent Contacts:	**Northland Power Inc.** Northland Power Head Office

	30 St. Clair Avenue West, Suite 300 Toronto, Ontario, Canada M4V 3A1 Phone: 1 (416) 962-6262 Darren Carl Director of Project Development, Americas Phone: 1 (416) 988-9198 Email: darren.carl@northlandpower.com
Proponent Website	https://www.westbaywind.com
Principal Consultant Contact:	CBCL Limited 1505 Barrington Street, Suite 901 Halifax, NS B3J 2R7 Phone: (902) 421-7241

The Proponent, NPI, is a Canadian-owned global power producer with a strong track record of developing, owning, and operating energy infrastructure assets. Established in 1987 as one of Canada's first independent power producers, NPI has grown into a global energy company with a diversified portfolio that includes offshore and onshore wind, solar, natural gas-fired generation, and battery energy storage projects. NPI's foundation is built on operational excellence, safety, and reliable project delivery, with a commitment to creating a sustainable energy future in partnership with the communities where it operates.

For nearly four decades, NPI has been delivering reliable and diversified power generation and storage solutions to meet evolving energy needs around the world. The company currently has approximately 3.5 GW of generating capacity in operation, 2.5 GW under construction, and an approximately 8 GW development pipeline. Through its full lifecycle approach to project development, ownership, and operations, NPI continues to advance the global energy transition while creating long-term value for its partners, communities, and stakeholders.

1.2 Purpose of the Project

Electricity demand in Atlantic Canada is expected to significantly increase in the coming years (Natural Resources Canada, 2022). Coal-fired power generation remains an important source of electricity in the region, but the Atlantic Provinces are committed to reducing reliance on fossil fuels and expanding renewable energy (Natural Resources Canada, 2022). As the region is shifting to a low-carbon future, the Government of Nova Scotia has committed to phasing out the use of coal and to powering 80% of the provincial grid with renewable energy by 2030 (Nova Scotia Department of Natural Resources (NSDNR), 2023), eventually leading to a net-zero emissions future by 2050 as stated in the *Environmental*

Goals and Climate Change Reduction Act (2021). To fulfill these commitments, the provincial government has proposed to increase onshore wind power generation from 20% to 50% or greater, as wind energy is considered the lowest-cost electricity resource in the province (NSDNR, 2023). The Project will support this transition by providing renewable electricity and offsetting approximately 259,609 tonnes (t) of CO_2 equivalent annually.

Regionally, the Project will contribute to the Government of Nova Scotia's goal to reduce GHG emissions by 2030 as per the *Environmental Goals and Climate Change Reduction Act* and concurrent revisions to the Renewable Electricity Regulations under the Nova Scotia *Electricity Act* in 2021 (Nova Scotia Environment and Climate Change, 2022). To meet these requirements, Nova Scotia Power Incorporated (NSPI) will procure 80% of its electricity supply from renewable sources and acquire a minimum of 1,100 GW-hours from independent power producers by 2030.

The Project is consistent with the Municipality of the County of Cumberland's Community Energy and Emissions Plan (CEEP), which aims to reduce community-wide greenhouse gas emissions by 45% by 2030 and achieve net-zero emissions by 2050 (Municipality of Cumberland, 2024). The CEEP identifies renewable energy development, energy independence, and the transition to a low-carbon economy as key priorities for the Municipality. By increasing the supply of renewable electricity in Nova Scotia, the Project aligns with these municipal objectives while also providing economic benefits through municipal tax revenues, local employment opportunities, and increased demand for local businesses and services as discussed in Chapter 3 (Consultation and Engagement) and Chapter 13 (Socio-Economic Environment) of this EA Registration Document. Once operational, the Project is expected to generate enough electricity to power approximately 50,000 homes annually.

1.3 Project Location and Setting

The Project takes place on Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq people, with a central coordinate of 45.459393°, -64.355376°. The Project is located approximately 9 km northwest of Parrsboro, Nova Scotia, in a primarily rural area of the Municipality of the County of Cumberland (Figure 1.1, Appendix A).

The Mi'kmaw communities located closest to the Project are Paq'tnkek and Pictou Landing First Nations (with respect to Franklin Manor lands in Cumberland County), and the Annapolis Valley and Glooscap First Nations (approximately 50 km from the Potential Development Area (PDA) measured in a straight line) (see Section 2.1 for details on the Potential Development Area or PDA). The Millbrook First Nation and the Sipekne'katik First Nations are other two Mi'kmaw communities in proximity to the Project (approximately 83 km and 82 km from the Project, respectively). Although these communities are not the closest to the Project by straight-line distance, they are the closest Mi'kmaw communities to the Project by road.

The wind project site was chosen on the basis of a detailed feasibility analysis that considered factors such as wind potential, land availability, local support for wind, and proximity to the provincial transmission network. An initial constraints analysis was completed prior to development of the Project layout which further confirmed the feasibility of the Project. The Project turbines are located on several properties under an option to lease (Table 1.1; Figure 1.2, Appendix A).

Table 1.1 Property Ownership of Proposed Project Turbine Locations

Property Identification (PID) Number	Ownership
25247248	Private
25206293	Private
25485558	Private
25199308	Private
25199498	Private
25348665*	Private
25348731*	Private

*Alternate turbine locations PIDs

The Project is situated within a predominantly forested landscape that has been influenced by historical and ongoing forestry activities and includes existing access roads and other areas of previous disturbance occurring throughout the area. The Project is located within an upland headwater environment, with a network of small streams and watercourses conveying surface drainage toward surrounding river systems. Wetlands are relatively limited and generally occur in association with local drainage features, with more extensive wetland habitat occurring along the River Hebert. The Project is approximately 1 km from the Kelley River Wilderness Area (Figure 1.3, Appendix A).

1.4 Regulatory Framework

Wind projects that produce 2 MW or more are considered Class I undertakings per Schedule A of the Nova Scotia EA Regulations under the provisions of the *Environment Act*, requiring Registration with NSECC to initiate the EA process. This EA Registration Document was prepared by CBCL in accordance with the *A Proponent's Guide to Environmental Assessment* (NSECC, 2025a), *Nova Scotia Class I Environmental Assessment Checklist* (NSECC, 2025b), and the *Environmental Assessment Supplemental Checklist: Wind Energy Projects* (NSECC, 2025c).

The Project does not require a federal impact assessment, as it will not be located on federal lands and is not classified as a designated project per the Physical Activities Regulations under the *Impact Assessment Act*.

Table 1.2 presents a summary of the federal, provincial, and municipal regulatory permits, approvals, or notifications that may be applicable to the Project, along with the status of requirements (as of the date of this report).

Table 1.2 Summary of Regulatory Permits, Approvals and Notifications

Permit/Approval/ Notification	Regulatory Authority	Application/Permit Status
Federal		
Request for Review of Project Near Water	Fisheries and Oceans Canada (DFO) Fish and Fish Habitat Protection Program	A Request for Review will be submitted to DFO after the detailed design phase, and before construction in watercourses or where activities have the potential to impact fish and fish habitat, for determination of the requirement for a *Fisheries Act* Authorization.
Canadian Navigable Waters Act Notification of a Work	Transport Canada	Required for minor works, such as watercourse crossings or aerial power transmission lines, or works in a non-scheduled waterway. Will be submitted prior to construction, if required.
Operations Interference Clearance	Department of National Defence (DND)	Required for confirmation that turbines will not cause electromagnetic interference (EMI) in communications used by DND or DND operations. DND has confirmed no objections to the Project.
Weather Radar Interference Approval	ECCC Meteorological Service of Canada	Required for confirmation that turbines will not cause interference to weather radars. ECCC has confirmed no objection to the Project.
Aeronautical Assessment Obstacle Evaluation	Transport Canada	Required for marking and lighting of obstacles (e.g., turbines). To be completed prior to construction.
Land Use Approval	NAV Canada	Required for confirmation that turbines will not cause EMI or interference to aviation. NAV Canada has confirmed no objection to the Project.
Notification of Project	Royal Canadian Mounted Police (RCMP)	RCMP has confirmed that the turbines are not expected to interfere with their operations, but to follow-up with Bell Mobility Inc. Bell Mobility Inc. has confirmed that no interference is expected.
Provincial		
Crown Land Applications	Nova Scotia Department of Natural Resources (NSDNR) and NSECC	Application for Project components that overlap Crown lands (managed by NSDNR or NSECC) to be submitted concurrently with EA process.

Permit/Approval/ Notification	Regulatory Authority	Application/Permit Status
Water Approval for Watercourse Alteration	NSECC	Application for watercourse alteration to be submitted following EA Approval.
Wetland Alteration Approval	NSECC	Application for wetland alteration to be submitted following EA Approval.
Water Approval	NSECC	Required if there is a need to draw surface water or groundwater for use during construction and/or operation that exceeds 23,000 litres per day.
Special Move Permit	Nova Scotia Department of Public Works (NSDPW)	Application to be submitted prior to mobilization of oversize vehicles on public roads.
Work within Highway Right of Way Permits	NSDPW	Application to be submitted in advance of planned work within a highway right-of-way (RoW). Expected for collector line crossings, transmission line crossings, and road upgrades.
Endangered Species Permit	NSDNR	Will be required if species at risk (SAR) listed under the Nova Scotia *Endangered Species Act* (NSESA) will be directly impacted. The Project is not expected to require a permit under the NSESA.
Municipal		
Development Agreement - Land Use By-law (2018, amended April 2026)	Municipality of the County of Cumberland	A Development Agreement will be applied for through the Development Officer with the Municipality of the County of Cumberland, further to the Municipal Planning Strategy Policy 4-52, Policy 4-56A and Policy 4-56B, and the development agreement policies of Section 6.3 following EA Approval.

1.5 Funding

There are no sources of public funding for the proposed undertaking.

2 Project Description

The Project is located approximately 9 km northwest of Parrsboro, Nova Scotia within the Municipality of the County of Cumberland. The Project will comprise up to 25 wind turbines with a maximum installed capacity of 150 MW, a network of upgraded and new access roads, above- and below-ground medium-voltage electrical collector lines, an electrical substation, an operation and maintenance building, and a transmission line for interconnection to the NSPI grid. Figure 1.1 illustrates a Project layout of 33 turbines; however, 8 of these are alternate locations to allow for flexibility during detailed design and the Project may consist of fewer turbines overall depending on the turbine model selected in final design (Appendix A).

Temporary laydown areas will be necessary during construction. Additionally, one or two long-term MET towers to assess and monitor the wind resource during operations will be included in the Project.

2.1 Potential Development Area, Alternate Project Infrastructure Area, and Project Footprint

The Potential Development Area (PDA) for the Project is approximately 840 hectares (ha) and represents a buffered area encompassing the primary infrastructure proposed for the Project. The PDA includes the access road network, turbine pads, power infrastructure (i.e., transmission line, collector lines, substation, and operations and maintenance building), and construction laydown areas. The PDA provides flexibility for refinement of the Project layout during detailed design and is larger than the area that will ultimately be disturbed by the Project.

An Alternate Project Infrastructure Area (APIA) has also been identified to provide flexibility should components of the primary Project layout not be feasible following detailed design. The APIA includes alternate turbine locations and associated turbine pads, alternate transmission corridors, and access roads required to access alternate turbine locations. These alternate locations may be considered where site-specific environmental,

engineering, geotechnical, constructability, land access, or other constraints affect the feasibility of the corresponding primary infrastructure.

The alternate infrastructure represents contingency options and is not intended to be developed in addition to the corresponding primary infrastructure. Where an alternate location is required, the corresponding primary infrastructure would generally not be constructed.

The Project Footprint represents the temporary disturbance and permanent space occupied by Project infrastructure and construction activities. This includes access roads, turbine pads, power infrastructure, construction laydown areas, and other supporting infrastructure. The Project Footprint associated with the proposed layout falls within the PDA and will be further refined as detailed design progresses.

The PDA represents a conservative development area and is therefore larger than the Project Footprint. The final extent of disturbance will be substantially smaller than the PDA following detailed design. The following considerations are relevant when interpreting the estimated disturbance associated with the Project:

- The PDA along proposed access road corridors is 150 m wide (75 m on either side of the centreline). The anticipated disturbance footprint within this corridor is substantially narrower, with a construction disturbance width of approximately 11 m and a final constructed road surface approximately 6 to 7 m wide.
- The road network within the PDA includes approximately 43 km of existing roads and 8 km of new roads proposed for construction. A substantial portion of the PDA also comprises previously disturbed or cleared areas; therefore, the total area of the PDA does not represent new clearing or disturbance.
- The PDA incorporates buffers around proposed infrastructure to accommodate refinement during detailed design. These buffered areas do not represent the anticipated limits of physical disturbance.
- Three MET tower locations are identified within the PDA; however, only one or two locations will be required for the Project.

2.2 Siting Considerations

The Project is located predominantly on privately owned lands that have been subject to historical and ongoing disturbance from forestry practices and recreational use. Prior to establishing the PDA, an environmental constraints analysis was completed. This analysis involved the identification and spatial mapping of sensitive receptors, environmental features, and local and regional infrastructure. Applicable setback distances were then applied to these features based on relevant legislation, best management practices, and guidance obtained through consultation with government regulators.

2.2.1 Turbines

The turbine layout considers multiple factors, with the objective of maximizing wind energy production while minimizing environmental and social impacts. The design approach prioritized first avoiding and, where avoidance was not reasonably practicable, minimizing potential adverse environmental effects. Layout development also considered the following siting principles:

- Maximizing exposure to areas with high wind resource potential
- Preferential use of previously disturbed areas and existing access networks
- Complying with noise and shadow flicker requirements
- Avoidance of managed and biologically significant areas
- Reducing interference with radar systems, aviation assets, and communications infrastructure
- Adhering to prescribed regulatory setbacks (see Table 2.1)

Subsequent refinements to the turbine layout were made following completion of field programs, results of technical modelling, and information received through community engagement. Turbines, including turbine laydown areas, have been sited to avoid wetlands, watercourses, and old-growth forests, where possible.

A summary of the turbine setback distances applied to the PDA layout and relevant references are provided in Table 2.1 and illustrated in Figure 2.2.

Table 2.1 Turbine Setback Distances

Feature	Setback Distance	Reference
Protected Areas, Provincial Parks, and Park Reserves	Avoidance, except for small, temporary areas	NSECC
Watercourses, Wetlands, and Wetlands of Special Significance	≥ 30 m measured from the area of disturbance (where possible) unless otherwise authorized in writing by the province	NSECC
Old Growth Forests	Avoid	An Old-Growth Forest Policy for Nova Scotia
Areas of High Archaeological Potential	Avoid	*Special Places Protection Act*
External Habitable Buildings	3.5 x turbine height or 1,000 m, whichever is greater.	Municipality of the County of Cumberland Municipal Planning Strategy Policy 4-56A (e)
External Wind Turbines	4 x turbine height	Municipality of the County of Cumberland Municipal Planning Strategy Policy 4-56A (e)

Feature	Setback Distance	Reference
Natural Gas Rights-of-Way	85 m	Municipality of the County of Cumberland Municipal Planning Strategy Policy 4-56A (f)
Internal Habitable Buildings	1.25 x turbine height	Municipality of the County of Cumberland Municipal Planning Strategy Policy 4-56 (g)
External Property Boundaries	1.25 x turbine height	Municipality of the County of Cumberland Municipal Planning Strategy Policy 4-56 (g)
Streets and Railway Rights-of-Way	1.25 x turbine height	Municipality of Cumberland Municipal Planning Strategy Policy 4-56 (g)
Noise	Distance required so that turbine operational noise levels do not exceed 40 dBA from permanent and seasonal receptors	NSECC
Shadow Flicker	Distance required so that shadow flicker will not exceed 30 minutes per day or 30 hours per year at any permanent or seasonal receptor within 2 km of the Project	NSECC
Wind Turbine Restricted Overlay	Avoid lands covered by Schedule F.	Municipality of the County of Cumberland Land Use By-law - Schedule F (Wind Turbine and Restricted Overlay)
Distance Between Turbines	Minimum separation distance between turbines is equal to the height of the tallest turbine	NSECC
Point-to-Point Microwave Link	3 x First Fresnel Zone	Radio Advisory Board of Canada (RABC) & Canadian Wind Energy Association (CanWEA) Guidelines (2025)
FM Radio Station	Consultation zone; 1,000 m setback (best practice)	RABC & CanWEA Guidelines (2025)

2.2.2 Other Infrastructure

A setback strategy was also applied to the other infrastructure of the Project, to minimize impact to the extent possible on environmental, heritage, and built features. This included minimizing encroachment of new access roads and the transmission line on wetlands and watercourses, and avoidance of old growth forest. It also included positioning the

proposed transmission line at safe distances from residences and building the substation in an area that avoids sensitive features.

2.3 Project Schedule

Project construction could begin as early as 2028, starting with necessary site clearing. Construction will resume in 2029 and be completed over a period of 12 to 18 months as outlined in Table 2.2.

Table 2.2 Project Construction Schedule

Construction Activity	Estimated Timeline
Site Clearing	Q3 2028 to Q4 2028
Site Preparation and Access Roads	Q2 2029 to Q4 2029
Foundation Installation	Q2 2029 to Q4 2029
Collector System and Substation Installation	Q3 2029 to Q2 2030
Turbine Delivery and Assembly	Q3 2029 to Q2 2030
Testing and Commissioning	Q2 2030 to Q3 2030

The commercial operation date (COD) is planned for Q3 2030. The Project will operate from COD through to decommissioning. While the Power Purchase Agreement with NSPI has a term of 25 years, the expected lifespan for the Project is up to 40 years if an additional offtake agreement is secured.

2.4 Project Components

2.4.1 Turbines

The Project will consist of up to 25 wind turbines. Each turbine will consist of a tower secured to a concrete foundation at the base, nacelle generator, and three blades. Each turbine has three independent pitch control systems with emergency power supply, rotor brake, and a rotor lock controlled remotely. There will be a crane pad at the base of each turbine and surrounding the base of each turbine will be a gravel ring. Turbine specifications are provided in Table 2.3.

Table 2.3 Turbine Technical Specifications

Turbine Component	Primary Selection	Market Availability
	Nordex N163/5.X	Alternative Turbine Range*
Rated Capacity	Up to 5.9 MW	4.5 – 8.0 MW
Rotor Diameter	163 m	150 – 182 m
Hub Height	125 m	110 – 140 m

Turbine Component	Primary Selection	Market Availability
	Nordex N163/5.X	Alternative Turbine Range*
Swept Area	20,867 m^2	17,671 – 25,447 m^2
Rotor Speed	Variable	Variable

* Subject to change pending turbine model selected in final design.

2.4.2 Access Roads

The Project will require approximately 51 km of access roads, 43 km (84%) of which are existing gravel roads. Most existing roads will require upgrades. New gravel road sections will be necessary where turbines branch from the existing roads, resulting in approximately 8 km (16%) of new road construction.

Access road design will conform to applicable engineering standards, turbine transportation requirements, and industry best practices. These roads will facilitate mobilization of equipment, turbine components, and personnel to and from the PDA during all phases of the Project. Accordingly, road design must provide sufficient bearing capacity and appropriate turning radii to accommodate heavy-haul vehicles, cranes, and other construction equipment. Upgrades will be implemented where existing road conditions do not meet these specifications.

Requirements for ditching, culvert installation, and bridge construction or rehabilitation will be finalized during detailed design to align with industry standards and regulatory requirements.

2.4.3 Ancillary Infrastructure

2.4.3.1 Collector System

A 34.5 kilovolt (kV) overhead turbine collector circuit (medium voltage electrical cabling) will relay power generated from each turbine to the base of wood or steel monopoles that will support the overhead collector lines. Underground collector lines will extend approximately 200 m from the turbine to the overhead collector lines. The overhead collector line system comprises four circuits and will generally run parallel to the access road RoWs within the PDA and will converge at the substation. Routing is expected to be optimized as part of detailed design.

2.4.3.2 Substation, Operation and Maintenance Building, and Transmission Line

The substation, situated in the northeastern portion of the PDA (Figure 2.3, Appendix A), is required to convert the voltage received from the turbine collector system prior to connection to the NSPI grid, in accordance with the NSPI Interconnection Procedure and Transmission System Interconnection Requirements. The substation will have an approximate footprint of 0.70 ha, although the final footprint is expected to be smaller.

The proposed operation and maintenance building will be located in the eastern portion of the Project area along Glooscap Trail and will have a footprint of up to 0.5 ha.

A new aboveground transmission line is proposed to connect the Project substation to the existing NSPI 69/138 kV transmission corridor east of Glooscap Trail (Figure 2.1, Appendix A). One proposed transmission line route has been incorporated into the PDA. Two alternate transmission routes, as part of the APIA, are also under consideration, with the final route to be selected as engineering design, land agreements, and other Project planning considerations progress. The final transmission line design will be confirmed during detailed design and is anticipated to consist of wood-pole H-frame structures in accordance with NSPI standards. The point of interconnection (POI), where the Project transmission line will connect to NSPI's existing transmission system, will include a switching station requiring up to 1 ha of land.

2.4.3.3 Fencing

For public safety, perimeter chain link fence, with three strands of barbed wire on top, will be installed around the substation, the switching station, and operation and maintenance building to restrict access by unauthorized people. No other restrictive fencing is planned for Project infrastructure.

2.4.3.4 MET Towers and Remote Sensing

A LiDAR remote sensing device was installed in Q2 2024 in the southern portion of the Project within the PDA and a MET tower was erected next to the LiDAR in Q4 2024. A second LiDAR remote sensing device was installed in the northern portion of the Project in Q4 2025. The MET tower and LiDAR remote sensing devices monitor atmospheric conditions relevant to the Project (wind speed and direction, atmospheric pressure, relative humidity, and temperature) and will be removed before COD. One or two MET towers will be installed as part of the Project to assess and monitor the wind resource over the operations phase of the Project.

2.4.4 Temporary Laydown Areas

A designated temporary working (i.e., laydown) area of approximately 0.2 ha is located adjacent to the crane pad, where the turbine components (the hub, nacelle, generator, and blades) will be stored just prior to assembly (Figure 2.4, Appendix A). A 30 m buffer will be created around each cleared turbine laydown area and is included in the PDA for flexibility during construction.

An additional temporary laydown area, covering an area of 4 ha, is proposed within the PDA to store other onsite equipment and components of infrastructure during construction. There are two additional alternative temporary laydown areas within the PDA, with areas varying from approximately 1-2 ha that are not expected to be used but are included within the PDA to ensure flexibility during detailed design.

2.5 Construction

Construction of the Project is anticipated to occur over approximately two years, from fall 2028 to 2030. Construction activities will include site preparation, access road construction and upgrades, delivery and storage of materials and equipment, installation of infrastructure, and restoration of the temporary areas needed to facilitate construction within the PDA. Testing and commissioning of the Project will occur toward the end of the construction period and will mark the transition to the operation phase.

It is estimated that approximately 200 to 250 workers will be employed during the construction phase. Accommodations for traveling workers will be provided through established commercial lodging facilities in the region of Cumberland County, Nova Scotia, and surrounding areas. Construction is to occur predominantly during daytime hours, up to seven days per week.

2.5.1 Site Preparation

Site preparation activities will include clearing, grubbing, excavation, grading, compaction, and ditching, supported by appropriate erosion and sediment control (ESC) measures. Grubbing will be completed to remove root material while retaining topsoil for salvage. Topsoil will be stored away from watercourses and other aquatic features for later use in restoring temporary workspaces and laydown areas. Grading and leveling within the PDA will be carried out using heavy equipment (e.g., graders, dozers, scrapers).

Site preparation will be restricted to the minimum practicable footprint to limit environmental effects while providing adequate space for construction activities. ESC measures and other mitigations will be implemented, and soil conservation practices will be applied consistent with regulatory requirements, engineering standards, and industry best practices.

The PDA is 840 ha, which includes the transmission line RoWs, turbine pads, new and existing access roads, ancillary infrastructure, and temporary laydown areas. Clearing will be limited to the Project footprint; however, portions of the PDA are non-vegetated areas (e.g., existing road footprints, cleared areas). Turbine pads may require up to approximately 2 to 3 ha of cleared area per unit; however, siting within previously disturbed locations was prioritized to reduce vegetation removal.

Earthworks will also be necessary to support access road development, including construction of ditches, drainage features, and turbine pad foundations. Excavated material generated during construction will be stockpiled onsite for reuse where feasible or disposed of in accordance with regulatory requirements and best practices.

2.5.2 Access Road Construction and Modification

New and upgraded road surfaces will be constructed using clean granular fill sourced from local quarries or borrow pits. Materials will be stored temporarily until necessary for placement. Excess fill and excavated material generated during construction will be stockpiled for reuse where feasible, or disposed of in accordance with applicable regulations, road construction standards, and best practices.

While the access roads on private lands may be up to 11 m in width during construction, the final, permanent RoW, inclusive of ditches, existing road segments, and turbine access spurs, will have a maximum width of 20 m or less, including space for overhead collector lines where applicable. Turbine transport requirements specify that road grades must generally remain below 10%. Blasting may be necessary to remove shallow bedrock and achieve required grades and turning radii. The final constructed road surface is expected to be approximately 6 to 7 m in width depending on load rating.

Roadside ditches will be constructed and stabilized using ESC measures appropriate to local drainage patterns and erosion risk. Culverts and/or bridges will be installed at new watercourse crossings. For existing access roads within the PDA, culvert replacement will be undertaken where current structures do not meet design standards or are in poor condition. The final number and locations of culvert replacements will be confirmed during detailed design.

2.5.3 Material and Equipment Delivery and Storage

Construction equipment will be mobilized to the PDA from local contractors and will include graders, bulldozers, excavators, telehandlers, cranes, rock trucks, and dump trucks, as well as light-duty trucks.

2.5.3.1 Transportation

The transportation route for delivery of turbine components to the Project will be determined by the final turbine technology provider following completion of a logistics study assessing transportation requirements from the receiving and unloading port to the Project. During operation, primary access to the Project is expected to be via Glooscap Trail and the existing network of smaller access roads.

Traffic management measures will be implemented on local and provincial roadways, as well as on recreational trails intersecting the PDA. These measures will include communication protocols for sharing proposed transportation schedules and haul routes with local communities and recreational off-road user groups through their representative organizations.

A Special Move Permit will be obtained from NSDPW for the movement of vehicles or equipment exceeding legal weight or dimensional limits on provincial roads.

2.5.3.2 Temporary Lay-down Areas

A turbine lay-down area will be established around each turbine location to accommodate crane operations, equipment positioning, and turbine component staging during assembly. These lay-down areas fall within the PDA.

The footprint of the Project laydown area is approximately 0.2 ha. Three additional temporary laydown areas were defined within the PDA, with one or two of these locations included as alternate areas for flexibility during construction. Each laydown area will include segregated sections for storage of fuel, aggregate, and construction materials. Storage locations will be sited a minimum of 30 m from wetlands and watercourses. Appropriate ESC measures will be implemented for aggregate stockpile and appropriate spill containment measures will be in place for fuel storage.

Laydown area configurations will prioritize safe equipment maneuvering and material staging. Demarcation, signage, and designated access routes will be established, together with environmental protection measures, to ensure compliance with applicable regulations and industry best practices.

2.5.4 Infrastructure Installation

This section describes the construction activities related to the installation of Project infrastructure, including the turbines, power lines, electrical substation, operation and maintenance building, lighting, and security fencing.

2.5.4.1 Turbines

The turbine components described in Section 2.4 will be installed sequentially.

Foundations

The foundation material will consist of structural concrete, as well as steel for rebar, anchor bolts, and spreader plates. The turbine foundation design will be finalised once the geotechnical investigation has been completed, but it is expected that turbines will be stabilized via a reinforced concrete gravity base or a rock anchored foundation. The foundations are expected to be a mix of buoyant and partially buoyant foundations, based on measured groundwater elevation relative to existing grade. The gravity base foundations will be approximately 28 m in diameter and consist of approximately 940 cubic metres (m^3) of concrete per foundation. The rock anchor foundations will be approximately 10 m in diameter and consist of approximately 200 m^3 of concrete per foundation. The majority of each foundation will be below grade surface, with the exception of the approximately 7 m diameter pedestal that will extend approximately 0.3 m above grade. Excavation for the foundation is expected to be approximately 3.5 m below grade for the gravity foundations and approximately 2.2 m below grade for the rock anchor foundations; however, at locations where bedrock is shallow and highly intact, excavation from localized rock blasting may be required up to 7 m below grade. Concrete will be sourced from a local

subcontractor, who will likely provide a mobile batch plant on site and deliver concrete by truck to the mobile plant. Rebar will likely be locally sourced.

Excavation may occur via drilling, or localized blasting if bedrock is present and determined not to be a suitable base. If required, blasting activities will be completed by a qualified blasting contractor and will follow the Nova Scotia Blasting Safety Regulations under the *Occupational Health and Safety Act*. Following excavation, the reinforcement bar supports will be laid and the concrete poured. After the concrete has finished curing, the foundation excavation, apart from the concrete pedestal, will be backfilled to ground level.

Assembly

The turbine assembly will consist of installing the tower sections, nacelle, hub, and three-blade rotors in sequence. Typically, a main crane and tailing crane will be mobilized to each working area and stabilized on a 35 m by 44 m pad during construction. It is possible that multiple main and/or shorter cranes could be utilized simultaneously during turbine erection. The turbines will be erected in pieces, starting with towers being hoisted vertically from the designated laydown areas by the cranes and secured in the turbine foundation. Once secured, the nacelle, drive train, hub, and turbine blades will be independently lifted and installed via crane. Assembly may be delayed or limited during high wind days as determined by the contractor and turbine supplier.

2.5.4.2 Power Lines and Substation

Collector Lines

Seven 34.5-kV turbine collector circuits (medium voltage electrical cabling) will be installed above ground to relay power from each turbine to the substation. Each circuit will be underground near the turbine and then strung overhead on wooden poles leading to the substation. The power poles will be built per industry and NSPI standards and installed as per standard procedures. The spacing of the poles will be determined during detailed design.

Transmission Line, Substation, and Switching Station

The seven collector circuits will converge at the Project substation (Figure 2.1, Appendix A), where the voltage will be stepped up for interconnection with the NSPI transmission grid, depending on final interconnection. The substation will be constructed as a permanent facility supported on piles, piers and footings. A larger foundation will be constructed for the main power transformer. The substation will include electrical equipment such as transformers, breakers, and protection and control systems. A switching station will be constructed, similar to the substation, for the point of interconnection with the NSPI grid. Security fencing and controlled access will be installed around the substation and the switching station for safety and security purposes as required by electrical safety standards and NSPI.

The transmission line will extend from the Project substation to the NSPI POI. The transmission line will be constructed within a cleared RoW expected to be approximately 35 m wide. Construction activities will include vegetation clearing, installation of structures (e.g., poles or towers), conductor stringing, and site restoration. Access to the transmission line corridor will utilize existing roads where feasible, with temporary access constructed as required.

2.5.4.3 Operations and Maintenance Building

The Project will include the installation of an operations and maintenance building to support the operation and maintenance of the wind facility during the operational phase. The building will be located within the PDA and accessed via the Project access road network. Construction of the operations and maintenance building will include site preparation activities such as vegetation clearing and grading, followed by foundation installation and building construction. The structure is expected to be a pre-engineered or conventional building and will be used to store equipment, tools, spare parts, and materials, and include office space for Project personnel. Ancillary infrastructure may include laydown areas, parking, exterior lighting, and utility servicing.

2.5.4.4 Security

Security fencing around the substation and operation and maintenance building will consist of a perimeter chain-link barrier. Installation will begin with excavation of post holes at regular intervals and placement of steel posts, which will be backfilled with concrete to ensure structural stability. Once the posts are set, top rails and tension bands will be installed and secured to the terminal posts. Chain-link mesh will then be attached to the line posts, gates will be installed, and the fencing fabric will be tensioned and trimmed to achieve the required specifications.

2.5.5 Restoration of Temporary Areas

Where practicable, topsoil will be conserved during grubbing activities for reinstatement once temporary laydown areas are decommissioned. Temporary construction areas will undergo decompaction and scarification to support restoration of natural site conditions. Areas of exposed soil will be stabilized and allowed to revegetate naturally.

2.5.6 Testing and Commissioning

The final stage of the construction phase will involve commissioning activities to verify operational performance and undertake any necessary physical adjustments to Project components. Electrical interconnection and power export will be implemented in accordance with the NSPI *Transmission System Interconnection Requirements* (NSPI, 2025). Commercial operation will begin once all required approvals and authorizations are secured, enabling electricity delivery to the provincial grid via the existing NSPI 69/138 kV power line in the corridor east of Glooscap Trail.

2.6 Operation and Maintenance

The Project is scheduled to be commissioned in Q3 2030, and operation and maintenance will occur for the life of the project, during which the facility will be contributing renewable power to the NSPI electrical grid. The facility will require oversight, maintenance, and repairs as needed for the turbines, roads, power lines, and substation as well as the management of vegetation and the safety and security of the site.

2.6.1 Turbine Operation and Maintenance

The wind turbines will operate automatically. A computerized system, or programmable logic control, will continuously monitor the operating parameters. When there is no wind, the wind turbines will remain idle until the cut-in speed is reached. At the cut-in speed, or minimum required wind speed of 3.0 m/s, the blades will begin rotating and electrical energy will be produced. When the wind turbines reach a cut-out speed of 26 m/s, which is the maximum wind speed the turbine is designed to operate at, safety measures will be initiated. The turbine's control system will automatically shut the turbine down, ceasing the rotation of rotor blades to prevent damage from high winds. Periodic shutdowns will occur during maintenance or during extreme weather or icy conditions when the risk of ice formation is high.

Turbine lighting will meet Transport Canada requirements for aviation.

Maintenance will be conducted in accordance with manufacturer specifications, industry best practices, and internal procedures and standards. Preventative and predictive maintenance activities will be carried out to avoid component failure and ensure proper system performance. Typical maintenance activities include the following:

- Inspection and condition assessment of mechanical and electrical components
- Application of lubricants and coolants to moving assemblies
- Examination and tightening of bolts and fasteners
- Repair or replacement of damaged or malfunctioning components
- Maintenance and troubleshooting of electrical systems
- Cleaning and upkeep of turbine blades to remove accumulated debris
- Software updates and control system upgrades
- Implementation of health and safety inspections
- Diagnostics and calibration of monitoring systems

Approximately three to eight personnel will be employed on a long-term or as-needed basis for Project operation and maintenance. Key roles of onsite personnel include a site manager, high voltage and wind turbine technicians, road maintenance workers, vegetation management service providers, snow removal providers, administrative support, and inventory/materials management.

2.6.2 Road Maintenance

Onsite staff will notify the facility management when maintenance is necessary. Onsite roads will require typical repairs to ditches, culverts, shoulders, and signage. Occasional clearing of brush may be necessary to maintain clearance and onsite litter will be collected for disposal. Washout and pothole repairs will be necessary during the lifetime of the Project. Gravel roads may need occasional resurfacing and grading as well as vegetation clearance at the shoulders (e.g., brush cutting).

2.6.3 Power Lines, Substation, Switching Station, and Operation and Maintenance Building

Maintenance of power lines, substation, switching station, and the operation and maintenance building may include repair and/or replacement of components such as utility poles, transformers, cables, connections and splices, switchgears, and circuit breakers, computer systems, and office equipment. The housing infrastructure of the substation enclosure and operation and maintenance building may also need repairs, such as roofing replacement, over the course of the Project operation.

2.6.4 Vegetation Management

Onsite vegetation management within the PDA will involve maintenance and control of plant growth in the areas directly surrounding the turbines, substation, and transmission lines. Vegetation control will be necessary to maintain the safety and environmental features of the facility grounds and will include trimming and removal of vegetation to prevent contact that could damage or disrupt equipment. The *Nova Scotia Industrial Vegetation Management Manual* outlines procedures for industrial vegetation managers (Nova Scotia Department of Environment and Labour, 1999). Management practices will be further developed as described in Section 2.9 of the manual.

2.6.5 Safety and Security

The selected turbines are equipped with advanced safety features and technology to maintain operation while safeguarding both people and systems. Safety-related parameters in the system control are continuously monitored. Data from the safety sensors are transmitted to the safety controller for evaluation. If specific parameters are exceeded, the system is stopped using actuators and placed in a secure state.

Different brake programs are activated based on the specific cause for cut-out (i.e., enabling of automatic shut down of the wind turbine). In instances of external factors like high wind speeds, icing events, or temperatures below the operational range, the wind turbine is softly slowed through adjustments to the rotor blades. Additional safety protocols are employed to safely halt operations for maintenance purposes.

During maintenance activities that pose safety risks to the public, clear signage will be erected to notify the public about the maintenance activities and potential hazards.

Onsite personnel will regularly monitor the condition of the fence. Fencing will require routine maintenance to preserve the security of the substation.

2.7 Waste and Emissions

This section summarizes the primary sources of waste and emissions from the Project, with emphasis on the assessment and quantification of GHG emissions over the Project lifecycle. In addition to identifying Project-generated emissions, the assessment considers the Project contribution to provincial GHG reduction and avoided emissions, meaning those displaced or reduced because of renewable electricity generation. Beyond GHGs, the Project will generate noise, light, fugitive dust/particulates, and solid waste, primarily during construction. The focus of this section is the characterization and quantification of GHG emissions associated with construction, operation and maintenance, and decommissioning.

Monitoring of emissions and air quality at the Project site will reference the NSDPW generic Environmental Protection Plan (EPP) (NSDPW, 2007). The construction contractor will be responsible for maintaining equipment in proper operating condition. Measures such as non-idling practices and reduced speed limits may be implemented across Project phases to reduce impacts on local air quality, soil and water quality, and GHG emissions. The NSDPW EPP also provides guidance for waste management and the handling, storage, and control of petroleum, oils, and lubricants (POL).

2.7.1 Waste Management

Hazardous waste generated during the Project, including used POL, oil filters, solvents, and batteries, will be segregated, stored, transported, and disposed of in accordance with applicable regulatory requirements and sent to an approved hazardous waste recycling or disposal facility. Non-hazardous waste will be managed using similar procedures, with disposal occurring at approved non-hazardous recycling or disposal facilities.

Construction-related wastes such as concrete debris, metal scraps, and other inert materials will be stored, handled, and recycled or disposed of in compliance with municipal by-laws and provincial regulations. Excess soil or excavated material unsuitable for reuse, cleared vegetation, and unused aggregates will be stockpiled in designated laydown areas and transported offsite for disposal in accordance with regulatory requirements once construction activities are complete.

2.7.2 Non-GHG Emissions

During the construction and decommissioning phases, primary sources of noise emissions include heavy equipment such as excavators, bulldozers, cranes, blasting equipment, and material-hauling trucks. All construction activities contribute to baseline noise levels, while only specific decommissioning tasks generate noise. Dust emissions may result from site preparation, soil handling, and vehicular movement, and are typically elevated under dry weather conditions. Although construction and decommissioning activities are expected to occur predominantly during daytime hours, nighttime work may occasionally be necessary. Artificial lighting associated with nighttime operations, including worksite illumination, vehicle headlights, and temporary construction lighting, will contribute to light emissions. Activities such as grading, excavation, and earth moving may also disturb soils and increase runoff and sedimentation potential. Appropriate stormwater management, ESC measures, and spill prevention and response protocols will be implemented. The effects of soil disturbance and accidental releases on the aquatic environment in the PDA are assessed in Chapter 7 (Aquatic Environment), as well as Chapter 17 (Accidents and Malfunctions). Additional mitigation measures will be applied as needed to minimize noise, dust, light emissions, and stormwater impacts within and beyond the PDA. The impacts of noise, light, and dust emissions to the atmospheric environment are assessed in Section 5 – Atmospheric Environment.

During the operation and maintenance phase, the primary source of noise will be wind turbine operation, including blade movement, generator activity, and mechanical components such as the gearbox. Maintenance-related noise sources will be similar in type to those present during construction, but of lower magnitude and frequency. Dust emissions are expected to be minimal during operation, though vehicle traffic along access roads may generate localized dust during inspection and maintenance activities. Artificial lighting may be required for specific maintenance tasks. As with construction and decommissioning, appropriate mitigation measures will be implemented to limit dust, light emissions, and stormwater impacts during operation and maintenance.

2.7.3 GHG Emissions

This section was prepared in accordance with ISO 14064-1: 2018, Greenhouse gases*, Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals*. This section focuses on the characterization and quantification of greenhouse gas emissions during all project phases (construction, operation and maintenance, and decommissioning).

2.7.3.1 Construction Phase

The construction phase will comprise the largest source of emissions out of all three project phases due to manufacturing and transportation of the wind turbines, concrete used to develop the foundations, and manufacturing and transport of the materials

needed to develop the electrical collection and transmission infrastructure as well as the substation.

The process of developing turbine sites, new roads, improving existing roads, clearing new transmission corridors, and preparing laydown areas will necessitate the clearing of vegetation and overburden, leading to the generation of GHG emissions. The construction of new and upgraded roads as well as the clearing needed for each turbine site will require the removal of existing vegetation as well as some temporary or permanent removal of the organic-rich natural overburden in most of the Project Footprint. A review of forestry layers in the provincial GIS database of the project site, as well as the Global Nature Watch Tree Cover Loss database, lead to the following estimates of the current vegetation cover in the PDA measured in tonnes per hectare per year (t/ha/yr) (NB Forest Carbon Inventory, 2023):

- Mature Forest – 2.0 t/ha/yr (NB Forest Carbon Inventory, 2023)
- Young Forest – 0.8 t/ha/yr (NB Forest Carbon Inventory, 2023)
- Non-Forested Vegetated – 0.1 t/ha/yr (USFS, undated)

It is estimated that 51 km of access roads will be required in the PDA to reach the 25 turbine locations and provide access points to the provincial road network. Review of the latest project layout map indicates that the required road network will comprise 43 km of upgraded existing roads and 8 km of new roads. Total loss of sequestration potential due to land clearing within the PDA to accommodate the Project is presented in Table 2.4.

Table 2.4 Sequestration Loss Attributed to the PDA

Current Vegetation	Area (ha)	Sequestration Intensity (t/ha/yr)	Total Sequestration (t/yr)
Mature Forest	675.3	2.0	1350.6
Young Forest	66.5	0.8	53.2
Non-Forested Vegetated	50.9	0.1	5.09

The organic soil layer in the PDA is assumed to contain a large amount of embodied organic carbon, given the predominant type of forest cover. Excavation of this layer to allow for the installation of turbine bases, laydown areas, and crane pads could allow for a large portion of this embodied carbon to be released back into the atmosphere if this material is not reinstated and revegetated before it dries out. It is assumed that all excavated soils at each turbine site will be reinstated and revegetated at a suitable site nearby to prevent soil carbon loss.

Emissions are expected to be temporary and short term for the construction of roads and laydown areas and therefore have not been quantified as they only contribute minimally to the project emissions.

Concrete Foundation

Based on a turbine base for a Nordex model N163 (as an example), it could require as much as 1,012 m^3 of concrete and 170 tonnes of steel rebar for foundation construction. Assuming 25 turbine bases, this will require 26,312 m^3 of concrete and 4,420 tonnes of steel rebar. Each ready-mix concrete truck can haul 7 m^3 (16.8 tonnes) which results in a total of 3,759 truckloads. Assuming concrete is produced at an existing plant in Amherst, Nova Scotia, and an average round trip distance of approximately 110 km, the total haul distance will be 413,490 km. At an average diesel fuel consumption of 0.05 L/t km fully loaded and 0.41 L/km unloaded, the transport of concrete will consume approximately 258,431 L of diesel fuel. Steel rebar for each base is assumed to be supplied from a location in Dartmouth, NS, which is approximately 200 km from each turbine location. At an average load of 21.25 t, it will require eight truckloads of steel rebar per turbine base. At an average round trip distance of 400 km the total haul distance will be 83,200 km. Fuel consumption for this portion of the project will be approximately 61,256 L of diesel fuel. Total embodied and transportation carbon emissions associated with the turbine bases are calculated and shown in Appendix B.

Wind Turbines

Based on the Nordex N163, each with a maximum generating capacity of 5.9 MW, Appendix B presents the estimated GHG emissions associated with turbine manufacture and shipment. For this assessment, it is assumed the turbines will be manufactured in southeast China (nacelles and blades) and Malaysia (tower sections) and transported by truck to dockside and then by ship to the Port of Sheet Harbour, and then by truck to the Project site. Each turbine will have a weight of approximately 702 tonnes that is composed primarily of steel (89%) with the remainder being mostly the fiberglass blades and electronics. The total embodied carbon associated with the manufacture of each turbine is estimated to be 1,735 tonnes. Transport from China and South-East Asia is assumed to include components for two turbines per ship for a total of 25 shiploads (thirteen from each port), while land transport will require 19 truckloads per turbine at an average load of 50 to 60 t. The total carbon emissions associated with the transport of each turbine from the manufacturer to the project site is estimated to be 6,433 t.

Electrical Infrastructure

The Project will require electrical infrastructure to permit interconnection with the Nova Scotia Power grid. Each of the 25 turbines will generate electricity that will be transformed to 34.5 kV at each site. Collector lines composed of three aluminum conductor steel reinforced (ACSR) overhead cables will connect the turbine locations to the project substation. We have estimated that five circuits will be required with each circuit connected to five turbines. A substation capacity of 126 MVA composed of two 60 MVA fan cooled utility transformers will increase the voltage to 230 kV. The substation will also include additional high and low voltage equipment as well as a small service building and perimeter fence. The outlet from the substation will travel via a single 120 MW capacity transmission line to intersect with an existing NSPI transmission line approximately 3 km away. The transmission line will include three ACSR cables supported on freestanding steel

lattice towers. Two overhead ACSR shield wires will be included to provide lightning protection and for communication and signalling purposes.

Calculations for the emissions associated with the fabrication and transport of the electrical infrastructure to the project site are included in Appendix B. When calculating the transportation distances, all components except for concrete are assumed to be shipped from Dartmouth which is approximately 200 km from the project site. Concrete will be assumed to be transported from a ready-mix plant in the Amherst area. Metals used in this infrastructure includes copper (transformers), aluminum (conductor cabling and busbars) and steel. Each transformer will also include mineral oil as a cooling medium. Concrete pads with steel reinforcement are included for all transformers and other major substation equipment, the service building slab, and foundations for steel transmission towers. The substation perimeter will include a steel chain link security fence. Total carbon emissions associated with the fabrication and transport of the electrical infrastructure is estimated to be 4,478 tonnes.

2.7.3.2 Operation and Maintenance Phase

During the operation and maintenance phase, any generation of electricity that offsets higher carbon producing sources of electricity will lead to a reduction in the emission intensity of the electricity grid in Nova Scotia, as the electricity produced will be entirely emissions-free, in contrast to other energy sources like coal, natural gas, and oil that are typically associated with emissions during electricity generation. This phase contributes to GHG emissions mitigation, aiming to combat climate change by reducing the concentration of GHGs in the Earth's atmosphere.

Maintenance activities, such as the servicing and replacement of turbine components, vegetation management, and road, power line and substation maintenance, will be the only contributor of GHG emissions. By way of example, the Nordex N163 maintenance manuals suggest that each turbine will require 144 kg of replacement lubricating oil and 40 kg of replacement coolant per year based on a 25-year turbine life. Replacement parts will average 328 kg per turbine per year and are assumed to be primarily steel. All replacement parts are assumed to be supplied from the Nordex North American distribution centre in West Branch, Iowa. The distance from West Branch, Iowa to the project site is approximately 2,550 km and it is assumed that one truck per year of spare parts will be sent to the project site. Lubricants and coolants for each turbine as well as mineral oil for transformers can be sourced through local suppliers in Nova Scotia. Annual emissions associated with the supply and transport of spare parts is estimated at 12 t carbon dioxide equivalent (CO_2e). It is expected that other turbine options under consideration for the Project will have similar impacts during the operation and maintenance phase. Energy consumption for the service building and other project infrastructure will be supplied from the windfarm output and will have no carbon emissions.

2.7.3.3 Decommissioning Phase

The sources of emissions during the decommissioning phase are expected to be like those during the construction phase but are expected to contribute less emissions. Most of the metal components associated with the project can be recycled using currently available technology. Fiberglass is currently not easily recycled but advances in recycling technology for this material are ongoing and it is expected that fiberglass recycling will be commonly available prior to the decommissioning phase of this project. Most emissions associated with the decommissioning effort will be linked to the emissions from equipment used to disassemble and haul away the project components and to restore each site. Decommissioning of this project is likely not to occur until the 2060s by which time most construction and heavy transport equipment is expected to be zero emitting.

2.7.3.4 GHG Emission Summary

A summary of the calculated total GHG emissions from the construction, transport, and operation of the windfarm as a producer of electricity for supply to the Nova Scotia grid is presented below:

- Total Emissions from fabrication and transport – 82,876.9 tCO_2e
- Loss of CO_2e sequestration due to land clearing – 1406.3 t per year
- Emissions due to operations and maintenance – 12.0 tCO_2e per year

Electricity production in Nova Scotia produces an average of 15,482 tCO_2e per day (NSPI, 2022). This Project is expected to offset approximately 259,609 tCO_2e per year for the lifespan of the Project.

2.8 Environmental Management and Monitoring

The Proponent is integrating environmental management approaches and strategies into Project planning and execution to comply with regulatory requirements and to avoid or minimize potential adverse environmental effects. These approaches inform the design and siting of Project components, the avoidance and mitigation of potential effects, and the development of a Project-specific EPP.

A Project-specific EPP will be prepared prior to construction and will incorporate the conditions of the Project EA Approval. Once finalized, the EPP will be made publicly available to the Community Liaison Committee. The EPP will outline known or potential environmental issues to be addressed during construction and operation and maintenance, as well as mitigation measures to be implemented based on site-specific conditions. The EPP will be reviewed by contractors and site personnel prior to initiation of construction activities and will describe the following:

- Personnel roles and responsibilities

- Environmental training and orientation requirements
- Document control procedures
- Regulatory requirements and commitments
- Scheduling and sequencing of activities
- Procedures for working in or near watercourses and wetlands
- Noise, light, and traffic management
- Wildlife management practices
- Protocols for heritage and archaeological resource encounters
- Environmental protection and control measures
- Environmental monitoring and reporting requirements
- Complaints resolution

2.9 Decommissioning

While the Power Purchase Agreement with NSPI has a term of 25 years, the expected lifespan for the Project is 40 years if an additional offtake agreement can be secured.

As part of the development permit application for the Municipality of the County of Cumberland, a Decommissioning and Site Reclamation Plan will be submitted for review and approval. Two years prior to Project decommissioning, a Decommissioning and Site Reclamation Plan will be submitted to NSECC for review and approval. If an individual turbine becomes inoperative for a period of two years during the operation and maintenance phase, NSECC will be notified of the Proponent's plan to either recommission or remove the unit.

Decommissioning activities will be similar to construction activities but will focus on the removal of infrastructure to a depth of approximately 1 metre below ground surface (mbgs), including foundations, underground collector lines, and overhead distribution poles. Current industry estimates indicate that approximately 85 to 90% of a wind turbine's total mass can be reused or recycled (Canadian Renewable Energy Association, 2021). Major components, including the steel tower, gears, and generator assembly, can be recycled or sold as scrap metal, and the concrete foundation can be recycled.

At the time of this EA, recycling options for turbine blades remain limited due to the predominance of fiberglass composites. However, industry advancements are rapidly expanding available pathways. Recent initiatives demonstrate viable solutions such as material recovery through shredding (Beauson et al., 2016) and repurposing fiberglass in cement manufacturing (Paulsen and Enevoldsen, 2021). For example, Carbon Rivers has developed a process that recovers 99.9% pure glass fiber from decommissioned turbine blades, enabling mechanical reuse in new composite products rather than disposal (U.S. Department of Energy, 2023). The European wind sector is also committing to "no-blade-to-landfill" solutions, with manufacturers and researchers working to commercialize fully recyclable blade designs and large-scale recycling programs (WindEurope, 2025). Over the

next 25 years, continued innovation is expected to enhance recovery, recycling, and reuse options.

If turbine components cannot be recycled or resold at the time of decommissioning, they will be managed by a qualified contractor and disposed of in accordance with applicable legislation and regulations. Landowners will determine whether access roads are retained or removed as part of site restoration. Restoration will begin following infrastructure removal and will include topsoil replacement and natural revegetation.

Decommissioning will proceed in the following sequence.

- Disconnect the Project from the NSPI transmission system and decommission and remove the substation.
- Re-establish temporary laydown areas to support heavy vehicles, topsoil storage, and equipment at each turbine location.
- Dismantle and remove turbine blades, hubs, nacelles, and tower segments.
- Remove underground electrical infrastructure to approximately 1 mbgs. Remove overhead poles where feasible.
- Remove overhead electrical lines, including the transmission line, unless otherwise requested by NSPI.
- Remove or retain access roads based on landowner agreements. Where roads are removed, affected lands will be restored to pre-construction land use, to the extent practicable and at the discretion of landowners.
- Remove the meteorological (MET) towers unless otherwise requested by the Municipality of the of the County of Cumberland, landowner, or other stakeholders.

Following removal of infrastructure to 1 mbgs, temporary staging areas and associated decommissioning facilities will be restored using stockpiled topsoil or clean imported fill. The site will be graded, contoured, and restored to appropriate elevations and slopes, followed by natural revegetation.

3 Consultation and Engagement

The Proponent and consultants conducted consultation and engagement as part of the Project planning process. Key rightsholders and collaborators involved in these discussions included the Mi'kmaq of Nova Scotia, regulatory agencies, municipal leadership, and the public. These interactions were aimed at providing information, gathering input, addressing concerns, and adhering to regulatory requirements.

The Proponent acknowledges the importance of conducting engagement processes early and continuously throughout the Project life, in good faith and with transparency and fairness to help establish the foundations of strong, lasting relationships.

3.1 Engagement with the Mi'kmaq

As stated in Section 1.3, the Project is set on Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq. The Mi'kmaw communities located closest to the Project are Paq'tnkek and Pictou Landing First Nations (with respect to Franklin Manor lands in Cumberland County), and the Annapolis Valley and Glooscap First Nations (approximately 50 km from the PDA measured in a straight line). Franklin Manor 22 is located approximately 12 km northwest of the Project and is a Mi'kmaq reserve administratively split between Pictou Landing First Nation and the Paq'tnkek First Nation. The Millbrook First Nation and the Sipekne'katik First Nations are other two Mi'kmaw communities in proximity to the Project (approximately 83 km and 82 km from the Project, respectively). Although these communities are not the closest to the Project by straight-line distance, they are the closest Mi'kmaw communities to the Project by road.

The Proponent is committed to meaningful engagement and collaboration with the Mi'kmaq of Nova Scotia. Regular updates and opportunities for feedback have been and will continue to be provided to the Mi'kmaq during all phases of the Project. The Proponent will work closely with the Mi'kmaw communities to ensure steps are taken to minimize project impacts on the Mi'kmaq, while pursuing economic opportunities and environmental benefits.

Below is a summary of the Proponent's engagement with Mi'kmaw communities:

- On September 9, 2024, information letters were sent to Paq'tnkek, Pictou Landing Nations, Millbrook, and Sipekne'katik First Nations. The letters outlined the Project

location, timeline, and capacity, and invited recipients to ask questions or request additional information. Kwilmu'kw Maw-klusuaqn Negotiation Organization (KMK) and the Native Council of Nova Scotia were also included in this correspondence.
- All communities and organizations involved in the first correspondence were sent updated information and offered an opportunity to provide feedback and meet regarding the project on June 6, 2025.
- An updated Project notification letter (including an updated project map, location, timeline and project details) was sent to the above communities and organizations on July 30, 2026.
- A meeting was held regarding the Project with Pictou Landing First Nation (November 7, 2024). No specific concerns were brought forth, and the Pictou Landing encouraged the Proponent to keep in touch about the project. They reiterated that Franklin Manor Lands in Cumberland County is owned by Paq'tnkek and Pictou Landing First Nations. The Proponent and Pictou Landing First Nation engaged in e-mail dialogue in August 2026 regarding setting up a follow-up meeting.
- On November 5, 2025, Proponent's staff held a meeting with KMK staff to review the proposed project and engagement efforts. This opportunity provided insight into the planning of future engagement and sought input from KMK on how they wanted to be engaged.
- On August 23, 2024, a virtual meeting with Consultation Advisors from the Office of L'Nu Affairs was held to provide a project update and introductions, review the Proponent's Guide, and answer any questions about proper engagement with First Nations communities. Follow up occurred in July 2026 to share updates on additional Mi'kmaq engagement and project status.

A record of further communication and engagement is provided in Appendix C, which summarizes engagement activities to date with five Mi'kmaw communities in Nova Scotia and Mi'kmaw community organizations. This record is organized by date and the nature of contact.

The Proponent is committed to sustainable development that balances economic viability with social and environmental considerations. A key part of this approach is engaging openly and respectfully with First Nations communities to support long term economic participation.

The Proponent is focused on ensuring that First Nations communities and businesses have meaningful access to economic opportunities associated with renewable energy projects. This includes supporting local procurement, contracting, and employment where possible. KMK has provided an Indigenous business directory, which will be used to help identify and connect with Indigenous businesses.

Meetings were held with Mi'kmaw communities and organizations and, through engagement, had the opportunity to ask questions and raise concerns. KMK has indicated they will be reviewing the MEKS and remain engaged during the EA process. The Mi'kmaw

communities of Paq'tnkek and Pictou Landing First Nations (with respect to Franklin Manor lands in Cumberland County), Millbrook and Sipekne'katik First Nations, will also be provided an opportunity to review the MEKS and remain engaged during the EA process.

While engagement has been ongoing, the Proponent has not been made aware of any concerns related to the Project.

3.2 Regulator Consultation

An essential aspect of Project planning was consultation with regulatory agencies, including federal, provincial, and municipal levels. This consultation aimed to introduce the Project, the Proponent, and to solicit collaborative feedback on the Proponent's approach to the EA in accordance with regulatory requirements and established protocols. Several key regulatory consultations are described below, and a summary of regulatory consultations completed for the Project is provided in Table 3.1.

3.2.1 Consultation on Environmental Assessment Process

Early consultation with regulators was undertaken to introduce the Project, discuss the proposed EA approach and schedule, and obtain feedback on the scope and methodology of the biophysical field programs being completed in support of the EARD. The focus of the initial consultation was to obtain feedback on the proposed baseline studies that were designed to characterize the existing environment.

On June 10, 2024, a package consisting of a Project overview and proposed field program methods was provided to NSECC and NSDNR. Survey locations, applicable guidance, and the anticipated field schedule were included as part of this package.

Following this submission, on June 19, 2024, a meeting was held with representatives of NSECC, NSDNR, and L'nu Affairs to discuss the Project, the proposed EA approach and schedule, and the planned biophysical field programs. During the meeting, the proposed survey methodologies were presented, and input was received from provincial regulators. Discussion included species at risk and critical habitat information, and the proposed survey programs. The meeting also included discussion of the proposed Mi'kmaq engagement approach, and L'nu Affairs provided input regarding the consultation strategy and Mi'kmaq Ecological Knowledge Study.

Additional consultation was undertaken with NSDNR to identify sensitive wildlife species that may occur within the PDA and LAA, to subsequently inform survey methods and assessment approaches. Through this consultation, occurrences of Mainland Moose (*Alces alces americana*) and Wood Turtle (*Glyptemys insculpta*) were identified as overlapping with the PDA and surrounding areas. A Species at Risk biologist with the Wildlife Division of the NSDNR was also again consulted on the proposed bird survey methods. Comments

received from the Species at Risk biologist on August 16, 2024, were incorporated into the survey methodologies, as applicable.

ECCC was provided with a Project consultation package on June 25, 2024. The package included information on the proposed Project and the proposed methodologies for the biophysical field programs being undertaken in support of the EA. The Environmental Protection Operations Directorate, Atlantic Region, and the Environmental Stewardship Branch of ECCC were also consulted regarding the proposed bird survey methodologies. Comments received from ECCC on July 30, 2024, were incorporated into the survey methodologies, as applicable.

3.2.2 Aviation, Radar, and Communications Consultation

The Proponent conducted consultation with recommended agencies per the RABC & CanWEA Guidelines (2025), with an aim to notify these agencies of the Project and request feedback. Per the guidelines, the following agencies were sent a notification providing turbine dimensions and coordinates to assess potential impact to their operations:

- NAV CANADA
- Department of National Defence (DND)
- Meteorological Service of Canada
- Royal Canadian Mounted Police (RCMP)
- Canadian Coast Guard (CCG)
- Innovation, Science and Economic Development Canada (ISED)
- Bell Aliant
- Eastlink Inc.
- Rogers Communication

Confirmation was received from DND, the RCMP, the Canadian Coast Guard, ECCC, NavCan, and ISED that they do not expect any interference with their communications and radar systems by the Project. However, the RCMP did advise that the area in which the Project is sited does receive radio coverage through infrastructure leased by Bell Canada. Through consultation with Bell Canada, they confirmed that the proposed Project does not interfere with this radio coverage. The Parrsboro Community Radio, a community radio station in Parrsboro, was also contacted regarding existing infrastructure.

3.2.3 Municipal and Regional Planning Consultation

Since Project inception, the Proponent has engaged with the Municipality of the County of Cumberland.

Several meetings have occurred, in-person and online, and several email exchanges have also occurred when clarifications were needed on the by-law, or specific questions were asked the County.

The County has been supportive of the Project and has collaborated with the Proponent to ensure the Project can advance with its zoning and permitting process. The table below provides a summary of engagement activities with local government, and more detail is provided in the engagement log in Appendix C.

Table 3.1 Summary of Regulatory Consultation

Regulatory Agency	Branch/ Representatives	Dates, Nature of Contact, Feedback
Federal Government		
ECCC	Meteorological Service of Canada	July 6, 2026 – EMI notification letter sent. Receipt of Letter of Non-Objection July 24, 2026.
NAV CANADA	service@navcanada.ca	July 6, 2026 – EMI notification letter sent. Application was submitted online July 10, 2026. Receipt of Letter of Non-Objection September 11, 2026
Canadian Coast Guard	Vessel Traffic Systems Radar	July 6, 2026 – EMI notification letter sent. July 7, 2026 - Canadian Coast Guard confirm there is no CCG communication or radar site in the vicinity of the proposed wind project (West Bay). Therefore, no interference issues are anticipated.
DND	Military Air Defence and Air Traffic Control Radars Military Radio Communication Users	July 6, 2026 – EMI notification letter sent. Receipt of Letter of Non-Objection July 23, 2026.
Innovation, Science, and Economic Development Canada	Nova Scotia District Office	July 25, 2026 – EMI notification letter sent. ISED identified a non-disclosed radiocommunication system requiring additional consultation under the RABC coordination process.
RCMP	Wind Farm Coordinator	July 6, 2026 – EMI notification letter sent. July 13, 2026 – RCMP advised that while no RCMP-owned radio sites are present in the area, at least one proposed turbine may be located within the 1 km consultation zone of a leased Land Mobile Radio (LMR) site. The area receives TMR2 radio coverage through infrastructure leased from Bell Canada. RCMP requested that the Proponent coordinate with the Province of Nova Scotia, which manages leased tower coordination on behalf of the RCMP, to confirm potential effects on TMR2 communications infrastructure and operations.

Regulatory Agency	Branch/ Representatives	Dates, Nature of Contact, Feedback
		Bell provided a response on July 15, 2026, stating the proposed wind energy project will not interfere with Bell's existing MW network. Additional consultation with Bell was complete in September and October 2026 regarding a specific tower (J0090). Bell confirmed these towers will not have any effect on the Bell systems at Yorke.
ECCC	Environmental Stewardship Branch Suzanne Wade Environmental Assessment Analyst	June 26, 2024 - email from CBCL to ECCC requesting input on proposed field survey methodologies. ECCC responded on July 30, 2024, and provided comments and feedback on the field methodologies. Feedback was integrated into the proposed methodologies as applicable.
Provincial Government		
NSDNR NSECC	Mark McGarrigle, Species at Risk Biologist, NSDNR Tara Crewe, Manager of Ecosystems and Habitat, NSDNR Lynda Weatherby, Business Relationship Manager, NSECC Candace Quinn, NSECC Gillian DesRoches, L'nu Affairs	June 10, 2024 – A consultation package was provided to provincial regulators containing information on the proposed Project, proposed field methodologies, supporting survey maps, and the anticipated field schedule. The package was provided to Bridget Tutty, Manager, Environmental Assessment Branch, NSECC, and Mark McGarrigle, Species at Risk Biologist, NSDNR, and was intended to facilitate discussion of the ten proposed biophysical field programs supporting the EA. June 19, 2024 – A meeting was held with representatives of NSDNR, NSECC, and L'nu Affairs to introduce the Project and discuss the EA timeline and approach, proposed environmental field programs, and EA modernization process. The proposed survey methodologies were presented, and feedback was received from provincial regulators. The discussion included species at risk and critical habitat, Mainland Moose, and the proposed bird migration monitoring program.
NSDNR	Tara Crewe, Manager of Ecosystems and Habitat Mark McGarrigle, Species at Risk Biologist Sarah Spencer, Species at Risk Biologist	June 2024 – Consultation with NSDNR was undertaken to identify sensitive wildlife species that may occur within the PDA and surrounding area, and to inform field survey methodologies and assessment approaches. Provincial information identified Mainland Moose and Wood Turtle occurrences overlapping the PDA and surrounding areas.

Regulatory Agency	Branch/ Representatives	Dates, Nature of Contact, Feedback
		August 16, 2024 – Mark McGarrigle, Species at Risk Biologist, provided comments on the proposed bird survey methodologies. Comments received were incorporated into the survey methodologies, as applicable. July 5, 2026 – Additional comments were received from Mark McGarrigle regarding the proposed bat survey methodology and were incorporated, as applicable. October 14, 2026 – Sarah Spencer, Species at Risk Biologist, provided information regarding sensitive bat occurrences in the vicinity of the Project. A SAR bat occurrence was identified approximately 3 km from the PDA; however, no SAR bat critical habitat was identified within or near the PDA.
Municipal Government		
Municipality of Cumberland	Planning and Development Department	The Proponent has engaged with the Municipality on multiple occasions, providing Project updates to Council and staff, and discussing items such as the Community Benefits Agreement. In March 2024, the Municipality provided a letter of support for the Project. July 8, 2024 – Meeting with the Municipality of Cumberland County Planning & Development staff to provide an overview of the Project. Discussion of bylaws in the Municipality that would apply to wind farms. February 25, 2025 – Meeting with the Municipality of Cumberland County Planning & Development staff to provide Project updates and upcoming activities. April 7, 2025 – Meeting with the Municipality of Cumberland County Planning and Development staff to provide Project updates, to request input on municipal planning and permitting, and to request input on communication and engagement strategies with the community. June 17, 2025 – Meeting with the Municipality of Cumberland County Mayor, Councillors, and Planning and Development staff to provide a Project update and invite them to the July open house session. March 19, 2026 – Email update sent to the Municipality of Cumberland County Mayor, Councillors, and Planning and Development staff on the Green Choice

Regulatory Agency	Branch/ Representatives	Dates, Nature of Contact, Feedback
		Program and timeline, and regarding other key Project updates. May 11, 2026 – Email sent to the Municipality of Cumberland County Planning & Development staff to request a follow-up meeting regarding updates to the Project, including an expansion and timelines for the Green Choice program. September 9, 2026 – Meeting with the Municipality of Cumberland County Planning & Development staff to present an updated Project layout and to provide key Project updates. October 14, 2026 – Email to the Municipality of Cumberland Mayor, Councillors, and Planning & Development staff regarding Project updates, the Green Choice procurement, and an invitation to the planned fall 2026 open house. October 15, 2026 – Meeting with the Municipality of Cumberland Planning & Development staff to introduce Northland Power Inc. and provide updated Project information. Discussion was also focused on next steps for the Development Agreement requirements and timing. As above detailed, the Proponent has established consistent and open lines of communication with the Council and Municipality throughout the development process. The Proponent has engaged with the Municipality on multiple occasions, introducing the Project and providing Project updates to the Planning and Development Department. Items that were discussed include other recommended groups to engage with, the Development Agreement application process and the Community Benefits Agreement.

3.3 Public Engagement

Meaningful public engagement, involving local and provincial organizations, businesses, and members of the public at large, helps build transparency and inclusivity while integrating a broad array of perspectives into a project. For the Project, several methods of public engagement have been used to share information on the Project with the public and to allow the public to ask questions, make comments, and share local knowledge to help inform the Project. These methods include the organization of community engagement

sessions, meeting with special interest groups and members of the public, distributing mailed informational pamphlets, posting Project updates in community areas, as well as using digital platforms to share and receive information, such as newsletters, websites, and mailing lists.

The Proponent also advertised for and has begun the formation of a Community Liaison Committee (CLC), which is anticipated to begin meeting in winter 2026/2027. To-date, approximately 14 individuals from the local area have expressed interest in joining and participating in the CLC once meetings begin. The CLC is an opportunity for the Proponent to provide Project updates, and for the community members of the CLC to discuss various issues. The CLC will have discussions on local community benefits, including the drafting of a Community Benefits Agreement with the Municipality, Project impacts, and land use.

A Project website www.westbaywind.com was created under public domain to begin the process of public engagement. The website, still active at the time of EA registration, includes information about the Project such as news and updates, a timeline, information on community benefits, and contact information. The Proponent will maintain this Project website to be updated through the Project lifespan.

A primary project contact (NPI's Director of Project Development, Americas) has had a phone number and email address been publicly posted on all materials to allow the community to submit questions, comments and concerns directly to the Proponent. This email inbox is actively monitored by the Proponent, and has been shared across various channels, including social media platforms and being actively featured on the Project website, and pamphlets. A project information email address will remain active throughout the Project lifespan and will enable community members to engage with the Proponent over this duration.

3.3.1 Community Engagement Sessions

Two open house sessions were held in the community, aimed at providing information on the proposed Project and receiving feedback. These sessions were held on July 8, 2025, and October 21, 2026. The open house community engagement sessions were designed to accommodate drop-in visits from community members and provide flexibility for attendees.

Notices of the July 8, 2025, and October 21, 2026, engagement sessions were widely publicized through social media, local radio, newspaper, email lists of all identified stakeholders, and through direct landowner contact and mass mail postcards to local residents. The use of multiple communication channels was intended to allow the public to stay informed on updates and enhance attendance.

The primary objectives of these open houses were to introduce the Project and the Project team, share high-level information about the Project, and gather local feedback to inform

Project design. This included conveying the key purpose of the Project; outlining the Project scope, tentative timeline, and location; and giving attendees a broad understanding of its potential impacts and benefits to the community. The open houses also provided a platform for the public to raise questions, comments, and concerns related to the Project through face-to-face conversations with the Proponent and Project team and through written feedback forms, which were provided at each meeting. Sign-in sheets were available at the entrance of the conference room, where attendees could provide their contact information and opt to be included on the Project mailing list to receive Project updates, including notifications for open house events. The feedback received during these sessions was collected and documented for further consideration in the Project planning and design, as well as in the EA Registration Document.

In both open houses, the Project team set up poster panels displayed on easels around the conference rooms of each event location. These boards featured visual representations and detailed information about various aspects of the Project, including a general location and layout, environmental considerations, and potential community enhancements. Poster panels are provided in Appendix C and the What We Heard document summarizing key themes of the first open house was published on the Project website following the session.

The open houses were also an opportunity to provide details on direct and indirect benefits resulting from the proposed Project to local landowners and the local community as a whole. Key benefits underlined during the sessions were the following:

- Local contracts, jobs and spinoff revenue, including indirect economic benefits for local services, housing, accommodations, etc.
- Municipal tax to contribute to local services and infrastructure.
- Community funds during operations, including community and Indigenous benefit funds during the life of the Project
- Capacity building funding and initiatives for Nova Scotia Mi'kmaq in region

The dates, times, locations, and number of attendees at each community engagement session are summarized in Table 3.2. The materials presented at the community engagement sessions are included in Appendix C.

Table 3.2 Community Engagement Session Attendance Information

Date/ Time	Engagement Session	Location	Public Attendance Numbers
July 8, 2025 4-7pm	Open House	Parrsboro Band Hall, Parrsboro NS	50
October 21, 2026 2-7pm	Open House	Parrsboro Lions Club, Parrsboro NS	45-55

3.3.2 Special Interest Group Engagement

Emails were sent by the Proponent to special interest groups starting in June 2025, inviting them to an information session on the proposed project. The Proponent has reached out to these special interest groups to gather their initial impressions of the project as well as feedback. The list included the following, while several others were notified and are listed in the engagement log in Appendix C:

- Cumberland Trails Association
- Snowmobilers Association of Nova Scotia (SANS)
- NS Offroad Riders
- Cumberland Wilderness
- Fundy Ocean Research Centre for Energy (FORCE)
- Cumberland County Riders ATV Club
- Chignecto-Glooscap Snowmobile Club
- Cliffs of Fundy Geopark
- Parrsboro Volunteer Fire Department
- Cumberland Business Connector

Snowmobilers Association of Nova Scotia (SANS) / Chignecto-Glooscap Snowmobile Club

The Proponent has reached out to these groups to notify of the Project, seek feedback, invite them to the open house, and confirm overlap of snowmobile trails with the Project area. The Proponent reached out initially in June 2025 to seek an introductory meeting to discuss shared land use considerations / snowmobile trails in the area, or any other questions they may have.

- With respect to snowmobiling and recreational land use, access to the PDA will not be restricted, except in some areas during active construction.
- This project is in its early stages and there is time for discussion and incorporation of local feedback.

The importance of shared use and mitigating disturbance of snowmobile trails is paramount, based on discussion to-date. Future discuss will involve more fulsome dialogue on shared use, and to implement and support safety measures, and to provide education and awareness materials.

Cumberland Trails Association

The Proponent met with the Trails Association at the 2025 open house and has had further dialogue with them by e-mail (this includes initial outreach and further correspondence). Through discussion, the Proponent learned from the Trails Association that no hiking trails appear to interact with the Project site area itself, but trails occur on the escarpment in the vicinity. No significant concerns have been expressed to-date.

Cumberland Business Connector

The Proponent met with the Cumberland Business Connector virtually in October 2024, and a representative attended the 2025 and 2026 open house sessions. The Cumberland

Business Connector is a not-for-profit organization focused on economic development in Cumberland County.

Cumberland Business Connector highlighted their many connections to local contractors and forestry industry to support the Project. They appreciated the concept of a Local Economic Development policy highlighted with a focus on local opportunities, including future supplier sessions and suggested advertising specific types of project roles early on is important for local residents to have a fulsome understanding of opportunities.

For a complete list of special interest groups engaged, and records of dates, contact information, and nature of contact that took place prior to registering the EA Registration Document, refer to Appendix C. Engagement with these groups is ongoing.

3.3.3 Summary of Concerns Identified During Engagement

Questions, concerns, and issues were received from the public via email, in-person engagement sessions, public stakeholder meetings, and phone conversations. The main concerns brought forward from the public through these channels of communication are summarized in Table 3.3, along with the Proponent responses and proposed resolutions. Table 3.3 also refers to specific sections of the EA that address these concerns. Per feedback received during the public engagement sessions and various other engagement activities with stakeholders, that the general sentiment around the Project is positive and the community is supportive. The Proponent is committed to on-going engagement and addressing any further issues as they arise.

Table 3.3 Summary of Key Questions and Concerns from Public Engagement

Subject	Questions and Concerns	General Responses/ Solutions	EA Registration Document Reference
Local Opportunities	How will the Proponent help to ensure opportunities for local workers and companies?	The Proponent strongly believes that communities in proximity to projects should receive preferential attention and access to business and employment opportunities. It is the Proponent's intent to maximize economic benefits for local communities and their residents and promote long-term commercial growth through access to goods and service contracts, capacity training, and employment. The Proponent aims to connect with local companies to help them understand upcoming opportunities and what benefits scaling up – if even for a short period of time – could help them in the long-term. Closer to construction, the Proponent plans to have local job and supplier information sessions and would also work to ensure that as much local services and labour are used as possible. The Proponent can also alert the unions in advance of the work so they can identify local tradespeople to support the project. If qualified local workers are not available due to the specialized nature of work or due to lack of available workers, workers may come from elsewhere as needed. As the Proponent continues to plan this Project, t they will develop a local Community Liaison Committee (volunteer-based) made up of residents. This committee can also discuss ways to integrate the local business community. The Proponent has already begun outreach to local economic development associations/groups and anticipate they will be helpful in bridging the gap to involve local companies wherever possible.	Section 2.5 Construction; Section 2.6 Operation and Maintenance; Section 3.3 Public Engagement; Section 13.2.1 Population and Economy
Tax Payments	What funds does the Project contribute to the	Annual payments are required to be paid by all wind farm operators in NS to the municipal government each year during	Section 3.3 Public Engagement; Section

Subject	Questions and Concerns	General Responses/ Solutions	EA Registration Document Reference
	municipality during the life of the Project, and why are these funds paid?	operations, as required by the Province's Wind Turbine Taxation Act. For the 25-turbine layout, this is estimated at over $39,000,000 in total during the 25-year life of the Project. Cumberland County would receive these payments as the municipal government for the area, and as such, payments would significantly contribute to services and infrastructure around the County. More on the required payments can be found here: Wind Turbine Facilities Municipal Taxation Act: overview - Government of Nova Scotia	13.2.1 Population and Economy
Community Benefits	Are you planning a Community Benefits Fund? How will this work?	Should the project proceed to construction and operations, a Community Benefits Fund (separate from the required municipal tax payments noted above) would be in place during the life of the project (anticipated 25 years), with either a one-time or annual payments. The total amount is still to be determined as the Project planning advances, including through further community consultation (to better understand community wants and needs) and finalizing the Project. The funds would be utilized in the communities closest to the Project and used for local initiatives that matter most to the community – whether for recreational improvement, scholarships for youth, environmental conservation or other local priorities. to the Proponent will seek to create a Community Liaison Committee comprised of a cross-section of representatives in the local area to help inform the community benefits planning.	Section 3.3 Public Engagement; Section 13.2.1 Population and Economy
Landowner Compensation	What amount of compensation will participating private landowners receive?	Participating landowners have private land leases, and individual payment terms are confidential. Applicable leases would continue for the Project lifespan where lands are required.	Section 1.3 Project Location and Setting; Section 2.1 Potential Development Area and

Subject	Questions and Concerns	General Responses/ Solutions	EA Registration Document Reference
			Project Footprint; Section 13.2.2 Land Use and Value
Project Funding	Will the development of the Project cost taxpayers money?	The Proponent advised that it is a private company and Project development are not funded by taxpayers.	Section 1.5 Funding
Transportation	How is the Proponent planning to transport turbine parts to the site, once construction begins? I am concerned about our small roads and local bridge infrastructure.	The project is still in the early stages of planning with construction years away, there are many of steps ahead including detailed engineering studies and route planning. However, the Proponent appreciates this issue being brought forth and will take this under close consideration through detailed transportation studies. The Proponent will be in further dialogue with the Province and/or Municipality to inquire as to the condition of local bridges and any future plans to inspect or repair or upgrade.	Section 2.5.3 Material and Equipment Delivery and Storage; Section 13.2.6 Transportation; Section 13.3 Effects Assessment (Socioeconomic Environment)
Construction and Project Footprint	Is this Project a "done deal"? I want to ensure local feedback is incorporated. How much land will be cleared or disturbed? How large are turbine foundations and access roads? Will existing roads be used?	Public input is highly valued and plays an essential role in shaping the Project. The West Bay Wind Project is currently in the early stages of planning. Before any development can proceed, there are many important steps ahead, including comprehensive environmental studies, community engagement, and securing the necessary approvals, such as an Environmental Assessment. Additionally, the project must be selected in the province's next competitive wind energy procurement round before proceeding to construction. Existing roads will be used where practical to reduce new disturbance. Clearing will be required for turbine sites, access roads and associated infrastructure, but the final disturbed area will be smaller than the broader Project development area.	Section 2.1 Potential Development Area and Project Footprint; Section 2.4 Project Components; Section 2.5 Construction; Section 4.2.2 Establishing Spatial and Temporal Boundaries

Subject	Questions and Concerns	General Responses/ Solutions	EA Registration Document Reference
Power Distribution	Of the homes and businesses potentially able to get power from this project, how many will be of the local immediate area?	The estimated number of homes/businesses the Project could power each year is a calculation based on the anticipated total energy output of the Project once it is operational in relation to the average energy consumption of a typical home/business. Power generated from this Project will feed into the Nova Scotia Power grid, providing clean energy to residents and businesses across the province by supplementing existing power sources. Once on the grid, it's quite possible that much of the power generated from the Project would likely go to those living closest to the Project, simply out of proximity (as the closest power source to homes/businesses nearby). However, since it is not a stand-alone power system, the Proponent cannot guarantee that all power would stay in the local area, as some would be directed when and where it's needed most in our Province.	Section 1.2 Purpose of the Project; Section 2.4.3 Ancillary Infrastructure; Section 13.2.4 Utilities
Setbacks	How far away will the nearest homes be from turbines?	The Proponent is planning on using 1000 m setbacks or compliance with the Province of Nova Scotia's requirements for distance and sound as planning advances.	Section 2.2 Siting Considerations; Section 5.3 Effects Assessment (Atmospheric Environment); Section 13.3 Effects Assessment (Socio-economic Environment)
Site Selection	Why was this area selected for the Project? Could turbines be located elsewhere?	Site selection considered factors including the available wind resources, existing forestry disturbance, and forestry activity, availability of private land agreements, distance from residences, access to roads and proximity to electrical transmission infrastructure.	Section 1.3 Project Location and Setting; Section 2.1 Potential Development Area and Project Footprint; Section 2.2 Siting Considerations

Subject	Questions and Concerns	General Responses/ Solutions	EA Registration Document Reference
Engagement	Will there be more open houses or other opportunities for community engagement? What role will Indigenous communities play with engagement?	Yes. Engagement will occur throughout the life of the Project. Early engagement and transparency is an important part of Project planning, and the Proponent will host more open houses and other forms of public engagement (including meetings with special interest groups and residents) as they continue planning. As the Project is in Mi'kma'ki, engagement with the Indigenous communities of Nova Scotia is a critical component of the EA process. The Proponent has been engaging with Paqtnkek, Pictou Landing, Millbrook, Sipekne'katik, the office of L'nu Affairs, KMKO, and others, and has been following the provincial guide 'Proponent's Guide: Engagement with the Mi'kmaq of Nova Scotia'. Engagement with the Mi'kmaq is ongoing and will continue to play an important role in Project planning. Additionally, a Mi'kmaq Ecological Knowledge Study (MEKS) for the Project is currently underway. Membertou Geomatics Solutions (MGS) is conducting the MEKS.	Section 3.1 Engagement with the Mi'kmaq of Nova Scotia
Archaeology and Heritage	Has the Proponent consulted Acadian historical groups, given the history of Acadian settlement in the area?	An Archaeological Resource Impact Assessment (ARIA) for the Project is currently underway. An initial desktop review was conducted. Results of the ARIA will further inform avoidance and mitigations. The Proponent is also considering engagement with Acadian heritage organizations.	Section 14.2.1 Archaeological and Heritage Sites; Section 14.3 Effects Assessment (Archaeology and Heritage)
Turbine Height	How tall are the turbines?	The Proponent expects the turbines to have a hub height between 125 and 140 m, with blades up to 87.5 m long. The final size will depend on factors such as local wind conditions and nearby vertical obstacles.	Section 2.2.1 Turbines; Section 2.4.1 Turbines
Aviation	Are there fly over clearances in relation to	The Proponent is required to consult with any comply with Transport Canada and NAV Canada with respect to avoiding	Section 1.4 Regulatory Framework; Section 3.2.2

Subject	Questions and Concerns	General Responses/ Solutions	EA Registration Document Reference
	wind turbine sites for small craft or recreational drones?	any interference with flight paths of airplanes. Transport Canada recommends that all drone operators (recreational or professional) must conduct a survey of the area and consult the Notice to Airmen (NOTAMs) for the flight location (NAV CANADA NOTAMs portal). NOTAMs tell pilots about event and obstacles that may affect them. A NOTAM in Canada is an official notice containing time-sensitive safety information for pilots and flight operations, such as runway closures, airspace restrictions, and ground hazards. Pilots check active NOTAMs before every flight to find out if new turbines or temporary meteorological evaluation towers are being built.	Aviation, Radar, and Communications Consultation; Section 13.2.5 Communications and Radar Systems
Environmental Impacts	What are the impacts that you are not telling us about?	As the Project is in early planning stages, the Proponent is sharing all available information known. Further studies, regarding environment/wildlife/birds, sound, shadow flicker and visual impacts will be shared publicly in the Environmental Assessment.	Chapters 5-14; Chapter 15 Consideration of Cumulative Effects; Chapter 16 Effects of the Environment on the project; Chapter 17 Accidents and Malfunctions
Visual Effects	What will the turbines look like from surrounding communities and important viewpoints? Will visual simulations be prepared?	Visual simulations will be prepared to help understand potential changes to views. Public input has been considered in identifying representative viewpoints, including locations such as Patridge Island.	Section 13.2.3 Visual Landscape, Section 13.3 Effects Assessment (Socioeconomic Environment); Appendix J, Visual Simulations
Recreation and Trails	How will the Project affect hiking, ATV and snowmobile trails? Will	The Proponent has engaged with local trail and recreation organizations and will continue to do so to identify potential interactions with trails and recreational uses. Project design	Section 2.5.3 Material and Equipment Delivery and Storage; Section 2.6.2

Subject	Questions and Concerns	General Responses/ Solutions	EA Registration Document Reference
	people still be able to access recreational areas during construction and operations?	and construction planning will seek to avoid or minimize disruption where practical, with access restrictions communicated where necessary for safety.	Road Maintenance; Section 3.3.2 Special Interest Group Engagement; Section 13.2.7 Recreation and Tourism; Section 13.3 Effects Assessment (Socioeconomic Environment)
Health	What are the noise impacts, particularly on someone with heightened sensitivities impacting balance, harmonics etc.	The Proponent is designing the Project to meet or exceed all sound and setback requirements in relation to nearby homes. In Nova Scotia, the minimum setback requirement that can be established by a municipality for wind turbines is no more than four times the turbine height, unless a greater distance is required to ensure that sound levels do not exceed 40 decibels at the exterior of a dwelling (home). 40 decibels is about as quiet as a library or fridge hum. Noise studies will be completed as part of our Project planning and will be included as part of our Environmental Assessment submission and shared with the public. Health Canada conducted the largest study in the world of people living, working, and playing near wind turbines. Over 1,200 people participated, who live in homes near wind farms. The study found no evidence of an association between exposure to wind turbine noise and the prevalence of self-reported or measured health effects beyond annoyance.	Section 5.2.4 Acoustic Environment; Section 5.3 Effects Assessment (Atmospheric Environment); Section 13.2.8 Human Health; Section 13.3 Effects Assessment (Socioeconomic Environment); Appendix D, Noise Assessment; Appendix K, West Bay Shadow Flicker Report
Extreme Weather and Safety	What experience does the Proponent have with extreme weather,	Wind, ice, and weather conditions inform the turbine model selection. A turbine de-icing plan will be developed, and	Section 2.6.1 Turbine Operation and Maintenance; Section 2.6.5

Subject	Questions and Concerns	General Responses/ Solutions	EA Registration Document Reference
	including strong winds and de-icing, and safety to surrounding communities?	turbines will automatically shut down when wind speeds exceed specified operating thresholds.	Safety and Security; Chapter 16 Effects of the Environment on the Project; Chapter 17 Accidents and Malfunctions
Vegetation Management	Aside from deforestation required to construct the remaining roadway infrastructure for the proposed project, how much land would require to be maintained as free from vegetation, and what practices would be used in vegetation management?	While the Proponent will keep tree removal to a minimum, some clearing will be necessary for turbine foundations and access roads during construction, and to optimize wind resource for operations. About 84% of the planned roads already exist, though many will need to be widened and/or graded, which will likely involve some clearing. Roads to the turbines are typically around 6 m wide. Each turbine and its infrastructure will use about half a hectare (about 5,000 square metres) - this includes the concrete base for the turbine (approximately 700 square metres) and the rest of surrounding land. The turbine's concrete bases naturally prevent plant regrowth, so ongoing vegetation control in those spots isn't expected. Any vegetation management, such as tree trimming of regrowth impeding access would be anticipated to be done manually as opposed to spraying. Nearby transmission lines that the Project would connect to would still be maintained by Nova Scotia Power, including vegetation control. Also, landowners will still manage surrounding land parcels not used for the project components, as the Proponent will only lease specific parcels as required for the Project infrastructure.	Section 2.6.4 Vegetation Management

Subject	Questions and Concerns	General Responses/ Solutions	EA Registration Document Reference
Decommissioning and Recycling	What happens to turbines at the end of the Project's operating life? Who is responsible for removing them? Can turbine components and blades be recycled?	At the end of the Project's operating life, infrastructure may be repowered or decommissioned in accordance with applicable approvals and agreements. Many turbine components, including metals and electrical components, can be recycled or reused, and recycling and disposal options available at the time of decommissioning will be considered.	Section 2.7.5 Decommissioning Phase; Section 2.9 Decommissioning
Remediation	Would site restoration include considerations for soil erosion, and reforestation?	The Proponent anticipates these would be requirements as part of the Environmental Assessment submission, once that has been submitted to, and evaluated by the Province of Nova Scotia. A reclamation plan including these types of elements is normally required to be in place prior to construction and will include commitments to return the landscape to its previously identified baseline conditions, and will include considerations for soil erosion, water management, species habitat, and reforestation/revegetation using native plants and grasses where possible.	Section 2.5.5 Restoration of Temporary Areas; Section 2.8 Environmental Management and Monitoring; Section 2.9 Decommissioning; Section 6.3 Effects Assessment (Geophysical Environment); Section 17.2 Erosion Control Malfunctions

4 Assessment Methods and Initial Screening

4.1 Approach

The methods applied to complete the environmental effects analysis for the Project were developed by CBCL in accordance with NSECC's (2025a*) A Proponent's Guide to Environmental Assessment*, NSECC's (2025b) *Nova Scotia Class I Environmental Assessment Checklist*, and NSECC's (2025c) *Environmental Assessment Supplemental Checklist: Wind Energy Projects.*

CBCL's assessment methodology follows a systematic and defensible approach consistent with provincial EA requirements. The approach involves the following key steps:

- Establish the scope of the EA
  - Describe Project (i.e., Undertaking) components and associated activities
  - Identify issues and potential interactions between Project activities and the environment
  - Select Valued Environmental Components (VECs) based on regulatory requirements, guidance, input from stakeholders and Indigenous communities, and known environmental sensitivities
  - Define appropriate spatial and temporal boundaries for each VEC
- Describe the environment as it exists
  - Collect and compile baseline information using desktop review, regulatory data sources, field surveys, professional expertise, and Indigenous and stakeholder input
  - Characterize current environmental conditions within the defined boundaries
- Evaluate environmental effects
  - Identify potential Project–environment interactions by assessing pathways of effects for each Project component and activity
  - Identify mitigation measures to avoid, reduce, or otherwise manage potential adverse effects
  - Characterize residual environmental effects after mitigation has been applied
  - Determine the significance of residual adverse effects using established criteria (e.g., magnitude, duration, geographic extent, reversibility, and likelihood)

The following sections describe the specific approach used to scope and evaluate environmental effects for this Project. Detailed methods for data collection and VEC-specific analysis are provided in each corresponding VEC chapter.

4.2 Scoping

Establishing the scope of the environmental effects analysis defines the extent of the Project to be assessed and the issues raised by regulators, Indigenous communities, and stakeholders. The primary objective of scoping is to identify VECs that are both important and potentially affected by Project activities. For this Project, the scope encompasses all Project components and activities outlined in Chapter 2: Project Description.

4.2.1 Identifying Issues and Selecting VECs

VECs are biophysical, socio-economic, or cultural components that may be affected by the Project and are important to regulators, Indigenous communities, stakeholders, or the public. For this Project, VECs were selected based on the scope and location of the undertaking and consideration of the following:

- Characteristics of the Project and expected construction and operation methods
- Consultation with regulatory authorities
- Applicable guidance, including *A Proponent's Guide to Environmental Assessment* (NSECC, 2025a), the *Nova Scotia Class I Environmental Assessment Checklist* (NSECC, 2025b), and the *Environmental Assessment Supplemental Checklist: Wind Energy Projects* (NSECC, 2025c)
- Community and stakeholder interests and concerns
- Indigenous rights, resource use, and knowledge of the environment
- Nature and extent of potential Project interactions and impacts
- Professional judgement and experience from similar wind projects

4.2.2 Establishing Spatial and Temporal Boundaries

Spatial and temporal boundaries define the geographic areas and time periods within which the Project may interact with a VEC. Environmental effects, including direct and indirect interactions, are assessed within these boundaries. Because Project interactions differ by VEC, boundaries are defined individually for each VEC in this EA considering the following:

- The geographic range and natural variability of the VEC
- The Project zone of influence
- The timing and duration of Project phases
- Seasonal presence or use of the area by the VEC
- The time required for recovery from potential effects
- Administrative or regulatory boundaries
- The availability and quality of existing data

4.2.2.1 Spatial Boundaries

Four spatial boundary terms are used consistently in this EA. Their specific extent varies by VEC to reflect ecological characteristics, potential pathways of effects, and regulatory context.

Project Footprint: Project Footprint represents the temporary disturbance and permanent space occupied by Project infrastructure and construction activities. This includes access roads, turbine pads, power infrastructure, construction laydown areas, and other supporting infrastructure. The Project Footprint associated with the proposed layout falls within the PDA and will be further refined as detailed design progresses.

Potential Development Area (PDA): The PDA represents the boundaries within which the Project Footprint may occur. The overall footprint of the Project will be substantially smaller than the extent of the PDA.

Local Assessment Area (LAA): The LAA represents the area where measurable environmental changes may occur during any phase of the Project (construction, operation, maintenance, or decommissioning), including effects from normal activities or potential accidents or malfunctions. The size of the LAA varies by VEC (e.g., the local area for aquatic assessment differs from that for atmospheric effects).

Regional Assessment Area (RAA): The RAA represents the broader area where Project-related effects may overlap with those of other existing or reasonably foreseeable projects, potentially resulting in cumulative effects. The size of the RAA is also VEC-specific. For example, the RAA for aquatic effects includes secondary watersheds overlapped by the PDA, whereas the RAA for wetlands extends 1 km beyond the PDA.

For the visual landscape, shadow flicker, and acoustic environment, modelling was used to determine the Project zone of influence.

4.2.2.2 Temporal Boundaries

Temporal boundaries for this EA encompass all phases of the Project: construction, operation and maintenance, and decommissioning. Where a VEC assessment does not apply to all phases, the relevant temporal scope and rationale are provided.

4.3 Describing the Existing Environment

Baseline conditions within the Project assessment areas are described in Chapters 5 to 14. These chapters characterize the physical, biological, socio-economic, and cultural environments to provide context for assessing potential effects within the PDA and surrounding areas. Baseline descriptions are based on field surveys, modelling, background information, and literature review, and are supported by technical reports and relevant published sources.

4.4 Evaluating Environmental Effects

4.4.1 Identifying Project–Environment Interactions and Pathways of Effects

Potential interactions between the Project and each VEC are identified using a matrix-based process that systematically evaluates which Project components and activities may influence environmental conditions. Interactions are characterized as positive, adverse, or neutral, recognizing the following:

- Some activities may result in both beneficial and adverse effects
- Some may not directly affect a VEC but may create indirect pathways that influence other VECs

Where potential adverse interactions are identified, a detailed assessment is completed. Effects are evaluated qualitatively and, when feasible, quantitatively, using existing data, analytical tools, professional judgement, and applicable regulatory guidance. If an activity is determined not to result in a likely interaction with a VEC, no further analysis is conducted.

4.4.2 Identifying Mitigation Strategies

The pathways of effects used to identify potential environmental interactions also inform the selection of mitigation strategies to avoid or reduce adverse effects on VECs. Mitigation measures are applied when they are technically and economically feasible and are expected to be effective. Established best practices are used where applicable. When adverse effects cannot be fully avoided or reduced, additional measures may be considered, such as habitat offsetting, species relocation, activity timing restrictions, or monitoring.

For each interaction where mitigation is applied, the effectiveness of the measure is evaluated to determine whether residual effects remain. Residual effects refer to the effects on VECs that persist after mitigation is implemented.

4.4.3 Characterizing Residual Environmental Effects

Residual adverse environmental effects are characterized using standard criteria: magnitude, geographic extent, timing, duration, frequency, and reversibility. These criteria describe the nature of the effect that remains after mitigation and provide the basis for determining the significance of the effect.

Magnitude—the amount of change to a VEC relative to baseline conditions

- Minor—the effect is at, or only slightly above, baseline conditions
- Moderate—the effect exceeds baseline conditions but does not exceed established regulatory criteria or published guidelines
- Large—the effect exceeds established regulatory criteria or published guidelines

Geographic Extent—the spatial area within which an effect of a defined magnitude will occur

- Immediate—the effect is limited to the PDA
- Local—the effect extends beyond the PDA but remains within the LAA as defined for each VEC
- Regional—the effect will occur on a regional scale, extending beyond the LAA into the RAA as defined for each VEC

Timing—when the effect occurs relative to the sensitive time period for the VEC

- Low—the effect occurs during low or non-sensitive time periods for the VEC
- Moderate—the effect occurs during moderately sensitive time periods for the VEC
- High—the effect occurs during highly sensitive time periods for the VEC

Duration—the period of time the effect persists (i.e., until the VEC returns to baseline conditions)

- Short-term—the effect occurs only during construction or for 0 to 2 years during operation
- Medium-term—the effect occurs through the construction phase and into the operation phase or for 2 to 10 years during operation
- Long-term—the effect persists for more than 10 years

Frequency—how often the effect occurs during the Project or a specific Project phase

- Once—the conditions or activities causing the effect occur once
- Intermittent—the conditions or activities causing the effect occur periodically
- Continuous—the conditions or activities causing the effect persist continuously throughout the Project phases

Reversibility—whether a VEC will recover from an effect and return to baseline conditions

- Reversible—the effect is feasibly reversible
- Irreversible—the effect is permanent

4.4.4 Determining Significance

The significance of residual adverse environmental effects is determined by comparing their characterized attributes to established benchmarks, where available. Applicable regulatory standards, guidelines, targets, or objectives are used when appropriate. Where explicit benchmarks are not available, reasoned argument and professional judgment are applied, supported by recognized scientific information and the residual effects characterization.

4.5 Initial Screening and VEC Selection

The Project construction, operation and maintenance, and decommissioning activities were screened against the VECs to identify potential Project-VEC interactions. VECs requiring further assessment were selected based on this screening process. The potential interactions are summarized in Table 4.1, and VEC-specific assessment and evaluation are provided in the chapters that follow.

The purpose of the Project is to generate renewable electricity that supports Nova Scotia's legislated climate goals, including phasing out coal, achieving 80% renewable energy by 2030, and reducing provincial GHG emissions. If selected under the provincial Green Choice Program, the Project will supply clean power to large public and institutional energy consumers, while also supporting local economic development and community climate goals. Based on operational activities, there are VECs that are expected to be positively affected that do not require in-depth assessment for mitigation measures:

- Climate
- Economy

Based on the environmental setting and Project activities, pathways to possible adverse effects have been identified for some components of the environment. The assessment is focused on those VECs on which the Project may have adverse effects:

- Air Quality
- Ambient Light
- Acoustic Environment
- Topography and Landform
- Bedrock and Soils
- Groundwater
- Aquatic Environment
- Flora
- Wetlands
- Terrestrial Wildlife
- Bats
- Birds
- Land Use and Value
- Visual Landscape
- Communication and Radar Systems
- Transportation
- Recreation and Tourism
- Human Health
- Archaeological Resources
- Indigenous Cultural Resources

Table 4.1 Potential Project-Environment Interactions and VEC Selection

Project Activities	Environmental Components																					
	Atmospheric Environment				Geophysical Environment			Biophysical Environment						Socio-Economic Environment								Heritage and Cultural Resources	
	Climate and Weather	Ambient Light	Air Quality	Acoustic Environment	Topography and Landform	Bedrock and Soils	Groundwater	Aquatic Environment	Flora	Wetlands	Terrestrial Wildlife	Bats	Birds	Population and Economy	Land Use and Value	Visual Landscape	Electricity and Other Utilities	Communication and Radar Systems	Transportation	Recreation and Tourism	Human Health	Archaeological Resources	Indigenous Cultural Resources
Construction																							
Site Preparation	-	-	X	X	-	X	X	X	X	X	X	X	X	X	X	-	-	-	X	X	X	X	X
Access Road Construction and Modification	-	-	X	X	-	X	X	X	X	X	X	X	X	X	X	-	-	-	X	X	X	X	-
Material and Equipment Delivery and Storage	-	-	X	X	-	-	-	-	X	X	X	X	X	X	-	-	-	-	X	X	X	-	-
Infrastructure Installation	-	X	X	X	-	-	-	X	-	X	X	X	X	X	-	X	-	-	-	X	-	-	-
Restoration of Temporary Areas	-	-	X	X	-	-	-	X	-	-	X	X	X	X	-	-	-	-	-	X	X	-	-
Testing and Commissioning	-	X		X	-	-	-		-	-	X	X	X	X	-	-	-	-	-	-	-	-	-
Operation and Maintenance																							
Turbine Operation and Maintenance	X*	X	-	X	-	-	-	-	-	-	X	X	X	X	X	X	X	X	-	X	X	-	-
Road Maintenance	-	-	X	X	-	X	X	X	X	X	X	X	X	X	X	-	-	-	X	X	X	X	-
Power Line and Substation Maintenance	-	-	-	X	-	-	-	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-
Vegetation Management	-	-	X	X	-	-	X	X	X	X	X	X	X	X	-	-	-	-	-	-	X		X
Safety and Security	-	X	-	X	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-
Decommissioning																							
Removal of Infrastructure and Site Restoration	-	X	X	X	-	X	X	X	X	-	X	X	X	X	-	-	-	-	X	X	X	X	X

X = Potential interaction
- = No meaningful interaction
*= Interaction with positive effect that does not require in-depth assessment for mitigation measures

5 Atmospheric Environment

5.1 Overview

The atmospheric environment comprises weather and climate, air quality, ambient light, and acoustic conditions.

Biophysical and socio-economic conditions are closely linked to components of the atmospheric environment, and changes to atmospheric conditions may influence a variety of other VECs. Weather patterns, including precipitation, temperature, and wind, shape habitat conditions and influence the characteristics of aquatic environments, wetlands, and vegetation communities. Atmospheric factors such as ambient noise levels and nighttime light conditions also contribute to habitat quality and can affect the behaviour of wildlife, including birds, bats, and terrestrial species, as well as the human environment. Air quality reflects the presence of emissions and particulate matter in the atmosphere, which can influence ecosystem health, climate, and human well-being through their effects on air, water, and soil quality. Given these interrelationships, Project interactions with the atmospheric environment are considered throughout the assessment of several VECs discussed in the following chapters.

The Project may interact with the atmospheric environment via several pathways during construction, operation and maintenance, and decommissioning. The overall purpose of the Project is to generate renewable electricity, reducing reliance on fossil fuel-based generation and contributing to reductions in greenhouse gas emissions at the provincial scale. The replacement of power plants that use conventional fossil fuels with wind energy projects ultimately results in lower emissions of fine particles that pose risks to human health (Bošnjaković et al., 2024).

Effects, mitigation measures, and residual impacts to atmospheric environment as a result of the Project are outlined in this chapter. Mitigation measures to minimize adverse effects will be further developed in a Project-specific EPP prior to construction.

5.1.1 Regulatory Context

Assessment of the atmospheric environment considers provincial and federal regulations, policy, and guidelines:

- Nova Scotia *Environment Act*

- Nova Scotia Air Quality Regulations
- Canadian Ambient Air Quality Standards (CAAQS)
- *Environmental Assessment Supplemental Checklist: Wind Energy Projects* (NSECC, 2025)
- Minimum Planning Requirements Regulations (NS Reg. 51/2025)
- *Guidelines for Environmental Noise Measurement and Assessment* (NSECC, 2023)
- Health Canada's *Guidance for Evaluating Human Health Effects in Impact Assessment: Noise* (Health Canada, 2023a)

5.1.2 Boundaries

The PDA represents the boundaries within which the Project Footprint may occur. The overall footprint of the Project will be substantially smaller than the extent of the PDA. The LAA and RAA boundaries are defined as follows for each subcomponent of the atmospheric environment VEC.

Air Quality: According to the United States (US) Environmental Protection Agency (2014), influences on air quality are generally limited to a range of 150 to 180 m downwind from the vicinity of heavily travelled roadways or along corridors with significant trucking traffic or rail activities. A 500 m LAA has been selected as a conservative distance over which temporary dust and equipment emissions associated with construction activities could reasonably affect nearby receptors. The Project is expected to affect air quality in the LAA for the lifetime of the Project, predominantly during activities that involve earthworks. The RAA is within the limits of Nova Scotia's northern air zone assessed in the AQMS by ECCC through monitoring at Pictou.

Ambient Light: Effects from anthropogenic light depend on properties of the light source and height as well as atmospheric conditions. An LAA of 1 km around the PDA has been selected for effects of light levels on the surrounding receptors; the RAA is limited to 5 km to consider turbine lighting that meets Standard 621 of the Canadian Aviation Regulations.

Acoustic Environment: An LAA of 2 km from turbines has been selected as per the *Environmental Assessment Supplemental Checklist: Wind Energy Projects* (NSECC, 2025) as well as Health Canada guidance (Health Canada, 2023a). The RAA is defined as the same 2 km zone as the LAA, as there are no nearby wind turbines or other major stationary noise sources with the potential to contribute to cumulative acoustic effects with the Project. Sound levels within the LAA may be affected for the lifetime of the Project.

Additionally, when describing the existing environment, a Study Area will be used, to describe both the PDA and the alternate infrastructure (including alternate turbines) to the south of the PDA. However, the effects assessment will be based on the PDA, LAA, and RAA, where the infrastructure is preferred.

5.1.3 Assessment Methodology

The description of the existing environment is based primarily on data collected by regional air quality and meteorological monitoring stations as well as online scientific reports:

- ECCC Canadian Climate Normals

- Nova Scotia Ambient Air Quality Data Reports
- Nova Scotia Ecological Landscape Analysis

A noise assessment was completed for the Project by Nortek Resource Solutions Inc. (Nortek) and is presented in Appendix D. A study area of 2 km from proposed turbines was established (Nortek, 2026).

Potential noise receptors were selected using publicly available satellite imagery and a field reconnaissance survey that identified whether the receptors were habitable was conducted. There are several buildings located within the wind farm which are situated on properties where the landowners have entered into agreements with West Bay Wind Inc. for the development and operation of the wind project. These buildings are participating receptors and therefore have been excluded from this analysis. A total of 41 receptors were included in noise modelling. Nortek (2026) applied a baseline acoustic value recommended by Health Canada (2023), where 35 dBA is considered the average baseline acoustic level in quiet, rural areas during the night.

Computer modelling was conducted to predict noise levels from operation of the Project. Details on the computer noise model inputs are provided in Nortek (2026) and consisted of source emissions from Project turbines, substation transformers, and environmental conditions known to influence noise propagation (ground cover, temperature, humidity, wind conditions).

5.2 Existing Environment

5.2.1 Climate and Weather

The Project is located within the Cobequid Hills and Parrsboro Shore ecodistricts. The Cobequid Hills ecodistrict is characterized by rolling hills dominated by tolerant hardwood forests, while the Parrsboro Shore ecodistrict consists of coastal plains, farmlands, rolling hills of red spruce forests, and blueberry fields (Ecological Stratification Working Group, 1995). The Cobequid Hills ecodistrict receives the greatest amount of snow of all the mainland, at over 300 centimetres (cm) of snow a year on average. The local climate of the Parrsboro Shore ecodistrict is influenced by the proximity to the cold Bay of Fundy. Summer temperatures are cooler, and fog is a common occurrence in the area (Nova Scotia Department of Lands and Forestry, 2019).

The nearest weather station to the Study Area that records Canadian Climate Normal data is the Parrsboro Weather Station, approximately 9 km from the PDA centre point (ECCC, 2026). The station collects data from heights of 24.3 and 30.9 m. Climate Normals, based on the most recently available collection of meteorological data from 1991 to 2020, indicate that the average annual temperature at the Parrsboro weather station was 6.2°C. The daily minimum temperature is the lowest in January, at -10.8°C, and the highest is in the months

of July and August, at 23.1°C. The extreme temperatures for the 30-year period were recorded as 31.4°C (July 2016) and -31.5°C (January 1993). The average annual precipitation at the Parrsboro Weather Station was 1,247.1 millimetres (mm), with an extreme daily precipitation of 163.7 mm in August 2019 (ECCC, 2026).

According to the Canadian Wind Atlas, annual mean wind speed at 80 m elevation near the centre of the Study Area is 7.25 m/s, having a wind energy of 316.88 W/m^2 (ECCC, 2025).

5.2.2 Air Quality

Nova Scotia shares air quality monitoring data with the federal government to inform the Air Quality Management System (AQMS) across Canada. The Canadian Council of Ministers of the Environment (CCME) assesses provincial values against the CAAQS (CCME, 2024) for fine particulate matter ($PM_{2.5}$), ground-level ozone, sulphur dioxide (SO_2), and nitrogen dioxide (NO_2). The CAAQS are meant to work progressively toward improving the air quality of Canada and are reviewed every five years. The evolving CAAQS for 2020 to 2030 are presented in Table 5.1.

Table 5.1 Canadian Ambient Air Quality Standards

Pollutant	Averaging Time	Standards (concentration)		
		2020	2025	2030
$PM_{2.5}$	24-hour (calendar day)	27 µg/m^3	-	23 µg/m^3
$PM_{2.5}$	Annual (calendar year)	8.8 µg/m^3	-	8.0 µg/m^3
Ground level Ozone	8-hour	62 ppb	60 ppb	Under review
SO_2	1-hour	70 ppb	65 ppb	Under review
	Annual	5.0 ppb	4.0 ppb	Under review
NO_2	1-hour	60 ppb	42 ppb	Under review
	Annual	17.0 ppb	12.0 ppb	Under review

$PM_{2.5}$: Particulate matter having a size of 2.5 micrometres (µm) or less
ppb: parts per billion
µg/m^3: micrograms per cubic metre

Nova Scotia is divided into four air zones; the Project is located in the northern air zone, where ambient air is monitored by the province at Pictou. The northern air zone contains a population of 0.2 million people, extending across the entirety of the northern shore of mainland Nova Scotia and to a southern extent that includes the communities of Sherbrooke and Truro (Health Canada, 2023b).

Based on the 2022 data (which is the most current at the time of document preparation) the CAAQS were met in all four air zones in Nova Scotia (NSECC, 2024). With a goal to

prevent deterioration of ambient air quality, two parameters in the northern air zone have been categorized as "yellow" under the CCME's Air Zone Management System, reflecting an aim to further reduce ground-level ozone and $PM_{2.5}$ annual concentrations. Although ground-level ozone values have risen from 46 to 51 ppb since 2017, the 2022 value is still below the 2025 target standard of 60 ppb. The $PM_{2.5}$ annual levels in the northern zone have decreased from 5.7 to 4.8 µg/m^3 since 2017, below the 2020 target of 8.8 µg/m^3.

5.2.3 Ambient Light

The LAA is predominantly within an area of forest, blueberry fields, and rolling hills. There is minimal exposure to artificial light sources in the area. Recreational vehicles occasionally travel roads and trails in the Study Area at night using headlights through the year.

Based on satellite data from 2025, the Study Area has Light Pollution Indices (LPIs) of 0.11 to 0.13. An LPI of zero means there is zero light pollution in the area, and an LPI of one means that the artificial light of the area is equal to natural starlight. In a city, LPIs are typically around 30 (Lorenz, n.d.; Elvidge et al., 2017). Therefore, an LPI of 0.11 to 0.13 means there is very low artificial light in the area.

In the Study Area, the ambient light along Highway 2, Highway 209, and smaller access roads in the area, is typical of rural areas. Outside of Parrsboro, there are no streetlights present on Highway 2 or Highway 209, nor on the smaller roads in the area. Headlights from rural traffic, and lights from rural residences distributed at low densities throughout the area can be observed. A small number of lighted telecommunications towers are present in the Study Area that may be visible at certain locations through the PDA. In the summer months, full foliage in the mountainous terrain limits the ambient light in the area.

5.2.4 Acoustic Environment

The area within the Study Area is considered to match the Health Canada description of being a quiet rural area where natural noise sources tend to dominate, having baseline sound levels of 35 dBA during nighttime periods (Health Canada, 2023a). During daytime hours, natural sounds such as songbirds, as well as intermittent anthropogenic noise from industrial and recreational activities, are typical of the acoustic environment within the Study Area.

Industrial forestry activities occur in the Study Area, and large vehicles associated with forestry frequently use the roads in the Study Area. Snowmobiles and ATVs regularly use trails and roads in the Study Area that extend through the PDA, and beyond.

5.3 Effects Assessment

5.3.1 Potential Effects and Mitigation

Direct and indirect effects of the Project on components of the atmospheric environment could occur through several interconnected pathways. During construction, operation and maintenance, and decommissioning, vehicular emissions, fugitive dust, and noise are expected to be produced—which will affect air quality. Ground lighting of the Project and aerial lighting on turbines will contribute to ambient light in the PDA and LAA. There will also be effects on the acoustic environment during all phases of the Project when people and vehicles are on site and turbines are in operation.

Project activities can affect the atmospheric environment as indicated in Table 5.2; identification of these potential effects does not consider the implementation of mitigation measures described herein.

Table 5.2 Potential Environmental Effects of the Project on the Atmospheric Environment

Project Activity	Potential Environmental Effects		
	Change in Air Quality	Change in Ambient Light	Change in Acoustic Environment
Construction			
Site Preparation	X	-	X
Access Roads Construction and Modifications	X	-	X
Material and Equipment Delivery and Storage	X	-	X
Infrastructure Installation	X	X	X
Restoration of Temporary Areas	X	-	X
Testing and Commissioning	-	X	X
Operation and Maintenance			
Turbine Operation and Maintenance	-	X	X
Road Maintenance	X	-	X
Power Line and Substation Maintenance	-	-	X
Vegetation Management	X	-	X
Safety and Security	-	X	X
Decommissioning			
Removal of Infrastructure and Site Restoration	X	X	X

X = Potential Interaction
- = No Interaction

5.3.1.1 Air Quality

The Project may result in temporary changes to air quality, primarily by dust emissions during construction activities for clearing, road construction and maintenance, and equipment delivery traffic. Potential Project effects on air quality can be effectively mitigated through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on air quality will be further detailed in a Project-specific EPP to be implemented prior to and during construction.

- Visually monitoring of the construction site and reporting of air quality concerns.
- Implementation of best management practices and mitigation measures, such as those identified in the Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities (Environment Canada, 2005) Stabilization of stockpiles and other disturbed areas to reduce/prevent erosion and escape of fugitive dust (e.g., tarped, mulched, graded, revegetated or watered to create a hard surface crust). Idling of heavy machinery and vehicles will be minimized as practicable.
- Heavy machinery and vehicles will be regularly checked and maintained for optimal operational emission levels.
- Speed limits will be enforced.
- Drop heights will be minimized when unloading trucks.
- Construction activities during high winds will be avoided whenever possible.
- No burning of cleared or grubbed materials will be permitted on site; surplus clearing and grubbing materials will be hauled off site for disposal.

5.3.1.2 Ambient Light

Activities associated with lighting of the PDA will occur through the life of the Project. Construction will be conducted seven days per week. During operation and maintenance, turbine towers will require lighting for the safe navigation of aircraft during Project operation. Some site lighting, such as that for the substation and operation and maintenance building, will also be needed for the duration of the operation and maintenance phase. Lighting will be limited to safety and security needs during construction and operation. During construction and maintenance, if lighting on site is needed, spill-over light will be minimized and be side-shielded and directed downward, where possible. Construction activities will be limited to the daylight hours, when possible. Construction will generally occur during daylight hours; however, limited nighttime activities may occasionally be required for safety or schedule-related reasons, and lighting will be used for human safety. Turbine and transmission line lighting levels will be minimized, while meeting Transport Canada's requirements for aeronautical safety. With these mitigations, change to ambient light levels is expected to be low for the lifespan of the Project.

Potential Project effects on ambient light conditions can be effectively mitigated through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on ambient light will be further detailed in a Project-specific EPP to be implemented prior to and during construction.

- Onsite lighting will be restricted during Project activities and minimized to the extent possible while maintaining regulatory and safety requirements.
- Where onsite lighting is installed near the perimeter of the LAA, open areas will be avoided where possible.
- Site lighting will be shielded downward to minimize light pollution to the surrounding environment and adjacent habitat, without compromising safety.
- Movement detection lighting will be used where possible and will turn off when not in use.
- Construction will mostly occur during daytime hours and will be restricted at night, when possible.

5.3.1.3 Acoustic Environment

The primary noise sources associated with construction will include trucks and other vehicles used to transport workers and materials to the PDA, backhoes and graders, cranes, and smaller equipment such as welding units. Blasting is expected as part of access road construction or upgrades, as well as turbine foundations. During operation and maintenance, the primary noise emissions are expected to occur through operation of the turbines. The modelling results (Appendix D) predict sound levels ranging from 36 dBA to 39 dBA.

In combination with natural and non-industrial anthropogenic sources, Nortek (2026) determined that the Project operation will comply with permissible sound levels outlined in the provincial noise guidelines for all 41 identified receptors (Appendix D).

Potential Project effects on acoustic environment can be effectively mitigated through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on acoustic environment will be further detailed in a Project-specific EPP to be implemented prior to and during construction.

- Nearby residents will be notified about scheduled noisy activities (e.g., blasting) to reduce disruption.
- A Blasting Management Plan will be developed.
- Where blasting is necessary, it will be undertaken in accordance with applicable regulatory requirements and conducted only by a certified blaster or other qualified blasting professional.
- Blasting patterns and procedures that minimize shock or instantaneous peak noise levels will be used, where possible.
- Blasting activities will be limited to that which is necessary.
- Work areas and travel paths will be designed to reduce the amount of time that equipment must operate in reverse to reduce the use of back-up alarms.
- Construction equipment and vehicles will be kept in good working order, and loud machinery will be muffled when possible.
- Idling of heavy machinery and vehicles will be minimized as practicable.

5.3.2 Residual Effects

Residual effects on the atmospheric environment are predicted to be minor. Except for short-term increases in particulate matter, Project activities are not expected to cause air quality parameters within the LAA to exceed the CAAQS. Effects on air quality will be temporary and will occur primarily during construction, with intermittent effects associated with operation, maintenance, and decommissioning activities. Ground-level lighting will be limited to that required for worker safety, and surrounding forested areas are expected to reduce light diffusion within the LAA. Aerial lighting associated with turbines will be minimized while complying with the requirements of the Canadian Aviation Regulations (Standard 621, Section 12.2 and Figure 5.3, Appendix A) (Transport Canada, 2025). The noise assessment predicts that Project-related noise effects will be minor, and construction and operation are not expected to result in unacceptable noise levels within the LAA or RAA. With the implementation of appropriate planning, management, and mitigation measures, adverse residual effects on the atmospheric environment are not expected to be significant. Overall, the Project will contribute positively to renewable energy generation in Nova Scotia, supporting reductions in air emissions associated with fossil fuel-based electricity generation. Effects on ambient lighting and the acoustic environment will be reversible and are expected to cease following Project decommissioning.

5.4 Monitoring

Aside from general observations and mitigation during work activities, monitoring is not proposed.

6 Geophysical Environment

6.1 Overview

The geophysical environment comprises the topography (both natural and artificial) and subsurface resources, such as soil, sediment, bedrock, and groundwater. Surficial geology and topography shape the bioterrain of the ecological environment and are therefore closely related to other VECs assessed in this EA. Changes in topography can affect surface water flow, effecting change on the aquatic environment, wetlands, and groundwater recharge. Soil and bedrock matrices influence dust formation and erosion. Changes in groundwater can affect the surrounding ecosystems (aquatic and terrestrial) and socio-economic environment, namely human health.

The Project could interact with the geophysical environment via several pathways during construction, operation and maintenance, and decommissioning. Site works in the PDA will involve the reshaping of the surface during construction that will affect the site's topography and run-off. Existing roads will be used to the extent possible, but excavation and blasting may be used where needed to achieve road grades suitable for construction and transportation of components, and/or preparation of turbine foundations. During decommissioning, while surface infrastructure will be removed (with the exception of access roads where landowners opt for retainment), the PDA will be restored to an approximate depth of 1 mbgs below which remaining structural components will remain in place.

Effects, mitigation measures, and residual impacts to the geophysical environment have been outlined in this chapter and will be further developed in a Project-specific EPP prior to construction to minimize adverse effects.

6.1.1 Regulatory Context

Assessment of the geophysical environment considers characteristics of the existing environment and measures effects using provincial and federal legislation and guidelines:

- Nova Scotia *Environment Act*
- Nova Scotia *Water Resources Protection Act*
- Sulfide Bearing Material Disposal Regulations NS. Reg. 57/1995
- Health Canada Guidelines for Canadian Drinking Water Quality (2022)

- The CCME Soil Quality Guidelines for the Protection of Environmental and Human Health (CCME, 2007)

6.1.2 Boundaries

The PDA represents the Project footprint and the maximum limit of physical disturbance within the PDA. The boundaries are defined as follows for each subcomponent of the geophysical environment VEC. Additionally, a Study Area was used when describing the existing geophysical environment, which includes the alternate turbine locations, and the alternate infrastructure.

Bedrock and Soils (Quantity and Quality): Physical changes in bedrock and soil characteristics will be limited to the PDA for the lifetime of the Project; some infrastructure will remain after decommissioning.

Groundwater (Quantity and Quality): An LAA of 1 km outside the PDA boundary has been established (Figure 6.1, Appendix A). The 1 km LAA encompasses all identified private groundwater wells and potential receptors that could reasonably be affected by localized blasting, excavation, and dewatering activities associated with the Project.

When discussing the existing environment, a Study Area will be used that encompasses the alternate infrastructure (including alternate turbine locations) to the south of the PDA. However, the effects assessment will focus on effects to the PDA and LAA and not the Study Area.

6.1.3 Assessment Methodology

The description of the existing environment is based primarily on available online data sources:

- Ecological Land Classification for Nova Scotia
- Nova Scotia Geoscience Maps, Reports, and Data
- Nova Scotia Water Resource Reports and Maps
- Nova Scotia Well Logs Database
- Nova Scotia Groundwater Atlas
- West Bay Wind Project Geotechnical Investigation Report (CBCL, 2024)

Information from well records from the Nova Scotia Well Logs Database within 1 km of the PDA are summarized in Table 6.1. There are 18 wells on the Nova Scotia Groundwater Database (NSGWDB) (NSECC, 2023) within 1 km of the PDA. The majority of these (17) are associated with residential homes.

6.2 Existing Environment

6.2.1 Topography and Seismicity

Nova Scotia is part of the Appalachian region. The Study Area lies within the Cobequid Hills and the Parrsboro Shore ecodistricts. The Cobequid Hills ecodistrict lies on and to the north of the Cobequid-Chedabucto Fault System, whereas the Parrsboro Shore ecodistrict lies on and to the south of this Fault System. There are many fault lines throughout the Cobequid Hills ecodistrict, the most prominent being the Cobequid Fault (NSDNR, 2015a; NS Department of Lands and Forestry (NSDLF), 2019a). The Londonderry Fault, the Rockland Brook Fault, the Spicers Brook Fault, and the Waughs River Fault are also larger faults in this ecodistrict. The Parrsboro Shore ecodistrict has three major faults, and a series of minor faults. The major faults in this ecodistrict generally run east and west (NSDNR, 2015b; NSDLF, 2019b). The region is not located near the edges of tectonic plates and is outside of any seismic zones and is therefore considered low risk for major earthquakes (Natural Resources Canada (NRCan), 2019).

Within the PDA, elevations range from approximately 17 to 278 masl. Roadways in the Study Area are single lane roads and small dirt and/or gravel roads. Watercourses travel through the Study Area and intersect the PDA at several locations. The closest quarry to the Study Area is a private quarry owned and operated by C. Ernest Harrison & Sons Limited, and it is immediately adjacent to one of the Project access roads. The second closest quarry is operated by OSCO Aggregates at Canaan Mountain, approximately 10 km to the east of the closest turbine. It specializes in aggregate products for use in concrete, landscaping, and construction. The second closest operational quarry is the Williamsdale Quarry (approximately 42 km northeast of the closest turbine) operated by Dexter Construction Company Limited, which extracts and supplies crushed stone, gravel, and other aggregate products.

6.2.2 Bedrock and Soils

The Parrsboro Shore region's bedrock geology is dominated by Late Paleozoic to Early Mesozoic sedimentary and volcanic rocks that record the assembly and subsequent breakup of the supercontinent Pangea (Calder et al., 2017). The area is strongly influenced by the east-west Cobequid Fault system and associated faults, including the Portapique and Clarke Head Faults. These faults have shaped the regional geology by repeated deformation and fault movement. Bedrock units in the region include Carboniferous sedimentary rocks of the Windsor and Mabou groups, Triassic red beds of the Blomidon Formation, Jurassic sedimentary rocks of the McCoy Brook Formation, and basaltic rocks associated with the North Mountain Formation and the Central Atlantic Magmatic Formation (Calder et al., 2017). In general, the bedrock of the region is complex, and characterized by folded, faulted, and locally highly deformed rock assemblages, particularly along the coastline near Clarke Head. The coastal exposures of this ecodistrict provide some of the most significant geological and paleontological features of the province (Calder et al., 2017).

The Cobequid Hills Ecodistrict is underlain by a diverse assemblage of Precambrian and Carboniferous-aged igneous, metamorphic, and sedimentary rocks associated with the Cobequid Highlands (NSDLF, 2019a). Bedrock units include granitic, gabbroic, gneissic, volcanic, sandstone, siltstone, argillite, and agglomerate formations, as well as diabase dykes and sills. The ecodistrict lies within and adjacent to the regional Cobequid-Chedabucto Fault System, which has produced a structurally complex landscape characterized by extensive faulting, folding, and uplift. Thin glacial tills and locally extensive glaciofluvial sand and gravel deposits overlie much of the bedrock, while exposed bedrock is common throughout the uplands. The region contains a variety of mineral resources, including historical occurrences of iron, coal, copper, barite, graphite, gold, and arsenic, and has also been explored for oil and natural gas. Overall, the bedrock geology is characterized by fault-bounded upland blocks composed of varied igneous, metamorphic, and sedimentary rocks that reflect the complex tectonic history of northern Nova Scotia and the development of the Cobequid-Chedabucto Fault System (NSDLF, 2019a).

Soils in the Cobequid Hills Ecodistrict are mainly well-drained sandy loams and loams associated with uplands, ridges, and glacial till deposits (NSDLF, 2019a). The ecodistrict is characterized by shallow, coarse-textured soils, frequent bedrock outcrops, and areas of glaciofluvial sand and gravel. Localized alluvial soils occur along major river valleys and floodplains, while peat deposits and poorly drained organic soils are associated with wetlands and bogs throughout the region (NSDLF, 2019a).

In the Parrsboro Shore ecodistrict, the soils are primarily shaly and sandy loams developed over glacial till deposits on rolling hills and coastal slopes (NSDNR, 2015b). Well-drained to rapidly drained coarse-textured soils, often containing gravel, occur within glacial outwash plains and valleys around Parrsboro and Advocate. Finer-textured, imperfectly drained soils are more common in lowland areas. Localized deposits of alluvium, peat, and organic soils occur in floodplains, wetlands, and salt marshes. Soil development through the ecodistrict is strongly influenced by underlying glacial till and glaciofluvial sediments, including extensive sand and gravel deposits (NSDNR, 2015b).

Interactive mapping provided by the province is based on that originally produced by J.D. Keppie, 2000 (NSDNR, 2006). The PDA is underlain by the Ragged Reef Formation and the Polly Brook Formation of the Cumberland Group, the Rapid Brook Formation of the Horton Group, Devonian - Carboniferous granite, Cranberry Lake, Humming Brook and Gilbert Hills Formations of the Jeffers Group, and the Parrsboro Formation of the Cumberland Group (Figure 6.2, Appendix A). The Ragged Reef Formation consists of fluvial sandstone, conglomerate, mudstone, coal, and lacustrine limestone. The Polly Brook Formation consists of alluvial conglomerate, sandstone, and mudstone. The Rapid Brook Formation consists of alluvial conglomerate, wacke, sandstone, fluvial siltstone, and argillite. The Cranberry Lake, Humming Brook, and Gilbert Hills Formations consist of metamorphosed deep marine arkosic turbidites, metamorphosed argillite, rare sandstone and siltstone, and metamorphosed tholeiitic and calcalkaline (NSDNR, 2006).

Geotechnical investigation conducted in the southern portion of the Study Area, where the alternate turbines are located, indicated that native silt/clay sand with gravel till was encountered below topsoil. Bedrock was encountered at depths ranging from 1.9 m to 5.3 m below the existing ground surface (mbgs). The bedrock encountered was sedimentary rock classified as reddish-brown mudstone and/or reddish brown to grey siltstone to shale. Groundwater was not observed during any of the drilling operations. Groundwater levels may vary in response to site construction activities, seasonal weather conditions, and recent precipitation events. As such, the absence of groundwater observed during drilling surveys does not necessarily reflect the absence of groundwater in the PDA (CBCL, 2024).

6.2.3 Subsidence and Sinkholes

The Study Area lies in areas of low-risk and medium-risk karst (NSDNR, 2019c) (Figure 6.3, Appendix A). There is one small high-risk karst area approximately 3.5 km southeast of the closest Project turbine (NSDNR, 2019). Sinkholes are uncommon in the Parrsboro region; however, one of Nova Scotia's highest-risk sinkhole areas is located approximately 50 km northeast of the closest Project turbine. While not in the LAA or RAA, the town of Oxford in Cumberland County sits directly on the Windsor Group geological formation, which is dense with soft gypsum. Many sinkholes have opened in the Oxford area, the largest of which opened in 2018 near the Lion's Club in the town of Oxford (Harbourside Geotechnical Consultants, 2020).

6.2.4 Groundwater

Groundwater flow within the region is influenced by the complex interaction of fractured bedrock, fault systems, glacial deposits, and surficial soils. The numerous faults associated with the regional Cobequid-Chedabucto Fault Zone provide potential preferential groundwater flow pathways. Groundwater flow within evaporitic rocks may be enhanced by dissolution-related secondary porosity, whereas flow within basalt is expected to be concentrated within joints and cooling fractures. Shallow groundwater systems may occur within glacial till, glaciofluvial sand and gravel deposits, and coarse-textured outwash materials present throughout the region, particularly within lowland and valley settings where surficial deposits are more extensive.

6.2.4.1 Watersheds and Groundwater Flow Divides

The Study Area is within portions of the River Hebert, Diligent River, and Ramshead River secondary watersheds, and located within the Kelly/MacCan/Hebert primary watershed and the Parrsboro primary watershed. These watersheds flow into the Bay of Fundy, specifically the Minas Basin (south) and the Cumberland Basin (north) (Nova Scotia Environment (NSE), 2011). Groundwater flow patterns in the Study Area are likely influenced by the variety of geologic formations and rock types present.

Groundwater flow pathways tend to mirror topography. A regional watershed divides oriented east-west intersects the southern portion of the study area, separating surface water flow, and likely serving as a regional groundwater flow divide as well. Groundwater flow under the majority of the Study Area is likely north to the Cumberland Basin (River Hebert Watershed) with a smaller portion flowing south to the Minas Basin (Ramshead and Diligent River Watersheds) (Figure 6.1). Regional faults and fracture orientations which intersect the study area could have a significant influence on groundwater flow direction across the Study Area (Figure 6.2).

Groundwater–surface water interactions are influenced by a variety of factors such as permeability of surficial sediments and bedrock, precipitation that contributes to groundwater recharge, and the presence of wetlands, lakes, and rivers which are influenced by topographic relief. The topographic relief across the Study Area, and the presence of this surficial hydrology, result in complex groundwater–surface water interactions. Lakes, ponds, and rivers could serve as areas of focused groundwater recharge, especially where surficial sediments are thin and bedrock porosity is high. Groundwater discharge areas may occur toward the bottom of steeper hills and cliffs as groundwater flows from regions of high to low pressure, often reflecting surface topography.

6.2.4.2 Municipal Water Supplies

The nearest public water supply is operated by the regional Cumberland County Water Utility and is sourced from local groundwater wells that draw water from a surficial sand and gravel aquifer, approximately 6 km southeast of the closest Project turbine in the Farrell's River loop (Figure 6.1). The Cumberland County Water Utility also operates two other municipal water facilities, in Pugwash and in Springhill. Like the Parrsboro water supply, the water supply in Pugwash is groundwater-fed. However, the water supply in Springhill is surface water fed, and is sourced from the Leamington Brook on Rodney Road, in Springhill, NS (Municipality of Cumberland, 2025).

While the Cumberland County Water Utility operates only three systems in the municipality (Parrsboro, Pugwash, Springhill), there are six protected water areas in the County. The Springhill water supply is from Leamington Brook, which is listed as a protected water area, as are two nearby water features closely tied to Leamington Brook, the MacAloney Lake and the McElmon Brook. The fourth protected water area is the Pugwash Water Projected Area, which is a 232.5 ha protected zone surrounding the Pugwash wellfield. The fifth protected water area is the North Tyndal Protected Water Area, which supplies the Town of Amherst with water. The Town of Amherst water source is not managed by the Cumberland County Water Utility. The sixth protected water area are the source water protection zones associated with the Parrsboro wellfield, southeast of the Study Area. The zone follows the deeper channel aquifer in which the wells are drilled, which is oriented north–south along the river valley. The Study area does not intersect with the SWP zones for the wellfield (Figure 6.1).

6.2.4.3 Potable Water Wells

A search of the Nova Scotia Well Logs Database (NSECC, 2023), identified 18 wells within 1 km of the PDA, as illustrated in Figure 6.1, Appendix A. Of these wells, 17 are identified as domestic use wells, and one is identified as commercial/industrial use. The commercial/industrial use well is most likely associated with a farm off Highway 2. Beyond the LAA and 1 km of the alternate infrastructure, there are many more wells, including some wells with unknown uses, some public non-municipal wells, and four municipal wells.

It should be noted that although Figure 6.1 shows only seven domestic water well points, multiple wells are listed under one domestic water well point. Information regarding depth to bedrock, total well depth, casing depth, static water level, and estimated yield (liters per minute (Lpm)) for these wells is summarized in Table 6.1.

Table 6.1 Summary Table for the 18 Wells Within 1 km of the PDA

	Bedrock Depth (m)	Well Depth (m)	Casing Depth (m)	Static Water Level (m)	Estimated Yield (Lpm)
Minimum	3.0	5.5	0.9	0.3	4.5
1st Quartile[1]	5.2	27.8	8.0	4.8	13.6
Median	8.4	53.3	12.5	10.8	22.7
Mean	16.2	46.8	15.3	11.6	78.9
3rd Quartile[2]	16.2	67.0	15.8	14.3	27.2
Maximum	71.3	92.9	71.6	26.5	908
Number of Record Entries	10	18	18	12	17

[1]1st Quartile – The value below which 25% of the data points are found when arranged in ascending order
[2]3rd Quartile – The value below which 75% of the data points are found when arranged in ascending order

Records indicate that well depths are typical for domestic wells (median value of 53.3 m) and provide low to moderate yields (median value of 22.7 Lpm), which is enough water for most domestic uses. Pumping test data provided on the provincial database in the vicinity of the LAA is sparse. The closest pumping tests have been conducted in the town of Parrsboro, approximately 5 km and 6 km southeast of the nearest turbine. These pumping tests are for wells drilled into the glaciofluvial sediments which are the production wells for Parrsboro and are not representative of the geology yield of the wells within the Study Area.

The closest provincial observation well, located approximately 8 km north of the closest turbine, is in Kelly River. This well is approximately 16 m deep and drilled into bedrock (shale) of the Malagash Formation. Water level data between 2006 and 2025 varied seasonally between 30.5 and 33 masl.

Wells in the LAA are primarily nearest to planned roadways, not turbine pads. The closest mapped well to wind turbines on the NSGWDB that is within the LAA is approximately 1.2 km away. Seventeen of the 18 wells discussed above appear to be associated with residences off Highway 2 and Harrison Settlement. Each residence is likely serviced either by a dug or a drilled well (Figure 6.2, Appendix A). One of the wells within the LAA appears to be associated with a farm on Highway 2 and is classified as for industrial use. This well is likely used for agricultural water. All drilled wells likely draw water from shallow and intermediate flow systems that originate in higher elevation areas.

6.2.4.4 Groundwater Quality

Groundwater quality in general varies depending on the mineral composition of the aquifer. Groundwater from igneous and metamorphic rock in Nova Scotia tends to exhibit higher concentrations of dissolved metals such as iron and manganese. Risk maps of the province (Nova Scotia Department of Mines) show some instances of elevated manganese in regional well water, and the area is broadly characterised as medium risk for elevated manganese (Kennedy, 2021).

In Nova Scotia, arsenic in groundwater is derived from bedrock-hosted sulphide minerals (primarily pyrite/pyrrhotite-bearing slate and granite). The Study Area is underlain by rock associated with low, medium, and high risk of arsenic occurrence in groundwater. The area of high risk for arsenic occurrence in groundwater is located in the Devonian Carboniferous granite, and the area of medium risk for arsenic occurrence in groundwater is located in the Rapid Brook Formation of the Horton Group (Figure 6.4, Appendix A).

Uranium has been identified in elevated concentrations across many groundwater wells in Nova Scotia. The bedrock deposits underlying the Study Area are labelled as low to medium risk for uranium in groundwater (Kennedy and Drage, 2020). Radon is a naturally occurring product of the breakdown of uranium. Radon is not considered a risk for drinking water (NSECC, n.d.); however, the PDA is mostly underlain by areas of medium risk for potential for radon in indoor air, with some areas of low or high risk for radon in indoor air (Figure 6.5, Appendix A). Water quality is assessed using Health Canada's Guidelines for Canadian Drinking Water Quality (Health Canada, 2022), which have been adopted by NSECC (NSECC, 2024). Arsenic, uranium, and radon are further discussed in Chapter 13 (Socio-Economic Environment) in relation to human health.

6.3 Effects Assessment

6.3.1 Potential Effects and Mitigation

Direct and indirect effects of the Project on the geophysical environment could occur through several interconnected pathways. During construction, there will be blasting in some locations and fill brought to the PDA for developing access roads and turbine pads, which could affect ground stability and possibly future land use. Infrastructure at a depth

greater than 1 mbgs, such as turbine foundations, will remain after decommissioning and landowners will have the option to retain access roads. Project activities can affect the geophysical environment as indicated in Table 6.2; these potential effects do not consider the implementation of mitigation measures described herein.

Table 6.2 Potential Environmental Effects of the Project on the Geophysical Environment

Project Activity	Potential Environmental Effects			
	Bedrock and Soils		Groundwater	
	Change in Quantity	Change in Quality	Change in Quantity	Change in Quality
Construction				
Site Preparation	X	X	-	X
Access Roads Construction and Modifications	X	X	X	X
Material and Equipment Delivery and Storage	-	-	-	-
Infrastructure Installation	X	X	X	X
Restoration of Temporary Areas	-	-	-	-
Testing and Commissioning	-	-	-	-
Operation and Maintenance				
Turbine Operation and Maintenance	-	-	-	-
Road Maintenance	X	-	-	X
Power Line and Substation Maintenance	-	-	-	-
Vegetation Management	-	X	-	X
Safety and Security	-	-	-	-
Decommissioning				
Removal of Infrastructure and Site Restoration	-	X	-	X

X = Potential Interaction
- = No Interaction

There are specific activities that could impact geophysical characteristics.

- Site preparation as well as operation and maintenance that includes vegetation clearing could impact nutrient loading to groundwater and remove or compact native soil. Increases in soil erosion rates could also occur.
- Site preparations involving earthworks and drainage features could alter groundwater recharge pathways and impact groundwater recharge rates.
- Construction and upgrades of access roads will introduce new material and cause soil compaction.

- Construction of turbine foundation footings that involve blasting could disturb established bedrock fracture networks that affect groundwater quantity (i.e., flow paths) and/or groundwater quality (i.e., creation and transmission of turbidity in large fractures, exposure of leachable elements such as arsenic or uranium).
- Temporary dewatering requirements during construction could lower groundwater table elevations in the areas surrounding the foundations.
- Decommissioning of infrastructure would involve heavy machinery and earthworks, which could impact the soil quality.

6.3.1.1 Change in Soil Quantity and Quality

Earthworks activities, such as constructing turbine foundations and new access roads, and/or improving existing access roads, will result in clearing vegetation and exposing soils in the immediate area of the PDA that will affect the characteristics of the site's terrain. Sloping in some areas may affect drainage features and will require ditching and/or installation of berms and culverts. Pathways and effects to surface water resources are described further in Chapter 7 (Aquatic Environment) and Chapter 9 (Wetlands).

Activities associated with earthworks as well as the use of vehicles and heavy equipment will occur during the lifetime of the Project, particularly during construction, and result in changes in ground stability where granular fill is used for building access roads, foundations, and temporary pads for cranes. During decommissioning, landowners may opt to retain access roads, which will continue to be vulnerable to erosion.

Access road materials generally require gravel consisting of stone, sand, and fine particles with a binding characteristic to form a smooth, firm surface that can withstand weight and environmental effects. Appendix F of the Generic EPP used by the NSDPW recommends that Gravel Type II be applied at a thickness of 125 mm, covered by Gravel Type I to a thickness of 75 mm before shaping, compacting, and crowning access roads (NSDPW, 2005). The combination of adding fill to some portions of the PDA while excavating in others will affect soil quantity in those locations.

Below depths of 1 m, portions of foundations may remain after decommissioning. Compacted areas, blasted bedrock, and buried turbine foundations will change the characteristics of the underlying soil and ground stability that could affect land use opportunities after decommissioning.

Potential Project effects on soil quantity can be effectively mitigated through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on soil quantity will be further detailed in a Project-specific EPP to be implemented prior to and during construction.

- Existing roads, harvested areas, and other previously altered areas will be used to the extent practicable.
- Areas of clearing and grubbing will be limited to that needed to construct and operate the Project.

- Where practicable, roots of trees and shrubs will be left intact to prevent soil erosion and dust generation.
- Disturbed areas will be stabilized and revegetated as required upon completion of work, and re-instated to the original pre-disturbed condition.
- Where possible, topsoil and subsurface excavated material will be stored separately to prevent mixing and will be reused and/or disposed of separately following applicable regulations and guidelines such as the CCME Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health (CCME, 2007) and parameter-specific updates.
- An ESC Plan will be developed and implemented to mitigate soil erosion and sediment transport.

Soil quality in the PDA and LAA is also at risk of being adversely affected. Dust and gravel produced during construction as well as operation and maintenance of roadways and foundations could settle into undisturbed areas of the LAA, impacting soil quality at the surface. Vegetation management including vegetation clearing would also impact soil quality as destroyed vegetation decays at a rapid rate into the soil, producing elevated concentrations of nutrients such as dissolved organic carbon, nitrate, and ammonia.

Potential Project effects on soil quality can be effectively mitigated through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on soil quality will be further detailed in a Project-specific EPP to be implemented prior to and during construction.

- Topsoil and subsurface excavated material will be stored separately to prevent mixing and will be reused and/or disposed of separately following applicable regulations and guidelines.
- Run-off from stockpiled soil and organic debris will be controlled or minimized using tarps.
- Disturbed areas will be visually monitored to assess if compaction has occurred and will be restored.
- Fill brought to site for access road maintenance will meet CCME Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health (CCME, 2007) and parameter-specific updates appropriate for the site's land use.
- Fuel and hazardous materials spill response will be included in a Contingency Plan to be developed as part of the Project-specific EPP.

6.3.1.2 Change in Groundwater Quantity and Quality

Groundwater is recharged from the surface via infiltration through porous rock, unconsolidated sediment, and/or bedrock fractures. Any alteration in these flow pathways resulting from Project activities could impact groundwater recharge volumes.

Construction and decommissioning activities have the potential to impact both groundwater quantity and quality. Blasting for construction can cause changes in established bedrock fracture networks, resulting in changes to flow to wells in the LAA.

These changes could either partially or fully seal fractures that previously provided water to nearby wells. Alternatively, blasting could open new, or expand, existing fracture networks, thereby providing more, or differently sourced, water to nearby wells. Blasting may be necessary only in select locations, to be determined during the final engineering design, so only a small fraction, if any, of the identified wells will be within 800 m of a blast, and vibrations will weaken through distance from the blasting point.

General earthworks, including turbine foundation construction and roadwork, could change infiltration rates and thus groundwater recharge across the PDA, as surfaces and permeability are altered. This could have an impact on the volume of water recharging the water-bearing fractures, and thereby water availability for nearby wells. However, planned access road and foundation construction accounts for a small percentage of the total surface area of the LAA. Furthermore, surfaces made less permeable during construction, such as roadways, will drain to constructed ditches or undisturbed areas of the LAA, which would continue to infiltrate within adjacent undisturbed areas; therefore, overall recharge rates are not expected to change appreciably.

If shallow water tables are encountered during blasting and excavation at foundation locations, temporary dewatering would be needed to allow the curing of the concrete. This has the potential to temporarily impact groundwater table elevations and groundwater flow pathways immediately surrounding the excavation, which could lower water levels in the area surrounding excavations. However, well depths in the LAA are typically much deeper (median of 50.2 m), the shallowest drilled well being 16.8m, than the depth of the turbine foundations (3 to 7 m). While the NSWLDB indicates that there are wells within the LAA, the closest well to any turbine foundation is approximately 1.2 km away (Figure 6.1, Appendix A), which is far beyond the extent of any drawdown caused by shallow dewatering.

The apparent well yield data are consistent with expectations for the rock types in the PDA and suggest that water management requirements would be greatest in areas of glaciofluvial sediment, if excavation is required. Propagation of any associated drawdown effects would extend furthest from the PDA in glaciofluvial sediments, but the magnitude of drawdown would be expected to be relatively minor. Drawdown in the sedimentary, metamorphic, and igneous rock would be the most significant, but the distance of propagation in this type of rock tends to be limited due to generally poorly developed and connected fracture networks.

The following key measures to mitigate the potential effects of the Project on groundwater quantity will be further detailed in a Project-specific EPP to be implemented prior to and during construction.

- Blasting activities will be limited to that which is necessary.
- Where blasting is necessary, it will be undertaken in accordance with applicable regulatory requirements and conducted only by a qualified blasting professional.

- Pre-blasting well water surveys will be completed for wells within 800 m of the activity. Bedrock monitoring wells installed during geotechnical investigations will be used to detect changes in water quantity.
- If demonstrable changes in groundwater quantity to a well are detected, an alternative water supply, of equal or better quantity than that impacted, will be provided to the landowner.

While wells are not likely to be affected by turbine construction and decommissioning, blasting for access road construction and upgrades could have potential adverse impacts on groundwater quality. Blasting during construction can expose uranium or arsenic-bearing bedrock to groundwater (i.e., new fracture development) or surface water (following excavation), which could introduce these contaminants to the groundwater system and impact nearby wells through increased turbidity. Excavated rock piles exposed to rainfall have the potential to leach contaminants from the rock into surface water, and subsequently into groundwater. Blasting also has the potential to open new fracture networks that connect to contamination sources such as surface water bodies, which could transmit sediment to nearby wells, but the risk is relatively low. Finally, byproducts of blasting such as ammonium nitrate and sediment can enter the groundwater system and affect nearby wells. There are eight wells within 1 km of the PDA, and four of these are within 800 m of proposed access roads, and could require pre-blast surveys, depending on where blasting is required.

Clearing of vegetation during both the construction and operation and maintenance phases could also deteriorate groundwater quality. Vegetation clearing has the potential to temporarily enhance the nutrient loading (as cleared vegetation decomposes over time) to surface water and groundwater systems, impacting well water quality. Herbicides can leach into the groundwater.

Potential Project effects on groundwater quality can be effectively mitigated through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on groundwater quality will be further detailed in a Project-specific EPP to be implemented prior to construction.

- Blasting activities will be limited to that which is necessary.
- Where blasting is necessary, it will be undertaken in accordance with applicable regulatory requirements and conducted only by a qualified blasting professional.
- Pre-blasting well water surveys will be completed for wells within 800 m of the activity. Monitoring wells installed during geotechnical investigations will be used to detect changes in water quality.
- If demonstrable changes in groundwater quality to a well are detected, an alternative water supply, of equal or better quality than that impacted, will be provided to the landowner.
- The Proponent will consult NSECC to determine whether rock samples from areas to be excavated require further analysis for sulphide-bearing materials per the Sulfide Bearing Material Disposal Regulations NS. Reg. 57/1995. The geotechnical investigation

that includes sulphide analysis is pending. Response and mitigation measures to control acid rock exposure will be described in the Project-specific EPP.
- Site-specific measures will be developed to restore and maintain infiltration areas and receiving water bodies in the Project-specific EPP.
- Fuel and hazardous materials spill response will be included in a Contingency Plan to be developed as part of the Project-specific EPP.

6.3.2 Residual Effects

6.3.2.1 Change in Soil Quantity

Changes in soil quantity directly within the PDA where access road and turbine foundation construction takes place cannot be avoided. The magnitude of these effects will be moderate, and the geographic extent of the impact immediate. These changes will permanently impact soil quantity (compaction, volume) as soil will be removed and roads and foundations are established. Therefore, the duration is expected to be long-term and the frequency continuous, as the access roads will be in place for the duration of the operation of the wind facility. Furthermore, the portions of the foundation slabs at 1 m and below will remain in place; as such, the impact to these areas is irreversible. The timing is considered to have a low effect on this VEC.

Given that the PDA represents a conservative estimate of the Project footprint and that actual ground disturbance is expected to occur within a smaller area, residual effects on soil quantity are predicted to be not significant.

6.3.2.2 Change in Soil Quality

Changes in soil quality directly within the PDA where road building and foundation construction take place cannot be avoided. The magnitude of these effects is expected to be minor, and the geographic extent of the impact immediate, limited to the PDA. These changes will temporarily impact soil quality (pouring concrete and gravel, compacting existing soil) as soil will be removed and roads and foundations established. Therefore, the duration is medium-term and the frequency continuous, as the access roads will be in place for the duration of the operation of the wind facility, with some compacted areas being restored following Project construction. The timing is considered to have a low effect on this VEC.

Given that the PDA represents a conservative estimate of the Project footprint and that actual ground disturbance is expected to occur within a smaller area, the overall residual effects on soil quality are predicted to be not significant.

6.3.2.3 Change in Groundwater Quantity

Changes in groundwater quantity resulting from dewatering, should it be necessary, will result in temporary changes in the groundwater flow system, however the magnitude of this effect is expected to be minor. The geographic extent of this effect is considered local,

extending beyond the PDA but not beyond the LAA. Once the foundations are poured, site dewatering will cease, and the groundwater table will be allowed to recharge.

Changes in groundwater quantity resulting from blasting changing fracture occurrence or orientation could result in changes in the groundwater flow system; however, the magnitude of this effect is expected to be minor. The geographic extent of this effect is considered local, extending beyond the PDA but not beyond the LAA. The timing of these impacts could be high, if groundwater flow pathways to wells were sealed off during the summer, when groundwater tables are typically lower. In the event where a water bearing fracture was sealed, this would be irreversible with continuous, long-term impacts on groundwater flow.

Neither of these changes are likely to affect private wells due to their distance from the turbine pads (at least 1.2 km), and their significantly deeper depths; public records indicate a median domestic well has a depth of 50.2 m and a median casing depth of 15.8 m compared to the relatively shallow turbine foundation depth (maximum 7 m). If proven adverse effects related to Project activities occur after mitigation, the Proponent will provide an alternative water supply of equal or better quantity and quality, which may include well replacement where appropriate.

Based on the likely limited extent of any potential impacts on groundwater, and the mitigation measures related to blasting (pre-blast surveys), the impact on groundwater quantity is predicted to be not significant.

6.3.2.4 Groundwater Quality

Similar to the effects on groundwater quantity, changes in groundwater quality resulting from blasting changing fracture occurrence or orientation could result in changes in the groundwater flow system and carry particulates; however, the magnitude of this effect is expected to be minor. The geographic extent of this effect is considered local, extending beyond the PDA but not beyond the LAA. Long-term, continuous, and irreversible impacts could result from this effect. While changes could theoretically be long-term if fracture networks were altered, the likelihood of such changes occurring and affecting groundwater receptors is low.

Blasting is unlikely to affect private wells due to their distance from the turbine pads (at least 1.2 km) and their significantly deeper depths; public records indicate a median domestic well has a depth of 50.2 m and a median casing depth of 15.8 m compared to the relatively shallow turbine foundation depth (maximum 7 m). Blasting may occur at some sections of access roads but changes in water quality are not expected.

Based on the likely limited extent of any potential impacts on groundwater, and the mitigation measures related to blasting (pre-blast surveys), the impact on groundwater quality is predicted to be not significant.

6.4 Monitoring

Construction monitors will report issues observed during earthworks; operation and maintenance staff will report signs of subsidence and erosion. A pre-blast well water survey to be conducted on domestic water wells located within 800 m of a blast site will be part of the Project-specific EPP and Blasting Management Plan, as required by the Blasting Safety Regulations (Nova Scotia, 2011). There is no continuous groundwater monitoring proposed for this Project.

7 Aquatic Environment

7.1 Overview

The assessment of the potential impacts of the Project on the aquatic environment includes the aquatic ecosystem in the watercourses and waterbodies that interact with the Project. Watercourses and waterbodies (e.g., ponds and lakes) support essential ecological and socio-economic functions that are connected to flora (Chapter 8: Flora), wetlands (Chapter 9: Wetlands), and wildlife (Chapter 10: Terrestrial Wildlife and Chapter 12: Birds).

This section of the assessment document describes the evaluation of the potential impacts of the Project on the aquatic environment, with emphasis on fish and fish habitat within watercourses and waterbodies and the associated riparian areas that interact with the Project. This document presents mitigation measures, along with construction and operational best management practices, to prevent or minimize effects from potential Project impacts. The information collected for the assessment has been used to provide input into Project design as it pertains to the interaction of the Project with the aquatic environment (i.e., watercourses, waterbodies, and fish habitat).

The Project has the potential to affect the aquatic environment both directly through changes to fish habitat during construction due to installation of watercourse crossings, or through changes in water quality during construction, operation and maintenance, and/or decommission phases from sedimentation. The Project also has the potential to indirectly affect the aquatic environment through increased use of Project roads and riparian habitat loss, fragmentation, and/or modification during the Project phases. In addition, aquatic species (i.e., fish) may exhibit behavioural changes and avoid habitats subject to disturbance or changes in water or habitat quality, during all phases of the Project, depending on the fish species and level of tolerance or preconditioned exposure to disturbance.

The Project design layout has been modified during Project development by implementing changes to access roads and facility placement to avoid or reduce the potential for adverse environmental effects on multiple VECs, including the aquatic environment. The LAA contains a number of named watercourses; however, only three large and 15 small permanent watercourses are intersected by the PDA. There are no protected areas in the

PDA and no identified critical habitat for aquatic SAR. Additionally, the road network maximizes use of existing roads and minimizes new clearing as much as practical.

As discussed in the following subsections, the Project avoids impacts on the aquatic environment through Project design, implementation of industry standard mitigation measures, and timing of in-water construction works. In-water construction is planned to avoid important areas of fish habitat (e.g., spawning, overwintering) and be conducted outside of key periods of fish life cycles by planning for work to occur within the least risk window for instream construction as set out by DFO (June 1 to September 30; DFO 2026a). Additionally, the Proponent will mitigate effects and protect the aquatic environment by acquiring required environmental permits and approvals for in-water works, implementation of erosion and sediment control (ESC) measures at watercourse crossing sites, isolating work sites to work in the dry and conducting fish salvages to relocate captured fish from the work area, and restoring sites to pre-construction conditions, when possible, after in-water works (e.g., watercourse crossings) have been completed. DFO will assess the potential for harmful alteration, disruption, or destruction of fish habitat (HADD) during the permitting phase of the Project and will determine the need for offsetting to counterbalance potential losses in fish habitat from the Project.

Potential effects, mitigation measures, and residual impacts on the aquatic environment as a result of the Project are outlined in this Chapter. Project and site-specific mitigation measures will be further developed in a Project-specific EPP prior to construction to minimize adverse effects.

7.1.1 Regulatory Context

The aquatic environment assessment has considered relevant provincial and federal legislation and regulations, including:

- *Fisheries Act*
- SARA
- *Canadian Navigable Waters Act*
- *Canadian Environmental Protection Act*
- NSESA
- Nova Scotia *Environment Act*

7.1.2 Boundaries

The PDA represents the Project Footprint and the maximum limit of potential direct physical disturbance associated with the Project. The final Project Footprint will occupy only a portion of the PDA. The PDA represents the boundaries within which the Project may occur. The LAA and RAA boundaries are defined as follows for the aquatic environment VEC.

- For this assessment, the LAA for the aquatic environment has been set as 100 m upstream and 100 m downstream from the point of interaction of the Project with a watercourse (e.g., crossing location). This is based on the path of the river and not a

straight-line distance. The LAA is based on the area where the extent of the effects from Project activities are likely to be detected and is based on the observed local conditions, assessed habitat, and typical size and flows in watercourses within the PDA.

- The RAA for the aquatic environment is set as the boundaries of the secondary watersheds in the PDA, which includes River Hebert, Diligent River, and Ramshead River watersheds (Figure 7.1, Appendix A). The determination of the RAA is based on the physical and biological conditions present and the type and location of other past, present, or reasonably foreseeable future projects or activities that have previously, or may be, implemented. The RAA is used to inform the cumulative effects assessment resulting from activities occurring within the RAA (Chapter 15: Consideration of Cumulative Effects).

7.2 Assessment Methodology

The aquatic environment was assessed for presence of watercourses or waterbodies within the PDA, along with the potential for fish and fish habitat to be present in any identified watercourse or waterbody. Specifically, the assessment was used to evaluate the type and quality of fish habitat present in identified watercourses and the potential fish species supported.

The assessment includes a review of existing mapping data and available, relevant literature and previous environmental assessment information. The data collected during the Aquatic Environment Assessment was used to evaluate the impact of the Project on the identified aquatic environment. The description of the existing aquatic environment was based on data collected during field assessment and through the following databases and resources:

- Provincially mapped watercourses (NS)
- Nova Scotia Topographic Mapping, LiDAR Data and Derived Elevation Products, Wetland, Waterbody, and Land Cover Mapping
- iNaturalist.ca Observation Database (2026)
- CBCL Predicted Watercourse Analysis
- Atlantic Canada Conservation Data Centre (AC CDC) Data Report (2026)
- Critical Habitat for Species at Risk National Dataset – Canada (ECCC 2026)
- DFO Aquatic SAR Database (DFO 2025a)

Known and predicted watercourses (i.e., GIS modelled and provincially mapped) within the LAA were mapped prior to the field assessment. The aquatic environment assessment was completed to confirm predicted or existing watercourses, identify unmapped watercourses within the PDA, document existing biophysical conditions within the watercourses, and evaluate each identified watercourse for the potential to support fish. The predicted and known watercourses, along with assessment locations from the field program in the PDA are provided in Figures 7.1 and 7.2 (Appendix A).

Biophysical features in the LAA were mapped using available geospatial data. The aquatic environment assessment focussed on determining the presence of predicted watercourses (i.e., GIS modelled and provincially mapped) and the evaluation of fish habitat watercourses in the PDA. A total of 54 watercourses were assessed in the PDA.

7.2.1 Aquatic Habitat Assessment

Detailed fish and fish habitat assessments, including habitat biophysical measurements, and water quality measurements, were completed from September 28 to October 16, 2026. Data were collected by an experienced environmental professional using a handheld device (i.e., Apple iPad) with a specialized assessment data template developed in the ArcGIS Survey123 application. Habitat assessments followed methods and standards adapted from the Nova Scotia *Fish Habitat Suitability Assessment: A Field Methods Manual* (NSSA, 2018), and those used in the *Reconnaissance (1:20 000) Fish and Fish Habitat Inventory: Standards and Procedures* (RISC, 2001) and *Reconnaissance (1:20 000) Fish and Fish Habitat Inventory: Site Card Field Guide* (RISC, 2008). These included the assessment of the following parameters and characteristics at each assessed site:

- Watercourse classification (permanent, intermittent, ephemeral, no channel)
- Watercourse stage (high, mid, low, dry, frozen)
- Channel biophysical features (width: channel, wetted, bankfull; depth: channel, bankfull, pool; bankfull height, gradient/slope, barriers to fish movement)
- Geomorphologic features (channel morphology, confinement, pattern, bank features)
- Fish habitat characteristics (channel substrates, instream cover types and amount)
- Fish habitat type and quality (spawning, rearing, migration, overwintering, foraging; None through Good)
- Velocity (metres per second)
- Riparian features (vegetation stage, vegetation type, crown closure)
- Human disturbance indicators (culverts, erosion)
- Water quality (In situ: dissolved oxygen, pH, temperature, turbidity (visual), salinity)

Habitat assessments were carried out at suitable locations on identified watercourses. A minimum of one transect was conducted at each identified watercourse, with permanent watercourses being assessed above and below any culverts, typically at 100 m upstream or downstream of the culvert, or at the intersection with other watercourses.

Watercourses assessed in the field were given a classification based on biophysical characteristics, specifically channel width, stream bed substrates, and flow presence. Watercourses were classified as per the definitions provided in Table 7.1, below.

Table 7.1 Description of Watercourse Types

Watercourse Type	Channel Width	Description
Large Permanent	Greater than 5 m	• Defined channels with scour • Defined beds and banks • Year-round flow • Fish habitat
Small Permanent	Less than 5 m	• Defined channel with scour • Defined beds and banks • Year-round flow • Fish habitat
Intermittent	No specific size but typically, less than 2 m	• Defined channels with scour • Defined beds and banks • Seasonal water flows (e.g., spring, fall) • May be seasonally fish-bearing • Potential for fish habitat
Ephemeral	Typically, less than 1 m; channel not always defined	• Signs of infrequent flow; minor scour • No defined bed or banks • Typically resulting from rain events or snowmelt • Signs of surface flow or flooding • Roadside ditches • Typically not fish-bearing • Typically not fish habitat
No Channel	N/A	• No defined channel or scour • Potential subsurface flow • Potential mapping error • Not fish-bearing • Not fish habitat

Channel substrates were assessed during the habitat assessments based on the size classification presented in Bain and Stevenson (1999), Cummins (1962), Hooper and Hubbart (2016), and the Wentworth Scale (Wentworth, 1922), as per Table 7.2.

Table 7.2 Substrate sizes and classes

Substrate Type	Size
Fines	< 2 mm
Silt and Clay	< 0.06 mm
Sand	0.06 to 2 mm
Small Gravel (e.g., pebbles)	2 to 16 mm
Large Gravel (e.g., pebbles)	16 to 64 mm
Cobble	64 to 256 mm
Boulder	> 256 mm
Bedrock	Continuous slab (> 2m diameter)

Fish habitat quality was determined through evaluation of existing conditions present in the assessed watercourses and the suitability of those conditions for the life stages of the fish species likely to be present in the watercourse. Because fish species presence in the LAA and PDA is uncertain, salmonid habitat requirements were used as the benchmark for habitat assessment. Salmonids were selected as a conservative indicator group because they generally have more specific, and studied, habitat requirements and lower tolerance to environmental disturbance than many other freshwater fish species, and their habitat requirements are well documented in the available literature.

An overall fish habitat quality rating was given to each identified watercourse based on the key fish habitat types assessed; rearing, spawning, foraging, migration, and overwintering. Habitat quality was ranked on a scale of 'None' to 'Good'. A ranking of 'None' indicated that no fish habitat was present in the assessed area or the habitat present was not suitable for the fish species expected to use the watercourse. A habitat quality ranking of 'Good' was given when multiple types of fish habitat were present in the assessed watercourse and would be expected to be used by the fish species present for the assessed purposes (e.g., spawning). Rankings were based on the presence of key habitat features or physical parameters (e.g., substrates, cover, flow) and subject to interpretation by the assessor (i.e., environmental professional) based on experience and previously reviewed published literature or guidance. Specifically, a rapid evaluation of the presence and quality of spawning, rearing, migration, foraging, and overwintering habitats were based on the following:

- Spawning habitat quality—water flow and depth, presence of groundwater upwelling, and substrate size, embeddedness, and composition (i.e., large and small gravels)
- Rearing habitat quality—based on cover abundance and type, water flow, and habitat connectivity
- Migration—based on connectivity of habitat to upstream and/or downstream areas, water depth, and waterflow
- Foraging—based on substrate size and quality for invertebrate presence, riparian and overhanging vegetation, and observed invertebrates
- Overwintering habitat quality—based on the presence of deep pools (50 centimetres (cm) or greater), adequate water quality, and the potential for year-round flow

Habitat data collected provide a snapshot of existing conditions at the time of the assessment. The collected data does not necessarily represent aquatic habitat conditions at all times of the year; however, for the purpose of the assessment we have used the conditions observed as a representation of the typical conditions at that time of year.

Fish habitat type and quality determined during the field assessments were typically based on the most sensitive species found in the region, which for the Project was salmonids (e.g., Brook Trout), unless otherwise indicated. Where habitat characteristics were suitable for multiple species, the rating was based on the species most likely to use the area based on known species in the region.

Fish sampling was not conducted as part of the field program. Fish species presence and habitat use were evaluated based on habitat assessments, watershed connectivity, available background information, and incidental observations of fish made during surveys.

7.2.2 Water Quality Analysis

In situ surface water quality measurements were taken with a handheld multimeter (YSI Professional Plus) where suitable conditions were present (e.g., adequate water depth and flow). Measurements were taken where water depth was greater than approximately five centimetres (cm). Water quality parameters measured for this Project were:

- Temperature in degrees Celsius (°C)
- pH
- Conductivity in micro-siemens per cm (µS / cm)
- Dissolved Oxygen (mg/L) and percent saturation (%)
- Salinity (parts per thousand (ppt))

Turbidity was qualitatively recorded by visual assessment of water clarity and recorded as clear, low, moderate, or turbid.

Water quality parameters (i.e., temperature, pH, and dissolved oxygen) measured in the field were compared to the CCME water quality guidelines[1] to support fish habitat ratings as presented in Table 7.3.

Data collected for this Project represent a snapshot view of the water quality in the watercourse at the time of assessment. The field habitat assessment and water quality program for the Project was completed from September 28 to October 16, 2026.

Table 7.3 Water Quality Limits for the Protection of Aquatic Life and Salmonids

Water Quality Parameter	CCME Water Quality Guideline for the Protection of Aquatic Life (Freshwater) (CCME, 2017)	Brook Trout Tolerance and Optimum Range (Raleigh, 1982)
pH	6.5 to 9.0	Tolerance: 4.0 to 9.5 Optimal: 6.5 to 8.0
Temperature (°C)	N/A	Tolerance: 0.5 to 22 Optimal: 11.0 to 16.0
Dissolved Oxygen (mg/L)	**Cold water: between 6.5 and 9.5	Tolerance: ≥ 5.0 Optimal: ≥ 7.0

** Depending on the life stage

[1] Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines for the Protection of Aquatic Life (CCME, 2017) and Brook Trout tolerance and optimal ranges for water quality (Raleigh, 1982)

7.2.3 Aquatic Invertebrates

Aquatic invertebrate presence was assessed within watercourses with suitable substrates and conditions (e.g., gravel or larger substrates and presence of water) during the field assessment. At each assessment location, at least four large gravel or cobble-sized rocks (if present) were selected, flipped over, and observed for the presence of aquatic invertebrates, casings, or larvae. Visual observations of invertebrates on the water surface or in the watercourse were also recorded as part of the assessment. Presence of aquatic invertebrates was recorded using a density scale of percent of substrates examined with invertebrates. The scale used was 'None' (No invertebrates observed), 'Low' (between 1 and 25%), 'Moderate' (25 to 50%), and 'High' (greater than 50 %). Presence and density of aquatic invertebrates observed was used to support the fish habitat quality assessment rankings.

7.3 Existing Environmental Conditions

7.3.1 Hydrology / Watersheds

The Project is located within an upland headwater environment that spans portions of the River Hebert, Diligent River, and Ramshead River secondary watersheds, which is part of the Cumberland region of Nova Scotia and is in the Parrsboro Shore and Cumberland Hills ecodistricts. Surface drainage is conveyed through a network of small streams, ponds, wetlands, and watercourses that originate within and adjacent to the PDA and flow toward surrounding river systems. Watersheds in the PDA drain to the Bay of Fundy, specifically to the Minas Basin and Cumberland Basin.

A total of 78 unique mapped or predicted watercourses intersect the PDA, the majority of which are small headwater streams and unnamed tributaries. The named watercourses within the PDA include Hannahs Brook, Taggart Brook, Fullerton Brook, Broad Brook, Jones Brook, Halfway River, and River Hebert. These watercourses form part of the drainage networks associated with the River Hebert, Diligent River, Parrsboro River, and Ramshead River watersheds and receive flow from numerous smaller tributaries originating within or adjacent to the PDA.

A total of 54 watercourses were assessed in the PDA for watercourse presence, watercourse type, fish habitat type and quality, and fish species presence, during the field assessment from September 28 to October 16, 2026. The majority of watercourses assessed in the PDA were classified as ephemeral, intermittent, or small permanent. Most of the ephemeral channels assessed were hillside drainage channels or steep, shallow drainages near headwater sources. Permanent watercourses assessed were generally of good condition and health regarding aquatic habitat, with a few small permanent watercourses having minimal flows due to shallow water at the time of assessment. The breakdown of the watercourses assessed in the PDA, by watercourse type, is presented in Table 7.4.

Table 7.4 Watercourses Assessed in the PDA, by Watercourse Type.

Watercourse Type	Number of Watercourses Assessed
Large Permanent	3
Small Permanent	14
Intermittent	12
Ephemeral	19
No Channel	6

Overall, the watercourses in the PDA were generally small ephemeral and intermittent drainages that originated on steep slopes, with minimal channelization, sections of no flow, subsurface flows, vegetated channel or undefined channel and barriers to fish passage. These drainages flowed into shallow small permanent watercourses located in the gullies at the bottom of the slopes. Flows were generally north-northeast in the River Hebert watershed, and southward in the Diligent River and Ramshead River watersheds. Flows in each of the watersheds came off the slopes, into the small permanent watercourses, then into large permanent named watercourses, which either directly, or eventually, drained southward into the Bay of Fundy. Flows were generally low in the PDA, with signs of higher, typical water levels visible on the banks of the watercourses.

Overall, watercourses with channels present were on average 1.98 m wide, and those that contained water had an average wetted width of 2.04 m and an average water depth of 13 cm; however, many of the assessed watercourses did not have water present at the time of assessment. The deepest pool measured near a crossing in the PDA was over 70 cm deep, while the average pool depth was 30 cm. Only five watercourses in the PDA had pools over 50 cm deep, which could be suitable overwintering fish habitat. The large permanent watercourses present in the PDA were on average 6.0 m wide, with an average water depth of approximately 42 cm, and an average flow velocity of approximately 0.36 metres per second (m/s).

7.3.2 Fish and Fish Habitat

7.3.2.1 Fish Habitat

Substrates

Substrate requirements for fish habitat uses vary between fish species. Substrate size/type, depth, and location in the watercourse are important for determining fish habitat function and quality. The composition of substrates present in the watercourses is used to evaluate aquatic invertebrate presence, as well as fish habitat quality, in combination with water quality and other biophysical measurements. Substrates at the assessed locations were evaluated for the types of substrate present, based on size class, and the dominant type present. The relative composition of substrates (i.e., percentage), were determined for each watercourse type and for each substrate type/size class present, based on the data

collected at the assessed locations. The dominant and sub-dominant (second most common) substrate types present for each watercourse type are described in this section.

A total of 54 watercourses in the PDA were assessed for substrate composition. Cobble and gravel were the most common dominant and sub-dominant substrates present in the assessed watercourses. Either cobble or gravel were the dominant substrate type in 42 of the 54 watercourses, while only five assessed watercourses had fines as the dominant substrate. One of the five watercourses with fines as the dominant substrate in the PDA was a large permanent watercourse (WC-83 or River Hebert). River Hebert, at the assessed location, was a slow moving, meandering watercourse in the middle of a large wetland. Fines were the most common substrates in intermittent and ephemeral watercourses. A summary of the dominant and sub-dominant substrates by watercourse type across the assessed watercourses is presented in Table 7.5.

Table 7.5 Watercourse Types and Dominant and Sub-Dominant Substrate Types in Assessed Watercourses

Watercourse Type	Dominant Substrate Type	Sub-Dominant Substrate Type
Large Permanent	Cobble	Gravel
Small Permanent	Gravel	Cobble
Intermittent	Fines	Cobble
Ephemeral	Fines	N/A
No Channel	N/A	N/A

Cover

Cover type and relative abundance of each identified cover type are part of the characteristics used to determine the suitability of available habitat for various life stages of fish. Cover is important for fish to avoid predation from aquatic, terrestrial, and avian predators. Cover suitable for fish was present in 35 of the 54 watercourses assessed. Small woody debris and instream vegetation were the most common dominant cover types observed. These cover types were dominant in just over half of the watercourses assessed where cover was present, at 10 and eight watercourses, respectively. Boulder, overhanging vegetation, and deep pool were the dominant cover type in five watercourses each. Large woody debris and uprooted tree mass were not identified as the dominant cover type in any watercourse and neither cover type accounted for more than 25% of the cover identified in any individual watercourse. A summary of dominant cover types identified at watercourse crossing locations in the PDA is presented in Table 7.6. Dominant cover types across all assessment locations, where cover was present, are presented numerically and as percentages of the total in Table 7.7.

Table 7.6 Dominant Cover Types in the PDA by Crossing Assessment Location Count

WC Type	Boulder	Overhanging Vegetation	Undercut Banks	Large Woody Debris	Small Woody Debris	Instream Vegetation Cover	Uprooted Tree / Root Mass	Deep Pool
Large Permanent	0	0	0	0	0	3	0	0
Small Permanent*	4	3	2	0	6	4	0	4
Intermittent	1	2	0	0	4	1	0	0
Ephemeral	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
No Channel	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

* Note: One Small Permanent watercourse crossing was co-dominant boulder and instream vegetation and counted twice.

Table 7.7 Dominant Cover in All Assessed Watercourse Locations in the PDA by Cover Type

Cover Type	Dominant Cover Type (N)	Dominant Cover Type (%)
Boulder	5	14.3%
Overhanging Vegetation	5	14.3%
Undercut Banks	2	5.7%
Large Woody Debris	0	0%
Small Woody Debris	10	28.6%
Instream Vegetation	8	22.9%
Uprooted Tree/Root Mass	0	0%
Deep Pool	5	14.3%
TOTALS	35	100%

Note: One Small Permanent assessment location was equally dominant across four cover types, all are accounted for in this table.

Habitat Quality

Fish habitat quality in watercourses in the PDA was evaluated for overall quality, as well as the presence and quality of five habitat types: spawning, rearing, foraging, migration, and overwintering. Habitat quality was based on watercourse type, type and abundance of substrates, cover habitat, and water quality. Quality habitat characteristics for salmonid species include adequate depth and flow, water quality parameters within optimal or tolerant ranges, resting pools, overwintering pools (if greater than 50 cm), adequate cover, gravel-dominant substrate for spawning, minimal siltation, and an abundance of invertebrates for foraging. Of the 54 watercourse crossing locations assessed for fish habitat quality in the PDA, 13 were ranked 'Good' or 'Moderate-Good' for overall habitat quality. Each of these watercourses were small or large permanent watercourses and were found in all three of the secondary watersheds that interact with the PDA. Thirty-five watercourses had 'Poor', 'Poor Moderate', or no fish habitat (i.e., 'None'), of which 31 were ephemeral or intermittent watercourses. Four small permanent watercourses, spread

throughout the three secondary watersheds, had overall habitat ratings of 'Poor Moderate' or 'Poor'. Generally, each of these small permanent watercourses with 'Poor' habitat were shallow, with minimal cover, and no suitable spawning or overwintering habitat present.

Foraging habitat was the most common habitat type present that was ranked as 'Good' at the crossing locations, with 13 watercourses assessed as having 'Good' foraging habitat. Rearing habitat was the second most common habitat type to be ranked 'Good' in 11 watercourses, followed by migration habitat (10 watercourses), and spawning habitat (six watercourses). Overwintering habitat was generally 'Poor' or absent in the assessed watercourses, with only two locations, both large permanent channels (WC-83 and WC-01), having 'Good' overwintering habitat. Ephemeral and intermittent watercourses did not have habitat that was better than 'Moderate' (foraging and migration) in any assessed watercourse. Generally, only the permanent watercourses contained habitat suitable for fish use.

A summary of the habitat quality evaluation by habitat type for the assessed crossing locations in the PDA is provided in Appendix E.

Fish Passage Barriers

As part of the fish habitat assessment program, fish passage barriers were identified when encountered. The most common barriers encountered during the assessment program were watercourses with a loss of channelization, sections of subsurface flow, cascades, and waterfalls (largest height observed was 1.1 m). An active beaver dam is present on one of the small permanent watercourses (WC-38), spanning across the entire main channel and creating a flooded complex. Beaver dams are typically considered a partial barrier to passage rather than full, as such, fish were observed upstream of the beaver dam in this watercourse. A total of 15 culvert crossings were identified to intersect roads in the PDA, with one location containing double culvert pipes (one damaged and blocked, the other clear and in good condition). A damaged and blocked culvert is present at one of the permanent watercourse crossings, as well as an intermittent watercourse crossing, obstructing any potential fish passage.

No barriers to fish passage were identified in the large permanent watercourses surveyed within the PDA during field assessments.

7.3.2.2 Aquatic Species

Sampling for fish presence via backpack electrofishing was not completed during the aquatic assessments; however, incidental observations of fish were recorded. Watercourses that were permanent and/or without barriers were conservatively assumed to be fish bearing for the purpose of this assessment unless site conditions indicated otherwise. Background fish presence information from DFO indicated that approximately 23 fish species are known to live or use the watersheds in the RAA (DFO 2025a). Based on habitat preferences and potential to be present, fish species that may be present in or near the RAA are presented in Table 7.8.

Table 7.8 Fish species that may be present in or near the RAA

Scientific Name	Common Name
Alosa pseudoharengus	Alewife
Anguilla rostrata	American Eel
Alosa sapidissima	American Shad
Salmo salar	Atlantic Salmon
Acipenser oxyrinchus	Atlantic Sturgeon
Microgadus tomcod	Atlantic Tomcod
Fundulus diaphanus	Banded Killifish
Rhinichthys atratulus	Blacknose Dace
Gasterosteus wheatlandi	Blackspotted Stickleback
Culaea inconstans	Brook Stickleback
Salvelinus fontinalis	Brook Trout
Luxilus cornutus	Common Shiner
Semotilus atromaculatus	Creek Chub
Notemigonus crysoleucas	Golden Shiner
Couesius plumbeus	Lake Chub
Pungitius pungitius	Ninespine Stickleback
Osmerus mordax	Rainbow Smelt
Oncorhynchus mykiss	Rainbow Trout
Petromyzon marinus	Sea Lamprey
Morone saxatilis	Striped Bass
Gasterosteus aculeatus	Threespine Stickleback
Morone americana	White Perch
Catostomus commersonii	White Sucker

Incidental observations of fish were recorded in the PDA on several occasions, all occurring in permanent watercourses. Eight sightings, each consisting of multiple fish, occurred in five watercourses. Species identification could not be confirmed for any of the sightings, though it is believed that most of the observations were salmonid parr based on behaviour and size. Observations occurred both upstream and downstream of crossing locations, as well as one sighting directly at a crossing location. No freshwater mussels were observed during the field assessment of the watercourses in the PDA.

7.3.2.3 Species at Risk

Two SAR fish are known to be present in or near the LAA according to AC CDC records (AC CDC, 2026). The endangered Inner Bay of Fundy (IBoF) population of Atlantic Salmon (pop. 1) has been recorded within 15 km of the LAA (AC CDC, 2026). The threatened Atlantic Sturgeon Maritimes Population (pop. 2) has also been recorded within 15 km of the LAA (AC CDC, 2026).

Species of Conservation Concern (SoCC) that are known to be present within 17 km of the LAA include Brook Trout, and two freshwater mussels: Triangle Floater and Eastern Pearlshell (AC CDC, 2026).

The Inner Bay of Fundy (IBoF) Atlantic Salmon population (pop. 1) has been assessed as Endangered by The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and SARA, and has a provincial AC CDC rank of S1 (AC CDC, 2026). The spawning range of this population spans approximately 50 rivers in Nova Scotia and New Brunswick that drain into the inner Bay of Fundy (DFO, 2019). Although Atlantic Salmon were not observed in the PDA, they are known to be present within approximately 15 km of the PDA. Suitable spawning habitat for salmonids was identified in some of the permanent watercourses in the PDA; however, the secondary watersheds that overlap with the PDA are not identified as critical habitat for IBoF Atlantic Salmon (DFO, 2019).

Atlantic Sturgeon, Maritimes Population (pop. 2), occur in the inner Bay of Fundy and are considered as Threatened (COSEWIC) with a provincial AC CDC rank of S2S3N (AC CDC, 2026). Atlantic Sturgeon are found in rivers and coastal waters from New Brunswick down to Florida (Themelis & Bradford, 2024; NOAA, 2026). They are large bodied anadromous fish that spawn in large freshwater rivers with high flows and hard substrates when mature, then return to the marine environment shortly afterwards. Juveniles prefer to rear and feed in estuaries and brackish areas along the coast (NOAA, 2026). As the PDA is characterized by small, freshwater drainages with few large watercourses, it is unlikely there is suitable habitat in the PDA for adult or juvenile Atlantic Sturgeon.

Brook Trout (AC CDC rank S3) are found widely around the province in clear, cool, well oxygenated streams. Brook Trout can live in salt or fresh water; however, they may spend their entire life in fresh water (DFO, 1988). Both sea run and freshwater Brook Trout spawn in fresh water. Brook Trout generally, prefer to spawn over gravel substrates in lakes or small protected streams with groundwater or areas of spring upwelling. Suitable habitat is present in many of the permanent watercourses in the PDA, where unidentified salmonid parr were observed.

The Eastern Pearlshell is a freshwater mussel that has been observed within 15 km of the PDA and has an AC CDC rank of S2S3 in Nova Scotia (AC CDC, 2026). The typical habitat for Eastern Pearlshell includes small to medium-sized cold-water streams and rivers with sand and gravel substrate. They require well oxygenated water, as this is a requirement of their salmonid host species (Martel et al. 2010). While this species was not observed in the PDA during field programs, suitable habitat is present in many of the permanent watercourses.

The Triangle Floater is a freshwater mussel with an AC CDC rank of S2S3 in Nova Scotia (AC CDC, 2026). Their preferred habitat is in flowing water with a sand and gravel substrate. This species was not observed in the PDA during field programs, however, suitable habitat is present in some of the permanent watercourses on site.

7.3.3 Water Quality

In situ water quality measurements were taken at 22 crossing locations in watercourses in the PDA where sufficient depth and flow were present. Watercourses where sampling occurred were permanent and intermittent watercourses. Data collected represent a snapshot view of the water quality in the watercourse at the time of assessment. The summary of in situ water quality parameters collected during the field program is presented below in Table 7.9.

Table 7.9 Water Quality Measurements Taken in Situ in the PDA

Watercourse ID	Watercourse Type	Temp (°C)	DO (mg/L)	pH	Conductivity (us/cm)	Salinity (PPT)	Turbidity
WC-01	Large Permanent	8	11.86	6.25	24.5	0.01	Clear
WC-09, WC-08, WC-06	Small Permanent	12	11.5	5.95	23.3	0.01	Clear
WC-10	Large Permanent	12	10.74	6.34	23.2	0.01	Clear
WC-12	Small Permanent	11.9	8.45	5.49	22.8	0.01	Clear
WC-13	Small Permanent	12	10.48	5.68	21.8	0.01	Clear
WC-15	Intermittent	8.7	9.08	4.79	19.4	0.01	Clear
WC-22 (Turbine Pad)	Small Permanent	10.5	11.05	4.96	20.8	0.01	Clear
WC-22	Small Permanent	7.6	9.4	5.07	21.6	0.01	Clear
WC-23	Small Permanent	10.7	9.71	4.43	28.2	0.01	Clear
WC-24	Small Permanent	8.9	10.68	5.76	17.3	0.01	Clear
WC-25	Small Permanent	8.9	11.69	5.86	19.1	0.01	Clear
WC-31	Small Permanent	8.4	11.88	5.8	19.8	0.01	Clear
WC-33	Small Permanent	7.9	11.64	5.82	21.6	0.01	Clear
WC-38	Small Permanent	11.8	9.96	5.55	20.2	0.01	Clear
WC-43	Intermittent	8.5	7.25	6.03	23.7	0.01	Clear
WC-45	Small Permanent	8.3	11.71	6.18	24.9	0.01	Clear
WC-58	Intermittent	9.9	9.82	6.33	25.1	0.01	Clear
WC-59	Intermittent	9.8	9.67	4.74	23.3	0.01	Clear
WC-65	Small Permanent	7.6	11	6.19	24.5	0.01	Clear
WC-67	Small Permanent	7.2	12	6	20.9	0.01	Clear
WC-76	Intermittent	9.9	8.95	5.48	16.4	0.01	Clear
WC-83	Large Permanent	10.2	8.43	6.34	65.5	0.03	Clear

Temperature, dissolved oxygen, and pH readings across all measured locations are within the tolerance boundaries for Brook Trout, a common species expected in the PDA, as presented in Table 7.31. Temperature measurements from the PDA were all within the tolerance range for Brook Trout (0.5 to 22°C), with five locations within the optimal range (11 to 16°C). The highest temperature measured was 12°C. All dissolved oxygen readings were above the optimal amount identified for Brook Trout (≥ 7.0 mg/L). All pH measurements fell below the optimal range (6.5 to 8.0), with 13 locations having a pH below 5.0. Many of the assessed watercourses had headwater sources near wetlands.

7.3.4 Aquatic Invertebrates

Aquatic invertebrates are suitable food for many fish species and presence within watercourses can correspond with suitable foraging habitat. Aquatic invertebrate density at assessed locations was typically high in permanent watercourses and overall was found to be high in 12 of the 54 assessed locations. Ephemeral watercourses generally had a low density of aquatic invertebrates where water was present. The most common aquatic invertebrate observations included caddisfly larvae casings and water striders. Lesser amounts of stonefly and mayfly larvae and aquatic beetles were observed. Aquatic invertebrate abundance is typically higher during the productive summer months (May to September); however, evidence of aquatic invertebrate presence was still apparent through remnant casings.

7.4 Effects Assessment

7.4.1 Potential Effects and Mitigation

Direct and indirect effects of the Project on the aquatic environment could occur through interconnected pathways. During construction, activities such as in-water works as well as earthworks and vegetation clearing in the riparian area of watercourses may lead to changes in riparian and in-water habitats, as well as changes in water quality. Changes to roads, including widening or increasing the number and length of the road network in the PDA will require additional watercourse crossings (i.e., bridges and culverts). Installation and operation of the additional crossings may result in changes to availability and use of fish habitat and movement of aquatic species. Additionally, sensory disturbance from noise during construction (e.g., blasting) has the potential to cause injury or mortality to fish and can impact aquatic organism behaviour in watercourses containing fish.

The Project has the potential to result in adverse effects on the aquatic environment from short-duration activities during the construction phase, as well as long-term operation and maintenance of Project components. The potential effects on the aquatic environment within the PDA are expected to include a short-term loss of use of fish habitat, a short-term change in water quality, and mortality or injury of fish. Project construction activities, specifically removal and placement of materials in or near water, will result in the alteration or disruption of fish and riparian habitat which may result in the destruction of fish habitat in the PDA. As such, changes to fish habitat from Project activities are expected to occur within the PDA.

Construction activities in or near water can potentially lead to changes in surface water drainage resulting in indirect effects on water quantity and quality in the watercourses in the PDA. Project activities can affect the aquatic environment as indicated in Table 7.10; these potential effects do not consider the implementation of mitigation measures described herein.

Table 7.10 Potential Environmental Effects of the Project on the Aquatic Environment

Project Activity	Potential Environmental Effects			
	Change in Fish Habitat		Change in Water Quality	Mortality or Injury of Fish
	Instream Habitat	Riparian Area		
Construction				
Site Preparation	X	X	X	X
Access Roads Construction and Modifications	X	X	X	X
Material and Equipment Delivery and Storage	-	-	-	-
Infrastructure Installation	-	-	X	X
Restoration of Temporary Areas	-	X	X	-
Testing and Commissioning	-	-	-	-
Operation and Maintenance				
Turbine Operation and Maintenance	-	X	-	-
Road Maintenance	-	X	X	X
Powerline and Substation Maintenance	-	X	-	-
Vegetation Management	-	X	-	-
Safety and Security	-	-	-	-
Decommissioning				
Removal of Infrastructure and Site Restoration	-	X	X	-

X = Potential Interaction
- = No Interaction

Potential adverse effects on the aquatic environment (e.g., fish habitat) have been determined through an evaluation of the DFO (2024a) Pathways of Effects diagrams based on the proposed Project activities. The potential effects are described in this section in terms of the changes to, or loss of, fish habitat (i.e., HADD), changes to water quality, and mortality or injury to fish. Avoidance is the first step of the hierarchy of measures for the conservation and protection of fish and fish habitat, described in DFO (2025b) followed by mitigation then offsetting, if required. Mitigation measures are applied prior to impacts, where possible, to avoid or minimize the effects of the Project activities.

Effects on the aquatic environment, due to Project activities, are expected to occur primarily at watercourse crossings. Watercourse crossing works will occur during road upgrades or new road construction when culverts or bridges are upgraded or installed. The works for the crossings will also require works in the riparian areas of watercourses. Effects

on the aquatic environment are possible during all phases of the Project but are most likely to occur during the construction phase when works will have direct interaction with watercourses through machinery operating in-water or the placement or removal of materials in-water. Although there will be an interaction between construction and in-water fish habitat, effects are only expected to occur during construction. The effects are expected to be short-term, occurring regularly during the construction phase, localized to the immediate construction areas in the watercourses or adjacent to the watercourses, and expected to be mostly reversible upon completion of the construction. Mitigation measures for these works are well known, industry standard, and are expected to be highly effective at preventing effects on the aquatic environment in the PDA. Details on the potential effects on the aquatic environment and applicable mitigation measures are presented in the following subsections.

7.4.1.1 Change in Fish Habitat

Although the Project layout and implementation methods have been designed to minimize adverse impacts on the aquatic environment, Project activities are expected to interact with the aquatic environment and have the potential to cause a change in fish habitat and hydrology, including direct losses of instream and riparian fish habitat. Habitat loss has the potential to occur where watercourses intersect the PDA, specifically where road crossing culverts require replacement or upgrades, or where additional tree clearing is required for turbine pads and along roadways. There are a total of three large permanent, and 14 small permanent watercourses that intersect the PDA. Five of these watercourses already have a bridge crossing, and three are culverted at the intersection of the watercourse and the PDA. These structures may require upgrades or replacement, along with installation of additional crossing structures, to allow for completion of the Project. These works have the potential to change the amount and quality of existing fish habitat in the PDA. Additionally, the Diligent River and Ramshead River are identified as historical or potential IBoF Atlantic Salmon rivers; however, neither river system contains critical habitat for that species (DFO, 2019).

Without mitigation, the Project has the potential to change the base flow in existing watercourses through changes to surface water drainage ditches and grading in the PDA, which can result in changes in direction and course of surface water flows, which can result in a change in the quantity of water available in watercourses in the PDA or the LAA, although any changes are expected to result in minor changes to water flow. A reduction in water quantity in fish bearing watercourses can cause a loss of usable area and a change in the suitability of available habitat for important life stages of fish and aquatic organisms. The change in quantity can also result in a reduction in water quality through increased temperature or changes in availability of food and nutrients.

During operation and maintenance, there may be less overall forested land due to clearing activities associated with the Project. This change could reduce stormwater storage on site, leading to increased runoff from precipitation. Although riparian clearing will be required as part of the Project construction activities, it will be limited to only those areas required

for the upgraded access roads or work areas. Watercourse banks and nearby disturbed slopes will be stabilized to prevent sediment releases in the watercourses. All proposed in-water works will be completed in isolation of flowing water (i.e., in the dry). Disturbed riparian and in-water areas will be restored to their previous condition, where possible. Loss of fish habitat from sedimentation is not expected after the implementation of site specific, effective, industry standard mitigation measures.

Mitigation measures to be implemented during the installation of culverts and bridges will include proper culvert and bridge design, including allowing for adequate flow conveyance, embedding and installing substrates within culverts in fish bearing streams, and maintaining fish passage through the installed culverts, where required. Additionally, all culverts installed for the access roads will meet DFO and Nova Scotia standards as provided in the Guidelines for the design of fish passage for culverts in Nova Scotia (DFO, 2015), Nova Scotia Watercourse Alterations Standard (NS Gov, 2015a) and Guide to Altering Watercourses (NS Gov, 2015b). The preferred type of crossings in Nova Scotia are bridged or open-bottom culverts; however, the minimum standard for closed-bottom circular culverts in Nova Scotia is 450 millimetres (mm). In Nova Scotia all culverts to be installed will be designed to convey a minimum of the 1 in 100-year event flows and have an energy dissipation pool at the outlet. These measures are expected to be effective at preventing changes in base flows in the watercourses where crossing culverts upgrades or installations are needed. Fish habitat features may be incorporated into embedded culvert designs through placement of appropriately sized substrates to create a low flow channel with cover and foraging habitat, while not impeding migration (DFO, 2024b). Instream areas around culvert and bridge work areas will be restored, as required, to pre-construction condition or equivalent habitat function.

The majority of the potential effects on fish habitat from Project activities can be effectively mitigated through planning, timing, and management of construction activities; however, impacts and/or effects to fish habitat that cannot be effectively mitigated and cause a HADD or changes to fish use of existing habitat may require offsetting through the DFO *Fisheries Act* authorization process. While the Project has been designed to avoid and minimize effects on fish and fish habitat, including to IBoF Atlantic Salmon which may be present, the requirement for Fisheries Act authorization and associated offsetting or counterbalancing measures, if any, will be determined by DFO based on the final Project design and proposed crossing methods.

Key mitigation measures for the potential effects of the Project on fish habitat and hydrology will be further detailed in a Project specific Environmental Protection Plan (EPP) and will be implemented prior to and during construction. The following mitigation measures are typical measures that are used for construction activities in or near the aquatic environment:

- In-water works will be avoided, where possible
- Permits, approvals, and authorizations for in-water works will be obtained prior to the start of activities that have the potential to impact the aquatic environment.

- The Project will follow the conditions and requirements set out in the acquired permits and approvals for the works.
- Environmental monitoring will occur during in-water works, or where works have the potential to adversely impact the aquatic environment, to identify potential issues and provide guidance.
- Installation of new or upgraded culverts will meet provincial standards and DFO design criteria for fish passage, where applicable.
- DFO's In-Water Site Isolation Standard will be followed. In-water works will be conducted between June 1 to September 30, unless otherwise approved by DFO.
- Restoration of instream and riparian areas will occur as required.
- Riparian clearing will be limited to only that necessary for the Project and will be conducted in stages to minimize the extent of exposed soil and the duration of exposure.
- Watercourse banks will be graded to a stable slope and revegetated/seeded where possible.

7.4.1.2 Change in Water Quality

Without mitigation, construction, operation and maintenance activities in or adjacent to the aquatic environment may result in a change to the water quality in watercourses and waterbodies in the PDA, which could extend into the LAA. Effects on water quality may occur during construction or during operation of the Project in areas where ground disturbance occurs. Effects on water quality are expected to be short-term in duration and localized to the PDA or immediately downstream of the construction area in flowing watercourses.

Potential Project effects on water quality can be effectively mitigated through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on water quality will be further detailed in a Project-specific EPP and implemented prior to construction.

- Site-specific measures will be developed to restore and maintain infiltration areas and receiving water bodies in the Project-specific EPP.
- An ESC Plan will be developed and implemented to mitigate soil erosion and sediment transport.
- ESC measures will be implemented prior to and for the duration of construction, especially upslope of wetlands and/or watercourses.
- ESC measures will be regularly inspected for effectiveness by an environmental monitor and maintained by the construction team or designated person.
- Refuelling will occur in designated areas at least 30 m from a water feature.
- Fuel and hazardous materials spill response will be included in a Contingency Plan to be developed as part of the Project-specific EPP.
- The use of explosives in the aquatic environment, or within the setback from the aquatic environment will be avoided where possible, as per the guideline criteria for substrates in Wright & Hopky (1998) or per a distance as directed by DFO. Any storage

of explosives will be a minimum of 30 m away from watercourses, unless authorized by applicable regulatory authorities.
- Debris from blasting will not be ejected into any watercourse.
- If required, response and mitigation measures to control acid rock exposure will be described in the Project-specific EPP.

7.4.1.3 Fish Mortality

Project activities during construction, operation and maintenance, and decommissioning of the Project have the potential to cause mortality or injury to aquatic organisms (i.e., freshwater fish). Project activities in watercourses for access road construction will typically include the placement or upgrades of crossing structures, culverts, as well as the placement of materials (e.g., boulders) that support the infrastructure. These activities can cause mortality or injury of fish/eggs/ova from physical crushing as a result of equipment use in watercourses. Sediment, contamination, and excess nutrients have the potential to cause mortality to fish/eggs/ova through the disruption of physiological functions in the organisms. If used in proximity to fish bearing watercourses or waterbodies, explosives have the potential to cause lethal or sublethal effects to fish. Through the blasting of rock or materials, the activity may cause the ejecta to land in adjacent waters where, if present, fish could be harmed or killed. Additionally, the vibrations and sound pressure from the blast can cause damage to internal organs, including swim bladders, which can affect the ability of a fish to regulate buoyancy in the water column, as well as affecting their ability to detect sound or pressure changes (Blanco & Unniappan, 2022; Wright & Hopky, 1998).

Mitigation measures to prevent or reduce loss of fish habitat and change in water quality will also prevent or reduce fish mortality and injury. Project activities in watercourses will be completed in the dry, in the appropriate timing window, and with a fish salvage and relocation program.

Potential Project effects on fish can be effectively mitigated through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on fish will be further detailed in an EPP and will be implemented prior to and during construction.

- In-water works will be avoided, where possible.
- Permits, approvals, and authorizations for in-water works will be obtained prior to the start of activities that have the potential to impact the aquatic environment.
- The Project will follow the conditions and requirements set out in the acquired permits and approvals for the works.
- Environmental monitoring will occur during in-water works, or where works have the potential to adversely impact the aquatic environment, to identify potential issues and provide guidance.
- Installation of new or upgraded culverts will meet provincial standards and DFO design criteria for fish passage, where applicable.
- DFO's In-Water Site Isolation Standard will be followed.
- Follow DFO's Codes of Practice: Temporary Fords: Crossing, when necessary.

- In-water works will be conducted between June 1 to September 30, unless otherwise approved by DFO.
- Restoration of instream and riparian areas will occur as required.
- Avoid the use of explosives, where possible, in the aquatic environment or within the setback from the aquatic environment as per the guideline criteria for substrates as per Wright & Hopky (1998), or as per a distance as directed by DFO. Any storage of explosives will be a minimum of 30 m away from watercourses unless authorized by applicable regulatory authorities.
- Debris from blasting will not be ejected into any watercourses.

7.4.2 Residual Effects

After implementation of mitigation measures, detailed design, restoration activities, and compliance with applicable approval and permit conditions, significant residual effects on fish and fish habitat and the aquatic environment are not expected in the LAA. Construction activities, particularly watercourse crossing installation or upgrades, are expected to result in localized and temporary disturbances to fish habitat and adjacent riparian areas. Residual effects from the Project activities are predicted to be low in magnitude, localized in extent, and primarily limited to the construction phase. Effects on water quality and the potential for fish injury or mortality are expected to be effectively mitigated through the application of standard industry practices, Project-specific environmental protection measures, and regulatory requirements. Where existing crossing structures are replaced or upgraded, opportunities may exist to improve fish passage and habitat connectivity relative to current conditions.

7.5 Monitoring

If required as a condition of Project regulatory approvals, including NSECC Watercourse Alteration Application (NSECC, 2015) and DFO *Fisheries Act* Authorization, a monitoring plan will be developed prior to the start of construction for the Project. The monitoring plan, if required, will identify locations and methods to assess the effectiveness of mitigation measures to protect the aquatic environment during construction of the Project. Monitoring locations will be based on the final Project design and the location of impacts on the aquatic environment, including culvert and bridge installations or upgrades, and/or relocation or placement of drainage features. Targets and goals of the monitoring plan will be determined during the permitting phase of the Project in coordination with the applicable regulatory agency (e.g., DFO, NSECC).

Monitoring locations will be identified in the monitoring plan and will be based on pre-construction conditions, as presented in this document, and will be monitored through construction and post-construction as required by conditions of issued regulatory approvals. Typical requirements of monitoring programs are expected to include the following:

- Experienced environmental monitors are to be on site full-time during works occurring in or near the aquatic environment to monitor the effectiveness of implemented mitigation measures and to provide support to the construction team for environmental issues that arise.
- Environmental monitors are to be given authority to stop work or modify activities that have the potential to cause, or are causing, an adverse impact on the aquatic environment, outside of the approved work. The environmental monitor will also have Stop Work authority for the entire work site, if necessary, to redirect construction teams to mitigate an unauthorized impact on the aquatic environment due to failing or improperly functioning mitigation measures. Details of the environmental monitor's responsibilities and authority will be defined in a Project-specific EPP.

8 Flora

8.1 Overview

This chapter assesses the potential effects of the Project on terrestrial flora, including vegetation communities, vascular plants, lichen, and bryophyte species (including SAR and SoCC). Project activities can affect flora through direct pathways, such as vegetation clearing and habitat loss associated with construction of turbines, access roads, collector lines, and associated infrastructure, and through indirect pathways, including habitat modification, fragmentation, degradation, and the introduction or spread of invasive species.

Interactions with terrestrial flora are closely linked to other VECs assessed in this EIA, including Chapter 7 (Aquatic Environment), Chapter 9 (Wetlands), Chapter 10 (Terrestrial Wildlife), Chapter 11 (Bats), and Chapter 12 (Birds). As such, the assessment considers both vegetation communities and the ecological functions they provide within the broader terrestrial ecosystem.

Project planning will incorporate iterative refinements to the Project layout to avoid or minimize disturbance to sensitive environmental features where practical, avoiding identified sensitive habitats, and maintaining setbacks and vegetated buffers around wetlands, watercourses, and other environmentally sensitive features. Vegetation within temporarily disturbed areas will be allowed to regenerate following construction, where appropriate, to support recovery of ecological function and reduce long-term effects on terrestrial flora.

The potential effects, mitigation measures, and residual impacts on terrestrial flora resulting from the Project are described in the following sections. Mitigation measures will be further refined and incorporated into an EPP prior to construction.

8.1.1 Regulatory Context

Assessment of the terrestrial flora considers relevant provincial and federal legislation and guidelines:

- SARA
- *Canadian Environmental Protection Act*
- NSESA

- Nova Scotia *Wildlife Act*
- Nova Scotia *Biodiversity Act*
- Nova Scotia *Environment Act*
- At-Risk Lichens–Special Management Practices (NSDNR, 2018)
- An Old-Growth Forest Policy for Nova Scotia (NSDNR, 2022)
- Nova Scotia Silvicultural Guide for the Ecological Matrix (McGrath et al., 2021)

8.1.2 Boundaries

The PDA encompasses the boundaries within which Project infrastructure may occur. The final Project Footprint will occupy only a portion of the PDA. For this assessment, the LAA for flora includes the PDA and a 200 m buffer of the PDA. The RAA for flora incorporates the LAA and adjacent contiguous natural habitats that may influence or support flora and vegetation communities occurring within the LAA.

The Study Area defines the spatial extent within which baseline conditions were characterized during field assessments. The existing environment describes the Study Area; the effects assessment is focused on the PDA, LAA, and RAA.

8.1.3 Assessment Methodology

The assessment of terrestrial flora focused on identifying vegetation communities and individual vascular plant and lichen species present or likely to occur in or near the LAA, with emphasis on SAR or SoCC and their habitats. The assessment approach combined a desktop review, habitat analysis, and targeted field surveys.

Information from the desktop review and habitat modelling was used to predict the potential occurrence of SAR and SoCC and to guide survey design. Field surveys were then conducted to confirm habitat conditions, document existing vegetation communities, and detect SAR or SoCC in the LAA. Data collected through this process were used to evaluate the potential effects of the Project on terrestrial flora and to inform iterative refinements to Project design. The findings supported the avoidance of sensitive habitats during siting and the development of mitigation measures to minimize adverse effects during construction, operation, and maintenance.

The description of the existing environment is based primarily on data collected through the following resources plus field surveys carried out for this Project:

- Nova Scotia Significant Species and Habitats Database (NSDNR, 2025)
- AC CDC Data Report (AC CDC, 2026)
- iNaturalist.ca Observation Database (2026)
- Nova Scotia Forestry Inventory (Government of Nova Scotia, 2021)
- Predictive Ecosystem Mapping for Nova Scotia (Government of Nova Scotia, 2024)
- Old-Growth Potential Index V2 (NSDNR, 2025)
- An Old Growth Forest Policy (Government of Nova Scotia, 2026)
- Forest Ecosystem Classification for Nova Scotia (2022): Field Guide (Neily et al., 2023)

- Ecological Land Classification 2015 (Government of Nova Scotia, 2018)
- Ecological Land Classification for Nova Scotia (Neily et al., 2017)
- Nova Scotia Parks and Protected Areas Map (Government of Nova Scotia, 2025)
- Global Nature Watch Tree Cover Loss 2001-2025 and Gain 2000-2020 (Global Nature Watch, 2026)
- Nova Scotia Forestry Harvest Plans (NSDNR, 2026)
- Nova Scotia Wet Areas Mapping (Government of Nova Scotia, 2012)
- Nova Scotia Topographic Database (Government of Nova Scotia, 2024)
- Nova Scotia LiDAR Data (Government of Nova Scotia, 2024)
- Surficial geology mapping (Government of Nova Scotia, 2021)
- Species at Risk Public Registry documents for federal SAR
- Species at Risk documents for provincial SAR
- Boreal Felt Lichen predictive habitat layer (NSDNR, 2012)
- Nova Scotia Location-sensitive SAR Database (NSDNR, 2026)
- Nova Scotia SAR Core Habitat Data (NSDNR, 2026)
- Critical Habitat for Species at Risk National Dataset – Canada (ECCC, 2026)
- Natural History of Nova Scotia (Davis and Browne, 1996)
- Nova Scotia Plants (Munro et al., 2014)
- Assessment of Species Diversity in the Atlantic Maritime Ecozone (McAlpine and Smith, 2010)

Landcover within the Study Area was analyzed through the Nova Scotia Forest Inventory layer (Figure 8.1, Appendix A).

A habitat assessment for terrestrial plant and lichen SAR and SoCC known to occur within a 100-km radius of the PDA was completed using available habitat information and species occurrence data, including federal critical habitat and provincial core habitat datasets. This assessment was used to identify areas in the LAA that may support SAR and SoCC and to guide the development of targeted field surveys for potential species and their habitats.

8.1.3.1 Field Surveys

The objective of the field surveys was to assess the presence and distribution of flora across the Study Area, focussing on SAR and SoCC and their habitats identified during the desktop assessment and in consultation with NSDNR. Field surveys for vascular plants, lichens, and vegetation communities were conducted between April 2024 and October 2026. The survey design prioritized areas considered more likely to support SAR and SoCC, including mature forests and wetlands, while also covering representative habitat types present across the Study Area (Figure 8.2, Appendix A). The Old-Growth Potential Index was reviewed as a desktop information source to help identify mature forest stands and inform the selection of field survey locations.

During field surveys, forested areas within the PDA and LAA were characterized and classified using the Forest Ecosystem Classification for Nova Scotia (2022): Field Guide

(Neily et al., 2023). Forest Ecosystem Classification sampling locations were selected in areas considered representative of the vegetation community being assessed.

Surveys for lichens were conducted by an NSDNR-approved lichenologist. Surveys were conducted in the PDA and LAA in areas with high potential to host SAR lichens including mature forests and watercourses with suitable habitat for Eastern Waterfan.

Additional observations of terrestrial flora were gathered as incidental observations during the biological field programs conducted in the Study Area including wetlands and watercourse assessments. These incidental observations were included in the assessment of the existing environment.

8.2 Existing Environment

8.2.1 Vegetation Communities

The Project is located in the Parrsboro area of Cumberland County, Nova Scotia, primarily in the Cobequid Hills Ecodistrict of the Nova Scotia Uplands Ecoregion. The Cobequid Hills are characterized by elevated, rolling terrain and incised valleys, and are predominantly forested, supporting vegetation communities characteristic of the Acadian Forest (Neily et al., 2017).

The Cobequid Hills support forests dominated by shade-tolerant hardwoods. On well-drained, medium- to rich-soil sites, characteristic late-successional forests include Sugar Maple (*Acer saccharum*), Yellow Birch (*Betula alleghaniensis*), and American Beech (*Fagus grandifolia*), with White Ash (*Fraxinus americana*) and Ironwood (*Ostrya virginiana*) associated with richer sites. At upper elevations, level to hummocky terrain with moderately well to imperfectly drained soils supports Red Spruce (*Picea rubens*) and Black Spruce (*Picea mariana*) forests. Steep-sided ravines support mixedwood communities that may include Eastern Hemlock (*Tsuga canadensis*), Red Spruce, Eastern White Pine (*Pinus strobus*), Sugar Maple, Yellow Birch, and American Beech (Neily et al., 2017).

The PDA occurs predominantly within the Tolerant Hardwood Hills landscape element, the dominant matrix element of the Cobequid Hills Ecodistrict. This landscape element is associated with hilly terrain and well-drained soils and supports shade-tolerant hardwood forests typically characterized by Sugar Maple, Yellow Birch and American Beech, with White Ash. Other landscape elements represented within the LAA include Tolerant Mixedwood Hills, Spruce Pine Hummocks, Red and Black Spruce Hummocks, and Red Spruce Hummocks, reflecting variation in topography, soil drainage, and forest composition across the LAA.

The southern portion of the Study Area extends into the Parrsboro Shore Ecodistrict of the Fundy Shore Ecoregion. In contrast to the elevated uplands of the Cobequid Hills, the

Parrsboro Shore encompasses the coastal landscape bordering the Minas Basin and Chignecto Bay and is influenced by its proximity to the Bay of Fundy. The landscape includes undulating lowlands, steep rolling hills generally below 125 m elevation, and valleys dissected by rivers and streams draining from the Cobequid uplands (Neily et al., 2017). Forests in this ecodistrict are generally composed of hardwood and softwood forests, with moister sites commonly supporting Black Spruce, Tamarack (*Larix laricina*), and Red Maple (*Acer rubrum*). Shade-tolerant mixedwood forests occur along steep-sided ravines, while coastal forests dominated by White Spruce (*Picea glauca*) occur along exposed headlands before transitioning to tolerant hardwood and softwood forests farther inland (Neily et al., 2017).

Northwest of the PDA is the Kelley River Wilderness Area, which protects over 21,000 ha of predominantly forested landscape (NS ECCC, 2026). The wilderness area contains extensive mature and older forest and diverse forest and wetland communities, including mixedwood forest, black and red spruce forest, red maple floodplain forest, and alder swamps. These habitats also support species at risk, including mainland moose, Wood Turtle, and Atlantic Salmon.

The majority of the landcover in the PDA is categorized as forested stands (84 %) with hardwood, softwood, and mixedwood stands comprising 35, 29, and 21%, respectively. Other land cover types include road corridors (5%) and blueberries (4%), clear cut (3%) and agriculture (2%), with the remaining cover types making up less than 1% of the total landcover. The provincial forest inventory does not fully reflect current site conditions, as portions of the PDA have been subject to forestry activities since the inventory data were collected. Global Nature Watch (2026) Tree Cover Loss data indicate that approximately 330 ha, or 44% of the tree cover present in 2000 within the PDA, experienced loss between 2001 and 2025. These data represent gross tree cover loss and do not account for subsequent forest regeneration or other tree cover gains during this period. The Global Nature Watch (2026) Tree Cover Gain data indicate that approximately 24 ha of tree cover gain occurred within the PDA between 2000 and 2020, equivalent to approximately 3% of the baseline 2000 tree cover.

Nine Forest Ecosystems Classification vegetation types were identified in the LAA during the field surveys. These are listed below, in Table 8.1.

Table 8.1 Forest Ecosystem Classification Vegetation Types Observed in the LAA

Forest Group	Vegetation Types
Intolerant Hardwood Forest	IH9 - Grey birch / Tall white aster / Hair-cap moss
Mixedwood Forest	MW1 - Red spruce – Yellow birch / Evergreen wood fern
Spruce Hemlock	SH5 - Red spruce – Balsam fir / Schreber's moss – Stair-step moss
	SH5b - Red spruce – Balsam fir / Schreber's moss – Stair-step moss - Balsam fir variant

Forest Group	Vegetation Types
Tolerant Hardwood	TH1 - Sugar maple / Wood fern - Hay-scented fern
	TH2a - Yellow birch variant
Wet Coniferous	WC1 - Black spruce / Cinnamon fern / Sphagnum
	WC6 - Balsam fir / Cinnamon fern - Three seeded sedge / Sphagnum
	WC8 - Hemlock / Cinnamon fern - Sensitive fern / Sphagnum

No forest stands protected under the Old-Growth Forest Policy (2022) are present in the LAA or within 5 km of the PDA.

8.2.2 Vascular and Non-vascular Flora

The AC CDC (2026) Data Report identified records of 409 species of Nova Scotian flora SAR and SoCC within a 100 km radius of the PDA (see Appendix F). Of these species, 228 are vascular plants and 181 are non-vascular species (lichens and bryophytes). The NSDNR Significant Species and Habitat Database did not identify records of terrestrial flora SAR or associated significant habitat within 100 km of the PDA.

8.2.2.1 Vascular Plants

No SAR vascular plant species occurring within 5 km of the PDA were identified through the AC CDC database. SoCC vascular plant species identified within 5 km of the PDA are presented in Table 8.2.

Table 8.2 SoCC Vascular Plant Species Occurring Within 5 km (Source: AC CDC)

Scientific Name	Common Name	NSESA	SARA	COSEWIC	S-rank
Impatiens pallida	Pale Jewelweed	-	-	-	S3
Persicaria arifolia	Halberd-leaved Tearthumb	-	-	-	S3
Carex tenera	Tender Sedge	-	-	-	S3
Fagus grandifolia	American Beech	-	-	-	S3S4
Alopecurus aequalis	Short-awned Foxtail	-	-	-	S3S4

A total of 263 vascular plant species were recorded within the Study Area during field surveys (Appendix G, Table 8.1; survey locations are shown on Figure 8.3 in Appendix A). No vascular plant SAR were observed. One vascular plant SoCC, American Beech (*Fagus grandifolia*; S3S4), was recorded. American Beech was common and widespread in the northern portion of the Study Area, occurring primarily within tolerant hardwood forest communities. Many individuals exhibited signs of poor health associated with beech bark disease and Beech Leaf-mining Weevil (*Orchestes fagi*).

Of the 263 vascular plant species recorded, 52 are considered non-native in Nova Scotia (s-rank: SNA). None of these species are listed as invasive by the Nova Scotia Invasive Species Council (2026).

8.2.2.2 Non-vascular Plants

SAR and SoCC non-vascular plant species identified through the AC CDC database within 5 km of the PDA are presented in Table 8.3.

Table 8.3 SAR and SoCC Non-vascular Plant Species Occurring Within 5 km (Source: AC CDC)

Scientific Name	Common Name	NSESA	SARA	COSEWIC	S-rank
Peltigera hydrothyria	Eastern Waterfan	Threatened	Threatened	Threatened	S1
Radula obconica	a scalewort	-	-	-	S1
Heterodermia galactophylla	Branching Fringe Lichen	-	-	-	S1S2
Jubula pennsylvanica	a liverwort	-	-	-	S3
Punctelia appalachensis	Appalachian Speckleback Lichen	-	-	-	S3
Thamnobryum alleghaniense	a Moss	-	-	-	S3S4
Sticta fuliginosa	Peppered Moon Lichen	-	-	-	S3S4
Heterodermia speciosa	Powdered Fringe Lichen	-	-	-	S3S4
Stereocaulon condensatum	Granular Soil Foam Lichen	-	-	-	S3S4
Anaptychia palmulata	Shaggy Fringed Lichen	-	-	-	S3S4
Heterodermia neglecta	Fringe Lichen	-	-	-	S3S4

Eastern Waterfan (*Peltigera hydrothyria*), listed under both the NSESA and federal SARA as Threatened, has been previously documented near the PDA. The AC CDC database identified 60 records within 5 km of the PDA, all associated with two streams, Hannahs Brook and the North Branch Diligent River. These records are not currently within areas identified as critical habitat in the federal Recovery Strategy and Action Plan for Eastern Waterfan (ECCC, 2021). Nova Scotia has adopted the federal identification of critical habitat in lieu of core habitat for the species; accordingly, these records are also not currently within provincial core habitat. The only records within the LAA occur as a cluster along an approximately 100-m long reach of Hannahs Brook. The nearest record is approximately 180 m from the PDA. The intervening forest between the PDA and Hannahs Brook has been previously harvested, with harvesting extending to approximately 130 m from the brook.

During field surveys, 35 non-vascular flora species, all lichens, were identified within the Study Area (Appendix G, Table 8.2). No non-vascular flora SAR, including Eastern Waterfan, were observed during the field surveys. Four SoCC lichens were recorded (Table 8.4).

Table 8.4 List of SoCC Non-vascular Plant Species Observed During Field Surveys

Scientific Name	Common Name	NSESA	SARA	COSEWIC	S-rank
Heterodermia neglecta	Fringe Lichen	-	-	-	S3S4
Leptogium acadiense	Acadian Jellyskin Lichen	-	-	-	S3S4
Anaptychia palmulata	Shaggy Fringed Lichen	-	-	-	S3S4
Heterodermia speciosa	Powdered Fringe Lichen	-	-	-	S3S4

8.3 Effects Assessment

8.3.1 Potential Effects and Mitigation

Direct and indirect effects on flora may occur through multiple, interconnected pathways. Construction activities like vegetation clearing, soil disturbance, and infilling have the potential to cause direct habitat loss for sensitive flora species and communities. Increased road width and density may contribute to vegetation community fragmentation and edge effects. The rise in Project-related vehicle traffic may facilitate the introduction and spread of invasive flora species, and may decrease air quality including generating dust that can affect vegetation health. While some flora species are adaptable to a variety of habitat types and environmental conditions, others are more specialized when it comes to habitat preferences and requirements. Species that are naturally more specialized, including SAR and SoCC, may be disproportionately affected by direct or indirect habitat loss.

Project activities can affect terrestrial flora as summarized in Table 8.5; identification of these potential effects does not consider the implementation of mitigation measures described herein.

Table 8.5 Potential Environmental Effects of the Project on Terrestrial Flora

Project Activity	Potential Environmental Effects		
	Habitat Loss and Fragmentation	Loss of SAR/SoCC	Habitat Degradation
Construction			
Site Preparation	X	X	X
Access Roads Construction and Modifications	X	X	X
Material and Equipment Delivery and Storage	-	-	X
Infrastructure Installation	-	-	-
Restoration of Temporary Areas	-	-	-
Testing and Commissioning	-	-	-

Project Activity	Potential Environmental Effects		
	Habitat Loss and Fragmentation	Loss of SAR/SoCC	Habitat Degradation
Operation and Maintenance			
Turbine Operation and Maintenance	-	-	-
Road Maintenance	-	-	X
Power Line and Substation Maintenance	-	-	X
Vegetation Management		X	X
Safety and Security	-	-	-
Decommissioning			
Removal of Infrastructure and Site Restoration	-	-	X

X = Potential Interaction
- = No Interaction

8.3.1.1 Habitat Loss and Fragmentation

The Project may result in habitat loss and fragmentation for terrestrial flora species and associated habitat in the LAA.

Direct habitat loss will occur through vegetation clearing associated with road widening, construction of new access roads, turbine pads, temporary laydown areas, and other Project infrastructure. This clearing will occur within a broader LAA characterized by historical and ongoing forest disturbance and regeneration. Clearing activities will result in both temporary and permanent habitat loss, with some portions of the PDA remaining permanently altered for the life of the Project. Following construction, temporary roads and laydown areas will be decommissioned and restored to support revegetation and re-establishment of vegetation communities.

Indirect habitat loss or alteration may also occur. Vegetation clearing and soil disturbance can alter surface and groundwater flow patterns, resulting in changes to moisture regimes that support flora species or communities dependent on specific hydrological conditions (Hartsog et al., 1997). Soil compaction from machinery and vehicle traffic may degrade soil structure and nutrient availability, potentially affecting vegetation establishment and species composition. Measures to reduce soil compaction and disruption of surface and groundwater flow patterns are outlined in Sections 6.3.1 and 7.3.1.

Habitat fragmentation may occur where Project infrastructure disrupts contiguous forest cover. Fragmentation can alter canopy structure and local moisture regimes, including shade and humidity conditions important for certain terrestrial flora, particularly lichens (Boudreault, 2008). Fragmentation may also affect plant-pollinator interactions where

changes in habitat area or connectivity influence pollinator abundance or movement (Yian, 2016).

Vegetation clearing adjacent to watercourses may alter riparian shading and local moisture conditions that support sensitive aquatic and riparian flora, including suitable habitat for Eastern Waterfan. The federal Recovery Strategy and Action Plan for the Eastern Waterfan identifies clear, silt-free streams and riparian shade among the species' habitat needs and identifies changes in water quantity, water quality, light, and humidity as threats (ECCC, 2021).

Habitat loss and fragmentation have been considered through Project siting and design and will continue to be minimized through refinement of the Project layout. The Project design has prioritized the use of existing roads and previously disturbed areas. Ongoing design refinement will continue to consider opportunities to avoid or minimize interactions with sensitive terrestrial flora habitats, including wetlands and other sensitive vegetation communities.

The following key measures will be implemented prior to and during construction to mitigate potential effects of the Project on terrestrial flora and associated habitats.

- Existing roads, harvested areas, and other previously altered areas will be used to the extent practicable.
- Areas of clearing and grubbing will be limited to that needed to construct and operate the Project.
- Natural vegetation, topsoil, and useable grubbed material will be conserved and reused where feasible to promote re-establishment of native vegetation through existing seed banks.
- Temporary disturbance areas will be restored and revegetated following construction where practicable and cleared areas will be stabilized and allowed to revegetate naturally.
- Vegetated buffers around wetlands and watercourses will be maintained to support habitat connectivity and local environmental conditions where possible.
- Compatible vegetation will be maintained in areas that do not interfere with Project infrastructure or site access (i.e., cutting trees while preserving low shrubs).
- During operation, low growing vegetation that does not interfere with Project infrastructure, access, or safety requirements will be retained where practicable.
- An ESC Plan will be developed and implemented to mitigate soil erosion and sediment transport into adjacent vegetation and habitats.
- Invasive species prevention and management measures will be implemented to reduce the introduction and control the spread of invasive species, as part of the Vegetation Management Plan.

8.3.1.2 Loss of SAR/SoCC

Field surveys identified one vascular flora SoCC, American Beech and four non-vascular flora SoCC within the LAA. Several of the occurrences of SoCC occurred within the PDA. No

flora SAR were observed during field surveys. However, known Eastern Waterfan records occur within the LAA along Hannahs Brook. These records do not overlap the proposed Project infrastructure footprint, with the nearest record approximately 180 m from the PDA. The intervening forest between the nearest proposed turbine area and Hannahs Brook has been previously harvested, with harvesting extending to approximately 130 m from the brook. Direct removal of known Eastern Waterfan occurrences is therefore not expected based on the current Project layout. However, given the species' sensitivity to changes in stream and riparian conditions, potential indirect effects associated with sedimentation, changes in water quality or quantity, and alteration of riparian shading and microclimatic conditions will continue to be considered during detailed design and construction. Surface water management and erosion and sediment control measures will also be implemented to reduce the potential for sediment transport and changes to drainage or water quality.

Vegetation clearing within the PDA may result in the loss of individual SoCC or associated habitat, including American Beech and the terrestrial lichen SoCC recorded during field surveys. Potential effects will be reduced through Project siting and design, limiting vegetation clearing to areas required for construction and operation, and implementing construction-phase mitigation.

Key measures to reduce potential effects on flora SAR and SoCC include:

- Project personnel will be provided with information on flora SAR and SoCC that may occur within the LAA.
- Known SoCC and associated habitat will be avoided or retained where practicable during final design and construction.
- Riparian vegetation associated with watercourses and their tributaries supporting known Eastern Waterfan occurrences will be maintained to the extent practicable.
- If a previously undocumented flora SAR is encountered during construction, work in the immediate area will be paused, where appropriate, and NSDNR will be consulted to determine appropriate mitigation and regulatory requirements.

8.3.1.3 Habitat Degradation

Terrestrial flora and associated habitats may be affected by habitat degradation resulting from Project activities. Potential pathways include soil erosion and sedimentation, altered hydrological and microclimatic conditions, soil compaction, air quality and the introduction or spread of non-native or invasive plant species.

Soil erosion may occur where vegetation removal and ground disturbance expose soils to precipitation and surface runoff, including along access roads and within cleared areas. Sediment transport from erosion can reduce soil productivity in terrestrial flora habitats (Al-Kaisi, 2000). Sediment transport into wetlands or watercourses can impair their function, potentially impacting riparian flora and aquatic habitats (Gleason and Euliss, 1998). This pathway is particularly relevant to sensitive aquatic flora, including Eastern

Waterfan, which is associated with clear, silt-free streams and is sensitive to siltation and changes in water quality (ECCC, 2021).

Fragmentation of habitat in the Project area may create edge habitats, which can affect habitat suitability by altering microclimatic conditions. Edge habitats are exposed to increased light, dust, and wind (Chen et al., 1993), causing short-term impacts such as increased susceptibility to windthrow (Esseen and Renhorn, 1998) and disrupting local temperature, moisture and light regimes that may impact sensitive species including lichens (Boudreault et al. 2008).

Vegetation clearing may also alter localized microclimatic conditions along newly created forest edges. Increased exposure to light and wind may affect temperature and moisture regimes and increase susceptibility to windthrow (Chen et al., 1993; Esseen, 1994). Changes in moisture, shade, and humidity may affect flora adapted to relatively stable microclimatic conditions, including some lichen species.

Construction and operational activities may facilitate the presence or spread of non-native or invasive plant species through soil disturbance and the movement of vehicles, equipment, and materials. Although non-native vascular plant species were recorded during field surveys, none were identified as invasive in the Existing Environment assessment. Project activities could nevertheless provide disturbed conditions conducive to the establishment or spread of invasive species if introduced.

Dust generated by road use, vegetation clearing, excavation, grading, and other construction activities may deposit on surrounding vegetation. Accumulation of dust on plant surfaces may affect photosynthesis (Farmer, 1993). Accumulation of dust on the soil surface and organic litter can alter soil properties. Airborne contaminants from vehicle exhaust and construction-related products may also affect the terrestrial flora community. They can enter the natural environment by settling on the ground or being absorbed directly from the air. Lichens and other non-vascular flora are particularly susceptible to atmospheric deposition because they obtain moisture and nutrients directly from the surrounding environment (Canters et al., 1991).

Potential habitat degradation will be reduced through construction planning and environmental management. Key mitigation measures include the following:

- Areas of clearing and grubbing will be limited to that needed to construct and operate the Project.
- Disturbed areas will be stabilized and revegetated as required upon completion of work, and re-instated to the original pre-disturbed condition.
- An ESC Plan will be developed and implemented to mitigate soil erosion and sediment transport.
- Stabilization of stockpiles and other disturbed areas to reduce/prevent erosion and escape of fugitive dust (e.g., tarped, mulched, graded, revegetated or watered to create a hard surface crust).

- Vehicle traffic and equipment staging will be limited to designated access roads and laydown areas.
- Alternative road de-icing methods may be employed during winter road maintenance to prevent salt impacts on terrestrial flora habitats.
- Invasive species prevention and management measures will be implemented to reduce the introduction and control the spread of invasive species, as part of the Project-specific EPP.
- Vehicle and equipment emissions will be managed through regular maintenance on machinery, avoidance of unnecessary idling, and minimization of haul distances.
- Construction-related fugitive road dust will be controlled through speed limits on access roads, road watering and limiting construction during high wind events.

8.3.2 Residual Effects

Following implementation of the mitigation measures described in Section 8.3.1, residual adverse effects on flora are expected to result primarily from permanent vegetation clearing and habitat loss and fragmentation within the PDA. Temporary disturbance areas are expected to revegetate following construction; however, vegetation communities within permanent Project infrastructure footprints will remain altered for the life of the Project.

Residual effects associated with habitat degradation may also occur adjacent to disturbed areas through localized changes in edge conditions, soil and moisture regimes, and vegetation composition and may be intermittent during construction, operation and maintenance, and decommissioning phases, corresponding with periods of onsite activity. With implementation of the proposed mitigation measures, these effects are expected to be minor in magnitude and generally localized within or immediately adjacent to the PDA.

No flora SAR were observed during field surveys. Known Eastern Waterfan records do not overlap proposed Project infrastructure, and direct loss of known occurrences is therefore not expected based on the current Project layout. Potential indirect effects on Eastern Waterfan habitat associated with sedimentation, hydrological change, water quality, or alteration of riparian conditions are expected to be reduced through maintenance of riparian vegetation where practicable and implementation of surface water management and erosion and sediment control measures. Vegetation clearing may result in the loss of individual SoCC or associated habitat; however, these effects are expected to be localized within the PDA.

Overall, residual effects on flora are expected to be minor in magnitude and primarily limited to the PDA and immediately adjacent areas. Effects associated with permanent vegetation clearing will be long-term and generally irreversible for the operational life of the Project. Effects associated with temporary disturbance and habitat degradation are expected to be shorter in duration, seasonally variable, and generally reversible as disturbed areas stabilize and vegetation re-establishes.

Based on current site conditions, the impact assessment, and the proposed avoidance and mitigation measures, residual adverse effects on flora are expected to be not significant.

8.4 Monitoring

No monitoring is proposed for this VEC.

9 Wetlands

9.1 Overview

The wetlands VEC comprises provincially regulated wetlands (i.e., equal to or greater than 100 m^2 in size) that may interact with the Project. The assessment considers wetland habitat, hydrology, and function within the PDA, and potential Project related effects on wetlands within the assessment boundaries.

Wetlands are generally characterized by water at or near the surface, low water flow and saturated (i.e., hydric) soils, and hydrophytic vegetation adapted to wet conditions. Wetlands are commonly classified by form as marshes, swamps, fens, or bogs. Wetlands support a range of hydrologic, ecological, and socio-economic functions, including biodiversity conservation, maintenance of watershed health, and regulation of surface water and groundwater quantity and quality. Wetlands are closely linked to other VECs assessed in this EA, as changes to wetland habitat, hydrology, or function can affect surface water, groundwater, and habitat for terrestrial and aquatic flora and fauna. Related effects are considered in Chapter 6 (Geophysical environment), Chapter 7 (Aquatic Environment), Chapter 8 (Flora), Chapter 10 (Terrestrial Wildlife), Chapter 11 (Bats), and Chapter 12 (Birds).

Project planning incorporates iterative refinements to the Project layout to support avoidance and minimization of potential adverse effects on multiple VECs, including wetlands. Complete avoidance of wetlands is not practicable due to Project siting and design constraints. Project activities may result in direct wetland alteration and indirect effects on wetland habitat, hydrology, and function. The Project layout will continue to be refined through detailed design to avoid wetlands where possible and minimize the extent of unavoidable alteration. Mitigation measures will be implemented to reduce potential effects on retained wetland habitat, hydrology and function. Temporarily disturbed wetland areas will be restored where feasible and unavoidable wetland alteration will be addressed in accordance with applicable NSECC approval and compensation requirements.

9.1.1 Regulatory Context

The assessment of wetlands considers applicable federal and provincial legislation, regulations, and policies relevant to wetland protection, alteration, and species at risk, including:

- Nova Scotia *Environment Act*

- Nova Scotia Wetland Conservation Policy
- SARA
- NSESA

9.1.2 Boundaries

The PDA represents the area within which Project components may be located. The final Project Footprint will occupy only a portion of the PDA. The LAA and RAA for the wetland VEC are defined as follows:

- LAA: The wetland LAA extends 500 m beyond the PDA and encompasses the area within which measurable Project related effects on wetlands may occur. The LAA provides a surrounding area for considering potential indirect effects on wetlands beyond areas of direct disturbance, including potential changes to habitat, hydrology, and function associated with Project activities. The extent of potential indirect effects will vary among wetlands depending on factors such as wetland type, location, topography, watershed hydrology, soil parent material, vegetation, and community diversity.
- RAA: The wetland RAA generally extends 1 km beyond the PDA and encompasses the broader wetland environment surrounding the Project. The RAA provides landscape level context for considering Project effects in combination with other activities that may affect wetlands in the surrounding area. Historical and ongoing forestry activities occur within the RAA including in areas associated with wetlands that extend into the PDA.

9.1.3 Assessment Methodology

The assessment of wetlands focused on wetland habitat intersecting the PDA and considered potential Project related effects within the LAA. Existing wetland conditions have been characterized through desktop review, predictive wetland modelling, and field surveys. Predictive wetland modelling was used to identify areas with the potential to support wetlands and to inform targeted field surveys for wetland delineation and functional assessment.

Information collected through the desktop and field surveys was used to characterize wetland distribution, type, hydrologic connectivity, and function; identify Wetlands of Special Significance (WSS); and evaluate potential interactions between wetlands and the proposed Project layout. This information also supports the development of measures to avoid or reduce potential adverse effects on wetlands.

The description of existing wetland conditions was informed by field surveys completed for the Project and review of the following resources:

- Predictive Ecosystem Mapping for Nova Scotia (Government of Nova Scotia, 2024)
- NSECC LiDAR Wet Areas Mapping
- NSDNR Forest Inventory
- Provincial topographic data

- Recent aerial imagery
- LiDAR imagery and elevation data
- Nova Scotia Geomatics Centre high-resolution digital orthoimagery

9.1.3.1 LiDAR Predicted Wetland Modelling

Predictive wetland modelling was completed to support the identification of potential wetlands and inform field surveys. Topographic and imagery data from the Nova Scotia Elevation Explorer data portal were compiled and reviewed. A 1-m resolution LiDAR-derived digital elevation model (DEM) was used to identify the landforms and drainage conditions conducive to wetland formation.

A depth-to-water-table model was generated from the LiDAR DEM, consistent with the approach described by White et al. (2012). Modelled depth to water table was reviewed in combination with slope, watercourse mapping, provincial wetland mapping and aerial imagery to identify areas with the potential to support wetlands.

Predicted wetland polygons were generated to support field survey planning. Predicted wetlands intersecting the PDA were reviewed using high-resolution aerial imagery prior to field surveys to refine areas targeted for field verification and delineation.

9.1.3.2 Wetland Delineation Surveys

Qualified wetland assessors conducted wetland delineation and functional assessment surveys within the PDA. Field surveys were conducted within the Study Area in 2024 and 2026. Wetlands greater than 100 m^2 within the PDA were field delineated, with some portions interpreted using desktop information where wetland boundaries or connectivity extended beyond the field surveyed area (Figure 9.1, Appendix A).

Individual wetlands were delineated using the US Army Corps of Engineers (USACE, 1987) *Wetlands Delineation Manual* and the USACE (2012) *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region*. Wetland boundaries and delineation data were collected using the ArcGIS applications QuickCapture and Survey123, with an estimated accuracy of 3 to 5 m. Wetland boundaries were walked and mapped in the field. Portions of wetland extending beyond the PDA (within the LAA and RAA) were interpreted upon completion of the field program using the NSECC Wet Areas Mapping, LiDAR Predicted Wetland Mapping, and aerial imagery.

Wetlands were classified using the *Canadian Wetland Classification System* (National Wetlands Working Group, 1997). Where a wetland consisted of more than one wetland class, the wetland was classified as a complex, with the dominant class identified first followed by the adjoining or subordinate class or classes.

Wetland type, water flow paths, dominant vegetation communities, fish habitat potential, wetland function, and SAR/SoCC were recorded, where applicable. Wetland inflows and

outflows were georeferenced where encountered, along with observations of culverts and ditches. Evidence of existing disturbance was also recorded when observed, and hydrologic connections with other wetlands, watercourses, and waterbodies were documented.

The wetland delineation procedure identifies the wetland-upland interface and is based on the presence of the following environmental parameters:

- Hydrophytic vegetation
- Hydric soils
- Wetland hydrology

All three parameters are required to support a wetland determination. Sampling points were established at representative locations within wetlands and adjacent upland habitat to characterize condition and support delineation of the wetland-upland boundary.

Hydrophytic Vegetation

Hydrophytic vegetation refers to plant species adapted to saturated soils (USACE, 1987). The Nova Scotia Wetland Indicator Plant List (NSECC, 2012) was used to assign wetland indicator status to applicable vegetation species. Wetland indicator status reflects the probability or likelihood of a species occurring in wetland relative to non-wetland habitat. Percent cover and wetland indicator status of vegetation species were recorded within plots according to each vegetation stratum (10 m for trees, 5 m for shrubs, and 2 m for herbs) and used to determine if hydrophytic vegetation was dominant at each sampling location.

Hydric Soils

Hydric soils form under prolonged periods of saturation, flooding, or ponding during the growing season, resulting in anaerobic (oxygen-free) conditions (US Department of Agriculture (USDA) Natural Resources Conservation Service, 1994).

Hydric soil indicators were assessed in accordance with the USDA (2017) *Field Indicators of Hydric Soils in the United States*. Soil samples were collected using a soil auger to an approximate depth of 50 cm or to the point of refusal. Soil profiles were assessed for texture, thickness, and colour using a Munsell Soil Colour Chart (Kollmorgen Instruments Company, 1990), and the presence of applicable hydric soil indicators.

Wetland Hydrology

Wetland hydrology is characterized by periodic inundation or soil saturation at or near the surface at some point during the growing season. Wetland hydrology indicators were recorded where observed at determination plots and throughout surveyed wetland areas.

9.1.3.3 Wetland Functional Assessment

Wetland functional assessments were completed for each field-assessed wetland using the Non-tidal *Wetland Ecosystem Services Protocol for Atlantic Canada* (WESP-AC V 3.3)

(Adamus, 2018). WESP-AC is used to assess wetland functions and associated benefits and is required by NSECC to support wetland alteration applications. Where surface water is present, physical parameters such as pH, total dissolved solids, and conductivity were measured. The desktop component WESP-AC assessment was completed following the field assessment.

WESP-AC characterizes and ranks 19 ecosystem functions and their associated benefits (Table 9.1) using ecological characteristics (indicators) documented through field observations, desktop review, and consideration of surrounding stressors. The WESP-AC model uses these inputs to generate standardized scores for each assessed function and associated benefit. Function scores are categorized as Lower, Moderate, or Higher relative to the distribution of scores for the applicable Nova Scotia wetland reference dataset.

Table 9.1 WESP-AC Ecosystem Functions and Benefits

Function	Definition	Potential Benefit
Hydrologic Functions		
Surface Water Storage	The effectiveness for storing runoff or delaying the downslope movement of surface water for long or short periods.	Flood control and maintaining ecological systems
Stream Flow and Temperature Support	The effectiveness for contributing to streamflow, and to water cooling, especially during the driest part of a growing season.	Supporting fish and other aquatic life
Water and Climate Protection Functions		
Sediment and Toxicant Retention & Stabilisation	The effectiveness for intercepting and filtering suspended inorganic sediments and toxins, thus allowing their deposition; reducing current velocity; resisting erosion; and stabilizing underlying sediments or soil.	Maintaining quality of receiving waters and protecting shoreline structures from erosion.
Phosphorus Retention	The effectiveness for retaining phosphorus for long periods (>1 growing season).	Maintaining quality of receiving waters
Nitrate Removal & Retention	The effectiveness for retaining particulate nitrate and converting soluble nitrate and ammonium to nitrogen gas while generating little or no nitrous oxide (a potent GHG).	Maintaining quality of receiving waters
Wildfire Resistance	A wetland's capacity to resist ignition by wildfire and/or to resist sustaining it once burning, thus potentially limiting, or delaying wildfire spread to other areas.	Maintaining quality of receiving waters. Protection from wildfires.
Carbon Stock Preservation	The ability of wetland processes to preserve the total biomass of organic carbon as it accumulates over time in a wetland's soil/sediment (an attribute, not a function).	Maintain carbon sequestration.
Carbon Capture	The effectiveness of a wetland both for retaining incoming particulate and dissolved carbon and converting carbon dioxide gas to organic matter	Increase carbon sequestration and

Function	Definition	Potential Benefit
	(particulate or dissolved) through photosynthesis. The effectiveness to then retain that organic matter on a net annual basis for long periods while emitting little or no methane (a potent GHG).	prevent the release of GHG.
Organic Nutrient Export	The effectiveness for producing and subsequently exporting organic nutrients (mainly carbon), either particulate or dissolved. It does not include exports of carbon in gaseous form or as animal matter.	Supporting food chains in receiving waters
Ecological (Habitat) Functions		
Aquatic Primary Productivity	The capacity to support aquatic primary productivity and provide nutrients and energy to higher trophic levels and organisms.	Supporting aquatic food webs and contributing to local biodiversity
Anadromous Fish Habitat	The capacity to support an abundance and diversity of native anadromous fish for functions other than spawning.	Supporting recreational and ecological values
Resident and Other Fish Habitat	The capacity to support an abundance and diversity of native non-anadromous fish.	Supporting recreational and ecological values
Amphibian Habitat	The capacity to support or contribute to an abundance and diversity of native amphibians (e.g., frogs, toads, salamanders) and turtles.	Maintaining regional biodiversity
Waterbird Feeding Habitat	The capacity to support an abundance and diversity of waterbirds that migrate or winter but do not breed in the region.	Supporting hunting and ecological values; and maintaining regional biodiversity
Waterbird Nesting Habitat	The capacity to support an abundance and diversity of waterbirds that nest in the region.	Maintaining regional biodiversity
Raptor & Wetland Songbird Habitat	The capacity to support an abundance and diversity of native raptors and wetland songbirds.	Maintaining regional biodiversity
Keystone Mammal Habitat	The capacity to support keystone mammals in the region.	Maintaining regional biodiversity
Native Plant Habitat	The capacity to support a diversity of native vascular and non-vascular species and functional groups, especially those that are most dependent on wetlands and water.	Maintaining regional biodiversity and food chains
Pollinator Habitat	The capacity to support pollinating insects and birds.	Maintaining regional biodiversity and food chains

9.1.3.4 Wetlands of Special Significance

The Nova Scotia *Wetland Conservation Policy* (Nova Scotia Environment, 2019) identifies WSS based on specific ecological functions, conservation, and regulatory criteria. For the purposes of this assessment, wetlands within the PDA were evaluated against the WSS criteria identified in the Policy:

- Salt marshes
- Wetlands within, or partially within, a designated Ramsar site, provincial wildlife management area, provincial park, nature reserve, wilderness area, or lands owned or legally protected by non-government charitable conservation land trusts
- Intact or restored wetlands that are project sites under the North American Waterfowl Management Plan and secured for conservation through Nova Scotia Eastern Habitat Joint Venture
- Wetlands that support SAR that are designated under the SARA or the NSESA
- Wetlands within designated protected water areas under Section 106 of the Nova Scotia *Environment Act*

WESP-AC results, including application of the WSS Interpretive Tool, were used to identify WSS.

Based on consultation with NSECC, a wetland is considered a WSS based on the presence of mobile SAR (e.g., birds and bat species that are provincially listed as Threatened or Endangered) if the subject wetland provides or supports life functions for the SAR (e.g., a SAR bird species observed during the breeding period in their preferred habitat). NSECC confirmed that the determination of a WSS based on the presence of a mobile SAR should be based on current observations during field surveys in support of this EA, rather than historical records (e.g., AC CDC records).

9.2 Existing Environment

9.2.1 Wetland Overview

Within the LAA, approximately 200 ha of wetland was identified using the Predicted Ecosystem Mapping for Nova Scotia, with field-delineated wetland boundaries used to refine or replace predicted wetland boundaries where field surveys were completed, representing approximately 4.4% of the LAA.

Field surveys identified and delineated 16 wetlands within the PDA, comprising approximately 12.7 ha, or 1.5% of the PDA. Identified wetlands included shrub swamps, forested swamps, and wetland complexes, with shrub swamp being the most commonly identified wetland type. The area of individual wetlands within the PDA ranged from approximately 136 m^2 to 5.6 ha. Wetland locations and extents within the PDA and LAA are shown in Appendix A, Figures 9.1 and 9.2., and wetland type, area within the PDA, and LAA

are summarized in Table 9.2. Wetland delineation and assessment information is provided in Appendix H.

Table 9.2 Wetlands Identified within the PDA

Wetland ID	Wetland Type	Area within PDA (ha)	Area within LAA (ha)
WL01	Shrub Swamp	4.09	27.3
WL03	Forested Swamp	0.11	0.11
WL04	Forested Swamp	0.37	0.38
WL05	Shrub Swamp	0.45	1.73
WL06	Forested Swamp	0.15	0.20
WL07	Forested Swamp	0.13	0.14
WL08	Shrub Swamp	0.01	0.02
WL10	Shrub Swamp	0.17	0.17
WL11	Shrub Swamp	0.08	0.14
WL12	Complex	5.60	126
WL13	Complex	0.27	0.27
WL14	Shrub Swamp	0.09	0.09
WL15	Forested Swamp	1.01	4.16
WL16	Shrub Swamp	0.07	0.07
WL17	Forested Swamp	0.06	0.06
WL18	Shrub Swamp	0.05	0.05

9.2.2 Wetland Functional Assessment

Wetland functions were assessed for each of the 16 wetlands within the PDA using information collected during desktop and field assessments. Individual wetland WESP-AC function scores and ratings are provided in Appendix H.

The distribution of WESP-AC functional ratings among assessed wetlands is summarized in Table 9.3. Categorical ratings were used to characterize general functional patterns among wetlands rather than directly comparing normalized scores across different functions.

Table 9.3 Individual Function Rating Counts for Assessed Wetlands

Function	Higher	Moderate	Lower
Surface Water Storage (WS)	2	8	6
Stream Flow & Temperature Support (SFTS)	3	11	2
Sediment & Toxicant Retention & Stabilisation (SR)	1	2	13
Phosphorus Retention (PR)	1	1	14
Nitrate Removal & Retention (NR)	1	9	6

Function	Higher	Moderate	Lower
Wildfire Resistance (WFR)	3	3	10
Carbon Stock Preservation (CSP)	2	12	2
Carbon Capture (CC)	5	5	6
Organic Nutrient Export (OE)	4	10	2
Aquatic Primary Productivity (APP)	4	4	8
Anadromous Fish Habitat (FA)	3	2	11
Resident & Other Fish Habitat (FR)	3	3	10
Amphibian Habitat (AM)	0	1	15
Waterbird Feeding Habitat (WBF)	0	8	8
Waterbird Nesting Habitat (WBN)	0	6	10
Raptor & Wetland Songbird Habitat (RSB)	4	12	0
Keystone Mammal Habitat (KMH)	7	6	3
Native Plant Habitat (PH)	7	5	4
Pollinator Habitat (POL)	12	4	0

Pollinator Habitat was the most consistently Higher-rated individual function, with 12 of the 16 assessed wetlands receiving a Higher rating and the remaining four receiving a Moderate rating. Raptor and Wetland Songbird Habitat was also consistently rated Moderate or Higher, with four wetlands rated Higher and 12 rated Moderate. Other frequently Higher-rated functions included Keystone Mammal Habitat and Native Plant Habitat, each with seven wetlands rated Higher.

At the grouped-function level, Transition Habitat had the greatest proportion of Higher ratings, with 81% of assessed wetlands rated Higher and the remaining 19% rated Moderate. Higher ratings were also assigned to 44% of wetlands for Aquatic Support, 25% for Water and Climate Protection and Aquatic Habitat, and 13% for Hydrologic functions. The distribution of grouped-function ratings is summarized in Table 9.4.

Table 9.4 Distribution of WESP-AC Grouped Function Ratings for Assessed Wetlands

Grouped Function	Higher	Moderate	Lower
Hydrologic	13%	50%	38%
Water & Climate Protection	25%	50%	25%
Aquatic Support	44%	44%	13%
Aquatic Habitat	25%	31%	44%
Transition Habitat	81%	19%	0%

Note: Percentages may not total 100% due to rounding.

9.2.3 Wetlands of Special Significance

Field-assessed wetlands were evaluated for WSS status using the criteria described in Section 9.1.3.4, including Project-specific field observations and the WESP-AC WSS

Interpretive Tool. No flora SAR designated under SARA or NSESA were observed during field surveys within the assessed wetlands.

Of the 16 wetlands assessed, WL12 was identified as a functional WSS based on application of the WESP-AC WSS Interpretive Tool. WL12 satisfied the Habitat Rule, with a High Function-Benefit Product category for Aquatic Habitat and a Moderate category for Transition Habitat.

WL12 is a large wetland complex associated with a section of the River Hebert between Gilbert Lake and Newville Lake. A portion of WL12 overlaps the current Project layout along the proposed transmission corridor.

The remaining assessed wetlands did not meet the criteria used to identify WSS.

9.3 Effects Assessment

9.3.1 Potential Effects and Mitigation

Avoidance is the first step in wetland conservation and mitigation (Nova Scotia Environment, 2019). Wetland delineation information will be considered during Project planning and will continue to inform detailed design and micrositing of Project infrastructure to avoid and minimize wetland alteration where practicable, while meeting engineering and design constraints. The PDA encompasses a broader area than the current Project layout; therefore, the presence of a wetland within the PDA does not necessarily indicate that it will be altered by the Project. Existing roads will also be used where feasible to reduce the need for new disturbance.

Potential adverse effects of the Project on wetlands may occur through several interconnected pathways: wetland habitat loss or alteration, changes in wetland hydrology, and associated changes in wetland function. Direct effects would occur primarily where Project activities overlap wetlands and may include vegetation removal, excavation, grading, infilling, and soil compaction. Indirect effects may occur where Project activities alter surface-water or groundwater flow, sediment transport, water quality, or other conditions supporting retained wetland habitat.

Potential interactions between Project activities and wetlands are summarized in Table 9.5 before consideration of the mitigation measures described below.

Table 9.5 Potential Environmental Effects of the Project on Wetlands

Project Activity	Potential Environmental Effects		
	Wetland Habitat Loss or Alteration	Change in Wetland Hydrology	Change in Wetland Function
Construction			
Site Preparation	X	X	X
Access Roads Construction and Modifications	X	X	X
Material and Equipment Delivery and Storage	-	-	X
Infrastructure Installation	X	X	X
Restoration of Temporary Areas	-	-	-
Testing and Commissioning	-	-	-
Operation and Maintenance			
Turbine Operation and Maintenance	-	-	-
Road Maintenance	X	X	X
Power Line and Substation Maintenance	X	-	X
Vegetation Management	X	X	X
Safety and Security	-	-	-
Decommissioning			
Removal of Infrastructure and Site Restoration	-	-	-

X = Potential Interaction
- = No Interaction

The nature and extent of potential effects, and the mitigation measures proposed to avoid or reduce them, are described in the following sections. Mitigation measures identified for other VECs, particularly surface water, aquatic habitat, soils, flora, and terrestrial wildlife, will also support the protection of wetland habitat, hydrology, and function.

9.3.1.1 Wetland Habitat Loss and Alteration

Construction of permanent Project infrastructure may result in direct loss or alteration of wetland habitat where Project components overlap wetlands. Potential effects include removal of wetland vegetation, disturbance or removal of organic material and hydric soils, infilling, soil compaction, and fragmentation of wetland habitat. Temporary construction activities may also disturb wetland vegetation and soils where avoidance is not practicable.

Clearing, grubbing, excavation, placement of fill, and movement of heavy equipment may alter the physical characteristics that support wetland habitat. Soil compaction may affect vegetation root systems, soil porosity, and saturation, while vegetation and soil disturbance may affect habitat available to wetland-associated flora and fauna, including SAR/SoCC. Potential changes to surface-water and groundwater conditions resulting from direct disturbance are discussed further in Section 9.3.1.2, Change in Wetland Hydrology.

Wetlands occur within the PDA; however, the PDA encompasses a broader area than the current Project layout and does not represent the anticipated extent of wetland alteration. The extent of permanent and temporary wetland alteration associated with the Project will be refined through detailed design and micrositing and through the wetland alteration approval process.

The Project will apply avoidance and minimization measures during detailed design and construction to reduce loss and alteration to wetlands where practicable. Measures applicable to wetland habitat will be further detailed in the EPP and implemented, as applicable, during construction.

- Wetland loss or alteration will be avoided, where possible.
- Permits, approvals, and authorizations for wetland alteration will be obtained prior to the start of activities that have the potential to impact wetlands. The Project will follow the conditions and requirements set out in the acquired permits and approvals for the works.
- Wetland organic material and topsoil removed during construction will be stored separately and reused for site restoration where practicable.
- Where temporary disturbance to wetlands is unavoidable, construction methods will be selected to reduce rutting, admixing, and compaction of wetland soils and vegetation.
- Temporarily disturbed wetland areas will be stabilized and restored following construction, as appropriate to site conditions and applicable approval requirements.
- Unavoidable wetland loss will be addressed through compensation in accordance with applicable NSECC requirements.

9.3.1.2 Change in Wetland Hydrology

Construction and operation and maintenance activities may affect surface water and groundwater conditions associated with wetlands within and adjacent to the Project layout. Earthworks, excavation, road construction and placement of fill may alter surface-water flow paths or local water-table conditions (i.e., saturation, impoundment and/or redirection of water, water storage). Wetland surface water quality may be impacted by sediment-laden runoff or nutrient input. Changes to stream flow quantity and direction may affect wetland area and surface water functions. Changes in drainage may result in increased or decreased water inputs to wetlands, altered flow direction or velocity, localized impoundment, or changes in wetland saturation and hydroperiod. Temporary dewatering and excavation may also affect groundwater levels near construction areas and, where hydrologically connected to adjacent wetlands, could affect wetland saturation.

Roads and other Project infrastructure may intercept or redirect surface water drainage where cross-drainage is not maintained. Stormwater runoff from roads and other disturbed surfaces may increase or concentrate flows entering receiving wetlands, potentially contributing to erosion, sediment transport, or changes in wetland hydrology. Sediment-laden runoff or other Project-related inputs may also affect wetland water quality.

Potential effects on wetland hydrology will be reduced through Project design, planning and management of construction activities, including surface water management and ESC measures. Measures will be further detailed in the EPP and implemented, as applicable, during construction.

- Areas of clearing and grubbing will be limited to that needed to construct and operate the Project.
- Clearing will be conducted during winter months on frozen ground to protect the underlying vegetative mat and to reduce erosion and sedimentation of wetlands, where feasible.
- Culverts and other cross-drainage structures will be appropriately located and sized to maintain drainage across Project roads and reduce the potential for impoundment or redirection of surface water.
- Disturbed areas will be stabilized and revegetated as soon as practicable following completion of construction activities.
- A Surface Water Management Plan will be developed and implemented during construction.
- Mitigation measures described in Chapter 7 (Aquatic Environment) will also support the maintenance of water quality and hydrologic conditions associated with wetlands.

9.3.1.3 Change in Wetland Function

Changes to wetland habitat and hydrology may result in corresponding changes to wetland function. The nature and extent of functional change will depend on the characteristics of the individual wetland, the function it supports, the extent and duration of disturbance, and the degree to which hydrologic conditions and connectivity can be maintained following construction.

Direct wetland alteration may reduce functions associated with surface-water storage, sediment and nutrient retention, carbon storage and capture, native plant habitat, and habitat for fish and wildlife. Changes in hydrology outside the direct disturbance footprint may also affect wetland function where Project activities alter water levels, hydroperiod, flow pathways, or hydrologic connectivity.

Vegetation removal, soil disturbance, and compaction may affect hydric soils, water storage capacity, vegetation communities, and organic carbon stores. Altered drainage or water inputs may also affect wetland vegetation and functions associated with water-quality maintenance. Sediment-laden runoff could affect retained wetland vegetation and receiving-water conditions if not appropriately controlled. Construction disturbance may also create

conditions conducive to the introduction or spread of non-native and invasive plant species, particularly along roads, disturbed wetland margins and downgradient wetlands.

Wetland alteration may also affect ecological habitat functions supporting fish, amphibians and reptiles, birds, mammals, pollinators, and other wetland-associated species. Effects on these receptors are considered further in Chapter 7 (Aquatic Environment), Chapter 8 (Flora), Chapter 10 (Terrestrial Wildlife), Chapter 11 (Bats), and Chapter 12 (Birds).

Potential effects on wetland function will be reduced primarily through avoidance and minimization of wetland alteration, maintenance of wetland hydrology and connectivity, ESC measures, management of invasive species, and restoration of temporarily disturbed wetland areas. Measures applicable to wetland habitat will be further detailed in the EPP and implemented, as applicable, during construction:

- Construction materials and practices will be managed to reduce the potential introduction or spread of non-native and invasive plant species.
- ESC and dust control measures will be implemented to reduce sediment deposition within adjacent and downgradient wetlands.
- Wetland compensation and monitoring will be undertaken in accordance with applicable NSECC wetland alteration approval conditions.
- Wetland organic material removed during construction will be stored separately and reused during restoration where practicable.
- Where monitoring identifies Project-related changes to retained wetland conditions, adaptive management measures will be considered and implemented as appropriate.

9.3.2 Residual Effects

Following implementation of avoidance, mitigation, and restoration measures, residual adverse effects on wetlands are expected to consist primarily of permanent wetland habitat loss or alteration associated with permanent Project infrastructure and the potential for localized changes to hydrology and function in retained portions of affected wetlands.

The extent of permanent and temporary wetland alteration will be refined through detailed design and micrositing and through the wetland alteration approval process. Permanent alteration will result in long-term loss or modification of wetland habitat and associated functions within the affected footprint. Temporarily disturbed wetland areas will be restored where feasible and in accordance with applicable approval requirements.

Potential indirect effects on retained wetlands, including changes in drainage, water levels, sedimentation, and associated wetland functions, are expected to be localized following implementation of surface-water management, ESC measures, maintenance of drainage pathways, and other mitigation described above. Monitoring required through applicable wetland alteration approvals will be used to evaluate conditions in affected wetlands and support adaptive management where warranted.

Residual adverse effects are expected to be localized in geographic extent, occurring primarily where the Project layout intersects wetlands and in immediately adjacent portions of affected wetlands. Effects associated with permanent wetland alteration will be long-term and irreversible at the location of alteration, whereas effects associated with temporary disturbance are expected to be reversible following restoration, where successful. Indirect effects on retained wetlands are expected to occur primarily during construction and to be reduced through mitigation and restoration. The magnitude of residual effects will depend on the final extent and type of wetland alteration and the functions supported by affected wetlands and will be further defined through detailed design and wetland alteration permitting.

The ecological context of affected wetlands was considered using wetland type, hydrologic connectivity, functional assessment results, and WSS status. The Project includes wetlands with varying functional ratings, and WL12 was identified as a WSS based on application of the WESP-AC WSS Interpretive Tool. Potential effects on higher-value or sensitive wetland functions will therefore be considered during detailed design and applicable wetland alteration permitting.

Considering continued opportunities to avoid and minimize wetland alteration through detailed design and micrositing, implementation of measures to reduce indirect effects on retained wetlands, restoration of temporary disturbance where feasible, and applicable regulatory requirements for wetland alteration, compensation, and monitoring, residual adverse effects on the wetland VEC are predicted to be not significant.

9.4 Monitoring

Wetland monitoring will be undertaken in accordance with applicable NSECC wetland alteration approval conditions. Monitoring will document the extent of wetland alteration and evaluate ecological and hydrological conditions in retained portions of affected wetlands before and after construction, as applicable.

Monitoring parameters will be established based on approval requirements and site-specific conditions and may include vegetation composition, presence of invasive species, wetland hydrology, and evidence of changes in wetland-upland boundaries or hydrologic connectivity. Hydrological monitoring may include water-level measurements and response to precipitation events to provide a basis for comparison between baseline and post-construction conditions.

Monitoring results will be used to identify Project-related changes in retained wetland areas and inform adaptive management measures where warranted. Monitoring associated with wetland compensation will also be undertaken in accordance with applicable NSECC approval requirements.

10 Terrestrial Wildlife

10.1 Overview

This chapter addresses the potential effects of the Project on terrestrial wildlife and their habitats, excluding bats and birds, which are assessed separately in Chapters 11 and 12. The assessment considers both direct and indirect Project-related interactions and describes measures to avoid, minimize, and mitigate adverse effects through all phases of the Project. Project interactions with terrestrial wildlife are closely linked to effects on other VECs discussed in related chapters, including noise and light disturbance (Chapter 5), vegetation loss or modification (Chapter 8), and wetland alteration or loss (Chapter 9).

The Project has the potential to affect terrestrial wildlife through direct pathways, such as increased mortality or injury associated with vehicle and equipment movement during construction, operation and maintenance, and decommissioning. Indirect effects may occur through habitat loss, fragmentation, and modification, as well as disturbance from increased human activity, noise, and lighting. Wildlife may exhibit short- or long-term behavioural responses, including avoidance of habitats affected by Project related activities, depending on species-specific sensitivities and tolerance to disturbance.

Strategic site planning has been used to reduce potential habitat disturbance, loss, and fragmentation, including through the use of existing roads and previously disturbed or harvested areas where feasible. Detailed design will continue to consider opportunities to minimize vegetation clearing and interactions with wetlands, watercourses, and wildlife habitat. Vegetated buffers adjacent to wetlands and watercourses will be retained where practical to support habitat functions and wildlife movement. Temporary disturbed areas will be allowed to regenerate following construction, where appropriate, to support recovery of ecological function and reduce long-term effects on terrestrial wildlife.

As described in the following subsections, measures to reduce habitat loss and fragmentation include utilizing existing roads where feasible, upgrading existing road infrastructure as required, and locating Project components within previously disturbed areas. Portions of the access roads that are only required for construction and not operation will be reclaimed and progressively restored in the PDA to mitigate the long-term impacts of habitat loss and fragmentation. Expected effects, mitigation measures, and

residual impacts to terrestrial wildlife resulting from the Project are outlined in this chapter and will be further developed in an EPP prior to construction to minimize adverse effects.

10.1.1 Regulatory Context

Assessment of the terrestrial wildlife considers relevant provincial and federal legislation and guidelines:

- SARA
- *Canadian Environmental Protection Act*
- NSESA
- Nova Scotia *Wildlife Act*
- Nova Scotia *Biodiversity Act*
- Nova Scotia *Environment Act*

10.1.2 Boundaries

The PDA represents the Project footprint and the maximum limit of potential direct physical disturbance associated with the Project. For this assessment, the LAA for terrestrial wildlife includes the PDA and a 2 km buffer of the PDA. The RAA encompasses the broader Cumberland-Colchester Mainland Moose concentration area and surrounding landscape. The RAA provides the regional context for evaluating wildlife populations, habitat availability, movement patterns, and cumulative effects associated with the Project in combination with other existing and reasonably foreseeable activities.

The Study Area defines the spatial extent within which baseline conditions were characterized during field assessments. The existing environment describes the Study Area, but the effects assessment is focused on the PDA, LAA, and RAA.

10.1.3 Assessment Methodology

The assessment of terrestrial wildlife focused on identifying wild terrestrial fauna species present or likely to occur in or near the LAA, with particular emphasis on SAR and SoCC and their associated habitats. This was accomplished through a combination of literature review, habitat analysis, and field surveys. Information gathered during the literature review and desktop habitat analysis informed the design and implementation of field surveys targeting priority species, as outlined in the *Guide to Addressing Wildlife Species and Habitat in an EA Registration Document* (NSECC, 2009).

Data collected through these efforts were used to evaluate the potential impacts of the Project on terrestrial wildlife, guide the siting of Project infrastructure to reduce potential impacts, and develop measures to minimize adverse effects of Project activities on terrestrial wildlife. The information collected through the assessment process provides baseline data for post-construction monitoring and adaptive management.

The description of the existing environment is based primarily on data collected from the following sources, supplemented by field surveys conducted for this Project:

- Nova Scotia Significant Species and Habitats Database (NSDNR, 2026)
- Species at Risk Public Registry documents for federal SAR
- Species at Risk documents for provincial SAR
- Predictive Ecosystem Mapping for Nova Scotia (Government of Nova Scotia, 2024)
- AC CDC Data Report (AC CDC, 2026)
- iNaturalist.ca Observation Database (2026)
- Nova Scotia Forestry Inventory (Government of Nova Scotia, 2021)
- Nova Scotia Wet Areas Mapping (Government of Nova Scotia, 2012)
- Old-Growth Potential Index V2 (NSDNR, 2025)
- Ecological Land Classification for Nova Scotia (Neily et al., 2017)
- Nova Scotia Hydrographic Network (Government of Nova Scotia, 2025)
- Global Nature Watch Tree Cover Loss 2001-2025 and Gain 2000-2020 (Global Nature Watch, 2026)
- Canada Landsat Disturbance 2017
- Assessment of Species Diversity in the Atlantic Maritime Ecozone (McAlpine and Smith, 2010)

Records of terrestrial mammal, herpetofauna, and invertebrate SAR and SoCC within 100 km of the PDA were obtained from the AC CDC Data Report (AC CDC, 2026). Habitat in the Study Area was assessed using available habitat information and mapping data, including federal critical habitat and provincial core habitat data layers.

Consultation with NSDNR was undertaken to identify sensitive wildlife species that may occur within the Study Area to inform survey methodologies and assessment approaches. Occurrences of mainland Nova Scotia population of Moose (*Alces alces americana*, herein referred to as Mainland Moose) and Wood Turtle (*Glyptemys insculpta*), were identified as overlapping with the Study Area.

Predictive habitat mapping was developed to identify areas of suitable habitat in the Study Area for Mainland Moose throughout its life cycle. The map was used to develop field surveys. Details of the habitat mapping are provided in Section 10.1.3.1.

10.1.3.1 Mainland Moose Habitat Mapping

A GIS habitat model was created to evaluate and predict habitat suitability in the Study Area for Mainland Moose life history stages (Figure 10.1, Appendix A). The habitat model applied biophysical criteria adapted from Appendix A of the Mainland Moose recovery plan to identify areas within the Study Area that may provide seasonal cover, forage, or calving habitat (NSDNR, 2021). The following datasets were used to build the model:

- Nova Scotia Forestry Inventory
- Wetlands and Watercourses of Nova Scotia
- Global Nature Watch Tree Cover Loss and Gain Data supplemented with recent satellite imagery to capture current forest loss from industrial forestry activities

In Nova Scotia, Mainland Moose occupy a variety of forest types, typically selecting mature stands that provide security and thermal cover, interspersed with areas offering forage such as young deciduous trees and shrubs. To account for changes in forest cover that have occurred since the Nova Scotia Forestry Inventory was completed, including those associated with widespread forestry activities within the region, the inventory was refined using Global Nature Watch tree cover loss and gain datasets and recent satellite imagery to provide a more current representation of habitat conditions in the Study Area.

The following outlines the criteria for selecting winter and summer cover habitat components:

- Winter cover – Softwood and softwood dominated mixedwood stands at least 5 ha in size meeting the mature stand requirements (60 % crown closure and at least 12 m in height (or at least 8 m in height with a depth to water table no more than 50 cm)
- Summer cover – Hardwood, mixedwood, and softwood stands at least 5 ha in size meeting the same mature stand requirements above

After selecting winter and summer forest cover, the following criteria were applied to identify seasonal forage and calving area habitat components:

- Winter forage – Any regenerating forested type within 200 m of winter cover, or mature hardwood or hardwood dominated mixedwood within 200 m of winter cover, or mature softwood dominated mixedwood (no distance requirement from cover)
- Summer forage – Any regenerating forested type within 200 m of cover (summer or winter), or mature mixedwood or hardwood (no distance requirement from cover)
- Calving area – Open water within 40 m of any mature stand, or open water within 40 m of regenerating forage (winter or summer) that is within 200 m of a mature stand, or open water within 40 m of mature forage (winter or summer)

10.1.3.2 Field Surveys

The objective of the field surveys was to document terrestrial wildlife occurrence and evidence of habitat use within the Study Area, with emphasis on Mainland Moose, other SAR and SoCC, and associated habitats. Surveys targeting Mainland Moose included winter tracking, trail camera traps, and Pellet Group Inventory (PGI) surveys (Figure 10.2).

Incidental observations of wildlife during other field survey programs conducted in the Study Area between 2024 and 2026 are also incorporated into the assessment of the existing environment.

The presence of available turtle habitat within the Study Area was assessed through desktop review of available spatial data; including watercourses, wetlands, aerial imagery; and habitat information collected during wetland and watercourse field assessments. Existing species occurrence records were also reviewed. No targeted turtle surveys were completed for the Project; therefore, the assessment of turtle occurrence was based on existing records, incidental observations, and the presence of suitable habitat within the Study Area.

Winter Tracking

Winter tracking surveys were conducted in the Study Area on foot over two winter seasons, in 2025 and 2026. In the first winter season, four rounds of winter tracking surveys were completed, January 14-15, February 7, February 10-11, and March 4, 2025. In the second winter season, five rounds of winter tracking surveys were completed, February 16, March 6-7, March 10, March 25, and March 28, 2026. Winter tracking surveys were completed following the *Protocol for Mainland Moose Snow Tracking Survey 2022 Update* (NSDNR, 2022a) and informed by habitat parameters in the Mainland Moose recovery plan (NSDNR, 2021). The surveys were designed to target areas where Mainland Moose are expected to be active during winter, particularly winter cover and winter forage habitats identified in the recovery plan, while also documenting evidence of other wildlife species across representative habitat types within the Study Area.

The winter tracking surveys were conducted along select survey routes within seven days of a snowfall event of 10 cm or more. Across four rounds of winter tracking surveys conducted in 2025, a total of 35.9 km was surveyed. Across five rounds conducted in 2026, a total of 54.2 km was surveyed.

Camera Traps

Camera traps using trail cameras were set up between April 2024 and May 2025 in the Study Area along natural corridors for wildlife movement including roadways, wetlands, forest trails, harvested areas, and riparian areas along watercourses and waterbodies. During the field program, camera traps were occasionally relocated to expand spatial coverage and respond to seasonal wildlife movement patterns and observations recorded through camera trapping and other field surveys. In total, 15 trail camera trap locations were established; Table 10.1 presents deployment locations, habitat, deployment days, and total survey days for each camera trap. SD cards in the camera traps were switched every three to four weeks, the images were uploaded, and were then analyzed using AddaxAI, a software tool developed to quickly detect wildlife captures on camera traps. For quality control, a subset of images was manually evaluated for wildlife detections from each SD card upload. The images identified as wildlife captures through AddaxAI were then verified and identified to the species level.

Table 10.1 Camera Trap Deployment Periods, Duration, and Habitat

Camera Trap Name	Date Deployed	Date Retrieved	No. of Survey Days	Habitat
WB01	29-April-2024	29-May-2025	396	Balsam Fir - Black Spruce Forest
WB02	29-April-2024	17-Dec-2024	232	Spruce - Pine Forest
WB03	29-April-2024	17-Dec-2024	232	Mixedwood Forest
WB04	01-May-2024	15-May-2025	380	Black spruce - Aspen Mixedwood Forest
WB05	01-May-2024	17-Dec-2024	230	Regenerating Mixedwood Forest
WB06	01-May-2024	17-Dec-2024	230	Mixedwood Forest

Camera Trap Name	Date Deployed	Date Retrieved	No. of Survey Days	Habitat
WB07	01-May-2024	17-Dec-2024	230	Red Spruce - Hardwood Mixedwood Forest
WB10	17-Dec-2024	15-May-2025	150	Regenerating Mixedwood Forest
WB11	17-Dec-2024	15-May-2025	150	Wet Mixedwood Forest
WB12	17-Dec-2024	15-May-2025	150	Wet Black Spruce Forest
WB13	17-Dec-2024	15-May-2025	150	White Birch - Red Maple - Aspen Forest
WB14	17-Dec-2024	15-May-2025	150	Black Spruce - Red maple Mixedwood Forest
WB15	17-June-2025	24-Sept-2025	100	Red Maple Forest
WB16	17-June-2025	24-Sept-2025	100	Sugar Maple Forest
WB17	17-June-2025	24-Sept-2025	100	Regenerating Hardwood Forest

Pellet Group Inventory

PGI surveys were conducted on foot by two-person teams in the Study Area to understand the distribution, suitable habitats, and movement corridors of Mainland Moose and White-tailed Deer (*Odocoileus virginianus*). The PGI surveys generally followed the Pellet Group Inventory Data Collection Protocol (NSDNR, 2022b), which involves walking transects and recording winter pellet groups and other evidence of moose and deer. Transect routes were selected to encompass representative habitats in the Study Area, with a specific emphasis on areas where Mainland Moose are expected to be active, including winter cover and foraging habitats. The PGI survey routes were designed to document baseline evidence of habitat use and support comparability with a post-construction monitoring program. Post-construction monitoring programs will help assess the effectiveness of Project-specific mitigation measures and detect changes in documented habitat use resulting from the Project.

PGI transects in the Study Area were surveyed over two seasons, in 2024 and in 2026. In 2024, surveys were conducted May 14 and May 15, and covered 12 km. In 2026, surveys were conducted April 26, May 29, May 31, and June 2, and covered 51.1 km.

Survey teams recorded winter pellet groups of moose and deer along the transect routes. All suspected Mainland Moose activity was recorded (i.e., browse, bedding, tracks) and signs of other animal activity, if observed, were also documented during the PGI surveys.

Wood Turtle Habitat Review

Consultation with NSDNR identified Wood Turtle observations within the Study Area; however, no Wood Turtle critical habitat was identified within 5 km of the PDA. Available species occurrence records, habitat mapping, watercourse data, wetland mapping, and other environmental datasets were reviewed to evaluate the possible presence of suitable turtle habitat within the LAA.

Information collected through the desktop assessment and other environmental field programs was used to inform the assessment of potential Project interactions with turtle habitat and other herpetofauna. Incidental observations of all wildlife, including herpetofauna were recorded if encountered during other environmental field programs.

10.2 Existing Environment

10.2.1 Mammals

The NSDNR Significant Species and Habitat Database contains 11 records related to terrestrial mammals (excluding bats) within 100 km of the PDA. All records correspond to Deer Wintering Areas or deer yards, four of which occur within 5 km of the PDA (Figure 10.2).

The AC CDC (2026) Data Report identifies Mainland Moose as the only terrestrial mammal SAR or SoCC recorded within 5 km of the PDA. Within 100 km of the PDA, nine terrestrial mammal SAR and SoCC have been recorded in Nova Scotia, including Mainland Moose.

Mainland Moose are expected in the Study Area as the Project overlaps Core Habitat identified in the species recovery plan, which spans much of Cumberland and Colchester Counties. The recovery plan identifies the Colchester/Cumberland area as supporting the highest concentration of Mainland Moose in the province (NSDNR, 2021).

Mainland Moose are known to use portions of the PDA based on evidence documented during the 2026 field program. The results of the surveys are summarized in Section 10.2.1.2.

In addition to Mainland Moose, seven terrestrial mammal SAR and SoCC identified in the AC CDC Data Report were considered based on their known distributions, habitat associations, and the availability of potentially suitable habitat within the LAA.

Canada Lynx (*Lynx canadensis*) in Nova Scotia predominantly occur in the Cape Breton Highlands, with occasional observations from mainland Nova Scotia (McAlpine and Smith, 2010). The species is associated with habitats supporting abundant prey, particularly Snowshoe Hare (*Lepus americanus*) and is influenced by competition with Bobcats (*Lynx rufus*). A viable population is known only from Cape Breton Island (Nova Scotia Lynx Recovery Team, 2006). The nearest AC CDC record is approximately 39 km from the PDA. Although occasional occurrence cannot be excluded, the LAA is outside the principal known concentration of Canada Lynx in Nova Scotia and is not expected to support a persistent breeding population.

Fisher (*Pekania pennanti*) occurs in coniferous, hardwood, and mixedwood forests and use habitats that support prey species such as Snowshoe Hare, Red Squirrel (*Tamiasciurus*

hudsonicus), and Porcupine (*Erethizon dorsatum*) (Milton et al., 2022). Forested habitats within the LAA may provide suitable habitat for Fisher. The nearest AC CDC record is approximately 14 km from the PDA.

American Marten (*Martes americana*) are primarily associated with mature coniferous and mixedwood forests that provide structural complexity, cover, and small-mammal prey. In Nova Scotia, the highest concentrations occur within populations on Cape Breton Island and in southwestern mainland Nova Scotia (NSDNR, 2023). Although suitable habitat occurs within the LAA, no records from Cumberland County between 2000 and 2021 are reported in the provincial Recovery Strategy (NSDNR, 2023). The nearest AC CDC record is approximately 11 km from the PDA.

Southern Flying Squirrel (*Glaucomys volans*) is associated with mature forest habitat. Mature forests within the LAA may provide suitable habitat, however, the reported range of the Atlantic population of Southern Flying Squirrel is in southwestern Nova Scotia (COSEWIC, 2006). The nearest record of this species is approximately 42 km from the PDA.

Southern Bog Lemming (*Synaptomys cooperi*) occurs in a variety of habitats, including wet areas within regenerating forests and meadows, grassy bogs, and hardwood forests on rocky or talus substrates (McAlpine and Smith, 2010). Regenerating forest, meadow, wetland, and hardwood habitats within the LAA may provide suitable habitat for the species. The nearest record of Southern Bog Lemming is approximately 27 km from the PDA.

A subspecies of Long-tailed Shrews (*Sorex dispar kirklandi*) occurs in the northern Appalachians region, from northern New Hampshire up to mainland Nova Scotia and is associated with cool, moist, mountainous, and rocky habitats (Huynh et al., 2023). Suitable habitat features may occur within the LAA. The nearest record is approximately 27 km from the PDA.

The Maritime Shrew (*Sorex maritimensis*) is associated with wet meadows and fields and may also occur in young coniferous forests characterized by open canopies and abundant ground cover of herbaceous plants, shrubs, and low branches (Henderson & Forbes, 2012). Wetland, meadow, and regenerating forest habitats within the LAA may provide suitable habitat for the species. The nearest record is approximately 43 km from the PDA.

The Eastern Water Shrew (*Sorex albibarbis*) is typically associated with cool, moist habitats near streams, wetlands, and riparian zones, often in mature forests (McAlpine and Smith, 2010). This species is semi-aquatic and relies on invertebrate prey found in aquatic and terrestrial environments. The open meadow wetlands present along watercourses in the LAA may provide suitable habitat for Eastern Water Shrew. The nearest record of Eastern Water Shrew is approximately 50 km from the LAA, in New Brunswick (AC CDC, 2026).

10.2.1.1 Mainland Moose Suitable Habitat

The LAA contains areas that meet one or more of the criteria used to identify core habitat for Mainland Moose in the recovery plan. Of the total land area evaluated in the LAA, 41 % meets the criteria for one or more Mainland Moose habitat components. Overlapping habitat components were counted once in calculating this value. Table 10.2 summarizes the area of each habitat component identified within the LAA and PDA. These habitat components may overlap; therefore, areas identified for individual habitat components should not be summed. The results of the Mainland Moose habitat mapping are presented in Appendix A, Figure 10.1.

Table 10.2 Summary of Predicted Mainland Moose Habitat Components Identified in the LAA and PDA

Habitat Component	Total Area (ha)	
	LAA	PDA
Winter cover	430	20
Summer cover	829	44
Summer forage	3283	258
Winter forage	1186	88
Calving area	14	0

10.2.1.2 Winter Tracking, PGI Surveys, and Camera Trap Results

A total of 11 terrestrial mammal species were documented through field surveys and incidental observations within the Study Area (Table 10.3), seven of which were detected by camera traps (Table 10.4). Locations of winter tracking transects, PGI surveys, and camera traps are presented in Appendix A, Figure 10.2.

Table 10.3 Summary of Terrestrial Wildlife Species Observed

Scientific Name	Common Name	NS ESA	SARA	COSEWIC	S-rank
Alces alces americana	Mainland Moose	Endangered	-	-	S1
Canis latrans	Eastern Coyote	-	-	-	S5
Erethizon dorsatum	North American Porcupine	-	-	-	S5
Lepus americanus	Snowshoe Hare	-	-	-	S5
Lynx rufus	Bobcat	-	-	-	S5
Odocoileus virginianus	White-tailed Deer	-	-	-	S5
Tamiasciurus hudsonicus	Red Squirrel	-	-	-	S5
Ursus americanus	American Black Bear	-	-	Not at Risk	S5
Mustela richardsonii	American Ermine	-	-	-	S5

Scientific Name	Common Name	NS ESA	SARA	COSEWIC	S-rank
Procyon lotor	Raccoon	-	-	-	S5
Lontra canadensis	North American River Otter	-	-	-	S5

Table 10.4 Summary of Terrestrial Wildlife Observations via Camera Traps

Camera Trap Name	Animals Observed	Number of Observations
WB01	No Wildlife Detected	-
WB02	White-tailed Deer	1
	American Black Bear	1
WB03	White-tailed Deer	7
WB04	White-tailed Deer	9
	Eastern Coyote	3
	American Black Bear	4
	Bobcat	6
	Raccoon	1
	North American Porcupine	9
	Snowshoe Hare	8
WB05	White-tailed Deer	60
	Eastern Coyote	7
	American Black Bear	5
	Bobcat	6
	North American Porcupine	1
WB06	White-tailed Deer	4
	Eastern Coyote	1
WB07	White-tailed Deer	10
	Eastern Coyote	9
	American Black Bear	4
	Bobcat	1
	Raccoon	3
	Snowshoe Hare	19
WB10	Eastern Coyote	1
WB11	No Wildlife Detected	-
WB12	White-tailed Deer	2
WB13	Eastern Coyote	2
WB14	White-tailed Deer	1
WB15	No Wildlife Detected	-
WB16	No Wildlife Detected	-
WB17	White-tailed Deer	1

Mainland Moose were not identified in camera-trap images. However, tracks, hair, and pellets attributed to Mainland Moose were documented at three locations along an approximately 500 m section of existing road in the central portion of the PDA. As Mainland Moose are a location-sensitive species, detailed observation locations will be provided to NSDNR under separate cover.

Field observations confirm use of portions of the PDA by Mainland Moose. Habitat modelling indicates that the LAA contains areas predicted to provide seasonal cover, forage, and calving habitat.

10.2.2 Turtles and Other Herpetofauna

The NSDNR Significant Species and Habitat Database contains three records related to herpetofauna within 100 km of the PDA. All three records are associated with Wood Turtle, with the nearest record associated with a river that overlaps the southern portion of the Study Area, approximately 3 km of the PDA. Consultation with NSDNR identified no Critical or Core Habitat for Wood Turtle within 5 km of the Study Area.

The AC CDC (2026) Data Report identifies five herpetofauna SAR and SoCC recorded in Nova Scotia within 100 km of the LAA (Appendix F). No herpetofauna SAR or SoCC records were identified within 5 km of the PDA. No turtles or other herpetofauna were observed incidentally during Project field surveys.

Wood Turtle is a semi-aquatic species associated with riverine environments and uses both aquatic and adjacent terrestrial habitats throughout its life cycle. Rivers and streams provide habitat for functions including foraging, mating, and overwintering, while riparian and upland habitats are used for basking, nesting, foraging, and movement. Nesting generally occurs in exposed sand or gravel substrates, including natural features along watercourses and anthropogenic features such as road shoulders and landings. Wood Turtles are generally associated with meandering, year-round flowing watercourses ranging from small creeks approximately 1 m wide to medium-sized rivers up to approximately 75 m wide, with nesting typically occurring within 10 to 50 m of aquatic habitat, although greater distances have been documented depending on the availability of suitable nesting sites (ECCC, 2020).

Most watercourses in the PDA are ephemeral, intermittent, or small permanent watercourses. Many of the ephemeral watercourses observed during field surveys consisted of hillside drainage channels or steep, shallow drainages near headwater areas. Permanent watercourses in the PDA are associated with the River Hebert watershed.

Based on the available occurrence information, lack of Critical or Core Habitat within 5 km of the Study Area, and the characteristics of watercourses assessed within the LAA, there is limited evidence that the PDA supports regular Wood Turtle occupancy or habitat features commonly associated with overwintering and nesting. Individuals could move through

terrestrial, riparian, or aquatic habitats within the LAA, particularly where these habitats are connected to suitable habitat elsewhere in the landscape.

10.2.3 Invertebrates

The AC CDC (2026) Data Report identifies 74 terrestrial invertebrate SAR and SoCC recorded in Nova Scotia within 100 km of the PDA (Appendix F). No terrestrial invertebrate SAR or SoCC records were identified within 5 km of the PDA.

No terrestrial invertebrate SAR or SoCC were observed incidentally during Project field surveys conducted within the Study Area.

10.3 Effects Assessment

10.3.1 Potential Effects and Mitigation

Direct and indirect effects of the Project on terrestrial wildlife could occur through several interconnected pathways including habitat loss and fragmentation, disruption of life history, mortality and injury, and other indirect effects specific to Mainland Moose. These effects may occur during construction, operation and maintenance, and decommissioning, although the nature and extent of interactions will vary by Project phase.

Vegetation clearing, earthworks, and construction or modification of access roads may result in habitat loss or alteration and changes in habitat connectivity. The Project will require approximately 51 km of access roads, of which 43 km (84%) will use existing gravel roads that may require upgrading, while approximately 8 km (16%) will represent new linear disturbance. Increased road width and density may fragment habitat and affect wildlife movement. Project-related vehicle and equipment movement may increase the potential for wildlife mortality or injury, while noise, lighting, and human activity may temporarily alter wildlife behaviour, movement, and habitat use.

Other effects on Mainland Moose include potential changes in White-tailed Deer distribution and associated parasite transmission risk, increases in non-Project human access, and invasive species that may indirectly affect Mainland Moose recovery

Potential interactions between Project activities and terrestrial wildlife are summarized in Table 10.5 prior to consideration of mitigation. The potential effects, proposed mitigation measures, and expected residual effects are assessed in the following subsections.

Table 10.5 Potential Environmental Effects of the Project on Terrestrial Wildlife

Project Activity	Potential Environmental Effects			
	Habitat Loss and Fragmentation	Mortality and Injury	Disruption of Life History	Other Effects on Mainland Moose
Construction				
Site Preparation	X	X	X	-
Access Roads Construction and Modifications	X	X	X	X
Material and Equipment Delivery and Storage	-	X	X	-
Infrastructure Installation	-	X	X	-
Restoration of Temporary Areas	-	-	X	-
Testing and Commissioning	-	X	X	-
Operation and Maintenance				
Turbine Operation and Maintenance	-	X	X	-
Road Maintenance	-	X	X	-
Power Line and Substation Maintenance	-	X	X	-
Vegetation Management	-	X	X	-
Safety and Security	-	-	-	-
Decommissioning				
Removal of Infrastructure and Site Restoration	-	X	X	-

X = Potential Interaction
- = No Interaction

10.3.1.1 Habitat Loss and Fragmentation

Construction of the Project will result in the removal and modification of terrestrial wildlife habitat within portions of the PDA and may contribute to localized habitat fragmentation within the LAA. Effects will primarily result from vegetation clearing associated with new access roads, turbine pads, electrical infrastructure, and other Project components. Widening or upgrading existing roads may also result in localized removal of adjacent vegetation.

The Project is located within the Colchester/Cumberland Mainland Moose concentration area, and overlaps Core Habitat identified in the Mainland Moose recovery plan (NSDNR, 2021). The recovery plan identifies habitat protection, enhancement, connectivity, and threat mitigation as important components of Mainland Moose recovery.

Based on the current PDA, approximately 61 ha of predicted forest cover habitat and 343 ha of predicted forage habitat identified through the Mainland Moose habitat model occur within the PDA. These habitat components are not mutually exclusive and may overlap spatially; therefore, the areas should not be summed to represent total Mainland Moose habitat potentially affected. In addition, these values represent overlap with the maximum PDA rather than the expected vegetation clearing footprint. The area directly altered will therefore be less than the total habitat area intersecting the PDA and will be refined through detailed Project design.

Vegetation clearing may reduce the availability of forest cover used by Mainland Moose for shelter and thermoregulation and may alter the spatial arrangement of cover and forage habitat. Conversely, regenerating vegetation within some disturbed areas may provide browse over time. However, such regenerating habitat would not replace the functions provided by mature forest cover, and increased forage availability may also benefit White-tailed Deer.

The Project will introduce approximately 8 km of new access roads, while approximately 43 km, or 84%, of the proposed access-road network will use existing roads. Consequently, much of the access network will make use of existing linear disturbance, although widening and upgrading may increase the existing disturbed footprint. New roads and other linear disturbances may locally alter habitat connectivity and wildlife movement and may increase human access to portions of the LAA.

The Project occurs within a working forest landscape that has been influenced by timber harvesting, forestry roads, trails, and other existing disturbances. Against this baseline, Project clearing will add new disturbance to an already fragmented landscape. Where feasible, the Project layout has been developed to use existing roads and previously disturbed areas and to reduce disturbance to mature forest, wetlands, watercourses, and other wildlife habitat. Vegetated buffers associated with wetlands and watercourses will also be retained where feasible to support habitat connectivity.

There is limited available research on the effects of wind energy development on large terrestrial mammals, and reports vary among species and environmental settings. Habitat loss, degradation, and fragmentation associated with wind energy projects have been identified as potential effects on large mammals (Tolvanen et al., 2023; Schöll & Nopp-Mayr, 2021). For example, Tolvanen et al. (2023) reported that 67% of studies examining large terrestrial mammals documented some degree of displacement following wind farm construction, with several studies identifying displacement distances of up to 5 km from disturbed areas.

Herpetofauna may be affected by alteration of wetlands, watercourses, riparian areas, and adjacent terrestrial habitat. Wood Turtle is of particular consideration because the nearest NSDNR record is associated with a river approximately 3 km from the PDA. However, no Critical or Core Habitat was identified within 5 km of the Study Area, and the watercourses

assessed within the LAA generally provide limited evidence of habitat suitable for regular Wood Turtle use or important life-cycle functions such as overwintering and nesting. Project planning has prioritized avoidance and minimization of wetland and watercourse interactions, including use of existing watercourse crossings where feasible. Because the presence of Wood Turtle or other herpetofauna within the PDA cannot be excluded, potential effects on individuals moving through aquatic, riparian, or terrestrial habitats will also be considered through Project mitigation.

Other terrestrial wildlife may experience localized loss or modification of forest, wetland, riparian, and regenerating habitats within the PDA. Habitat alteration may also affect refuge availability and movement through the landscape. These effects are expected to be greatest in areas of new disturbance, while the use of existing roads and previously disturbed areas reduces the amount of new habitat fragmentation associated with the Project.

Overall, the Project will result in localized habitat loss and modification within the PDA and incremental fragmentation within the LAA. Effects will be reduced through detailed siting, use of existing infrastructure and previously disturbed areas where feasible, minimization of clearing, retention of vegetation adjacent to wetlands and watercourses where practical, and restoration of temporary disturbance areas. With implementation of the proposed siting, clearing, restoration, and habitat-management measures, Project-related changes in habitat availability and connectivity are expected to remain localized within the PDA and adjacent portions of the LAA. The magnitude of direct habitat loss will be refined as the vegetation-clearing footprint is finalized.

Potential Project effects related to habitat loss and fragmentation will be reduced through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on terrestrial wildlife habitat will be further detailed in an EPP and will be implemented prior to and during construction:

- Existing roads, harvested areas, and other previously altered areas will be used to the extent practicable.
- Areas of clearing and grubbing will be limited to that needed to construct and operate the Project.
- Vegetated buffers around wetlands and watercourses will be maintained to support habitat connectivity and local environmental conditions where possible.
- Temporary disturbance areas will be revegetated/restored following construction where practicable and compatible vegetation will be maintained in areas that do not interfere with Project infrastructure or site access (i.e., cutting trees while preserving low shrubs).Invasive species prevention and management measures will be implemented to reduce the introduction and control the spread of invasive species, as part of the Project-specific EPPA Mainland Moose Monitoring Plan will be developed and submitted to NSDNR and NSECC prior to construction. The program will be implemented for two years following the start of operation.
- The Proponent will develop and implement a Wildlife Management Plan.

10.3.1.2 Mortality and Injury

Project activities may increase the risk of mortality or injury to terrestrial wildlife through an increase in road traffic in the PDA with Project-related vehicles, mobile equipment, vegetation clearing, excavation, and active work areas. The potential for vehicle-wildlife collisions is expected to be greatest during construction and decommissioning, when traffic and equipment activity within the PDA will be greatest. Roads within the LAA are currently used by local residents, recreational users, and forestry operators.

Field surveys documented use of the Study Area by a variety of terrestrial animals including White-tailed Deer, American Black Bear, and Eastern Coyote. Evidence of Mainland Moose was also documented along an existing road within the PDA. Increased Project-related traffic may therefore increase the potential for collisions with wildlife using or crossing Project roads. This interaction may occur during all Project phases but is expected to be greatest during construction and decommissioning when vehicle and equipment activity is highest.

Herpetofauna may be particularly sensitive to mortality or injury from vehicle and equipment movement due to their slow movement across roads and active work areas. Wood Turtle warrants consideration because individuals use both aquatic and terrestrial habitats and may undertake overland movements. The Recovery Strategy for the Wood Turtle in Canada identifies road networks, including new road construction, road widening, and increased traffic volume and speed, among the important threats to the species (ECCC, 2020). During seasonal migrations from their overwintering areas, Wood Turtles may cross roads to reach breeding sites. Turtle species are highly sensitive to increased mortality among adults and older juveniles due to their delayed sexual maturity and slow reproductive rate. While there is limited evidence of habitat supporting regular Wood Turtle use within the PDA, the presence of individuals cannot be excluded.

Flying invertebrates may collide with operating turbines, although the extent to which turbine-related mortality affects insect populations or community composition remains uncertain. Voigt (2021) reports that insects are frequently killed by operating wind turbines, with hill-topping, swarming, and migrating insects among those observed interacting with turbines. Turbine characteristics, including colour and lighting, may be an influencing factor contributing to the collision risk for some insect groups (Long et al., 2010; Crawford et al., 2023). No terrestrial invertebrate SAR or SoCC records were identified within 5 km of the PDA through the Project desktop review, and none were observed incidentally during the field surveys. Based on the available information and uncertainty regarding population-level effects of turbine-related insect mortality, measurable effects on terrestrial invertebrate populations at the LAA scale are not anticipated.

The risk of mortality and injury will be greatest during construction and is expected to decrease substantially during operation as Project-related traffic and ground-disturbing activities decrease. Potential effects will be reduced through traffic management, wildlife

awareness, procedures for responding to wildlife encountered within active work areas, and implementation of the Project Wildlife Management Plan.

- Project personnel will receive wildlife awareness training, including information on terrestrial wildlife SAR and procedures for reporting wildlife encounters and reducing associated stress to wildlife.
- Speed limits will be enforced, with additional measures implemented during sensitive seasonal windows for wildlife.
- Signage will be posted in sensitive habitat or during periods of elevated wildlife interaction risk.
- Vehicle traffic and equipment staging will be limited to designated access roads and laydown areas. To avoid attracting wildlife, the site will be kept clean of food scraps and garbage, transporting waste to an approved landfill on a regular basis.
- Project personnel will be prohibited from intentionally harassing or feeding wildlife.
- Permanent and temporary watercourse crossings will be planned to minimize disturbance to aquatic and riparian habitat and reduce potential interactions with wildlife.
- If turtles or other wildlife SAR are encountered within an active work area, work in the immediate vicinity will be managed in accordance with the Wildlife Management Plan and applicable regulatory requirements.

10.3.1.3 Disruption of Life History

The Project activities may temporarily disrupt terrestrial wildlife behaviour, movement, and habitat use through increased human activity, noise, lighting, vehicle traffic, and other sensory disturbance. Effects are expected to be greatest during construction, when vegetation clearing, earthworks, road construction, equipment operation, and other activities will occur throughout portions of the PDA. During operation and maintenance, periodic vehicle traffic, maintenance activities, lighting, and turbine operation may continue to influence wildlife behaviour, although the intensity and frequency of human activity will generally be lower than during construction.

Wildlife responses to disturbance may include temporary avoidance of active work areas, changes in movement patterns, and shifts in habitat use. The nature and extent of these responses will vary among species and individuals and with the intensity, duration, timing, and location of disturbance.

Mainland Moose may be affected by disturbance associated with Project-related road construction and upgrades, operation and maintenance, and decommissioning. Research indicates that moose responses to roads, and other linear features vary among individuals and across landscapes. Studies have found that the density of roads across a landscape can influence Moose populations directly and indirectly (Yost and Wright, 2001; Beazley et al., 2004; Shanley and Pyare, 2011). However, Finnegan et al. (2023) found that some GPS-collared Moose in west-central Alberta were indifferent to roads, selecting roadside habitats for seasonal foraging. Gagnon et al. (2024) reported that female Moose in Québec generally avoided paved and dirt forest roads alike, but they attributed this avoidance

behaviour to associated human activity rather than the road corridors themselves. These findings suggest that Project effects on Mainland Moose are likely to depend on factors such as type and intensity of disturbance, traffic levels, surrounding habitat, and availability of alternate habitat.

Research on the effects of wind energy development on Mainland Moose to is limited. Nevertheless, available evidence suggests that some large mammals may adapt to these disturbances over time. A study conducted on the Gaspé peninsula in Québec found that moose returned to the area within one year following construction of a 73-turbine wind farm (Pelletier & Dorais, 2010). By comparing annual Moose harvest data collected before and after construction, the study found no significant differences in harvest rates, indicating that Moose continued to occupy and use the area following the wind farm's construction and into its operational phase.

Studies of other terrestrial mammals indicate that responses to operating wind farms can be species-specific. Studies of other large mammals in Europe, including deer, reindeer, and elk, have documented behavioural changes during both wind farm construction and operation (Łopucki et al., 2017; Skarin et al., 2015; Skarin and Alam, 2017; Skarin et al., 2018). However, some studies have found little or no evidence of long-term behavioural effects during the operational phase (Walter et al., 2006; Colman et al., 2013; Taylor et al., 2016; Tsegaye et al., 2017). Research on mammalian carnivores suggests that wind energy developments can influence habitat use, particularly during construction when disturbance levels are greatest (Sirén et al., 2016; Łopucki et al., 2017; Sirén et al., 2017). To minimize potential disturbance to wildlife life-history functions, seasonality will be considered when scheduling construction, maintenance, and decommissioning activities.

The presence of Mainland Moose, White-tailed Deer, American Black Bear, and other mammals documented during Project field programs indicates that wildlife currently use habitats in the PDA and LAA within a landscape also subject to forestry operations and recreational activities. Project construction will introduce additional disturbance within portions of this landscape and may temporarily alter wildlife movement or habitat use.

Small mammals may also be affected by localized construction disturbance and changes in habitat conditions. Available studies have reported little evidence of significant population-level effects on small mammals associated with wind farms (De Lucas et al., 2005; Łopucki and Mróz, 2016). However, relatively few studies have examined these effects, and the extent to which Project activities may influence local small mammals in the PDA remains uncertain.

Herpetofauna may experience disruption during periods of movement, nesting, and breeding, or other seasonal activities, particularly where Project activities occur near wetlands, watercourses, or associated terrestrial habitat. Habitat alteration and increased human activity levels in the PDA could affect movement patterns or create temporary barriers between their important habitats. However, Project planning has prioritized the

use of existing roads and previously disturbed areas, minimizing the need for new habitat disturbance. Mitigation will focus on reducing potential interactions where suitable habitat features or individuals are encountered and avoid sensitive periods where feasible.

Overall, Project activities may result in temporary and localized changes in wildlife behaviour, movement and habitat use, with the greatest potential for disturbance occurring during construction. Effects during operation are expected to occur less frequently and be associated primarily with turbine operation, maintenance activities, and Project-related traffic. The extent of behavioural response will vary among species and individuals, and some uncertainty remains regarding the response of Mainland Moose and other terrestrial wildlife to wind energy development in Nova Scotia. However, given the existing disturbance regime within the PDA and broader LAA, the use of previously disturbed areas where feasible, and the implementation of mitigations and seasonal timing considerations, most wildlife species are expected to adapt to Project activities and continue using habitats within the PDA and LAA.

Potential Project effects related to disruption of life history can be reduced through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on life history of terrestrial wildlife will be further detailed in an EPP and will be implemented prior to and during construction.

- Construction activities will be limited to the areas required for Project development, where feasible.
- Project personnel will be prohibited from intentionally harassing or feeding wildlife.
- Project-related vehicle movements will be minimized where practical.
- Blasting will be undertaken by qualified personnel in accordance with applicable regulatory requirements.
- Procedures for responding to wildlife or SAR encountered within active work areas will be established in the Wildlife Management Plan.
- On-site lighting will be designed and directed to reduce unnecessary illumination of adjacent wildlife habitat, where practicable.
- The Proponent will develop and implement a Wildlife Management Plan.

10.3.1.4 Other Effects to Mainland Moose

Project-related vegetation clearing and road development may alter habitat conditions or access in ways that favour White-tailed Deer or increase human use of portions of the PDA. The Mainland Moose recovery plan identifies White-tailed Deer as reservoir hosts associated with Brainworm (*Parelaphostrongylus tenuis*) and Winter Tick (*Dermacentor albipictus*), both of which are identified as important threats to Mainland Moose. The recovery plan also identifies roads as a pathway that may facilitate White-tailed Deer movement and associated exposure of Mainland Moose to these parasites.

White-tailed Deer were frequently documented during Project field surveys, and existing roads provide access through the LAA. Project-related clearing and approximately 8km of new linear disturbance may incrementally increase access and create regenerating habitat

conditions that could be used by White-tailed Deer. However, the extent of the Project-specific contribution is uncertain because the LAA already contains an extensive network of forestry roads, trails, harvested areas, and other linear disturbances. Mitigation will therefore focus on minimizing new access, managing roads not required for operation, restoring temporary disturbance areas, and monitoring Mainland Moose habitat use.

Human access represents an additional potential indirect effect. The Mainland Moose recovery plan identifies human access to habitat as a significant threat and notes that roads can create opportunities for poaching and increase recreational access to Mainland Moose habitat (NSDNR, 2021). It also identifies poaching as an important threat to the endangered population and recognizes road management among the approaches available to support recovery.

The LAA is already accessible through existing forestry roads and recreational trails. Nevertheless, construction of new roads and upgrades to existing roads may improve vehicle access to portions of the PDA and surrounding habitat. This could increase opportunities for non-Project recreational access, including ATV and snowmobile use, and potentially facilitate unauthorized activities.

Invasive species may also affect Mainland Moose through changes in habitat quality and forage availability. Project construction and maintenance activities could facilitate the introduction or spread of invasive species through ground disturbance and movement of vehicles or equipment. Invasive species prevention and management measures described in Chapter 8: Flora will therefore also support the protection of terrestrial wildlife habitat.

Potential Project contributions to these indirect threats will be reduced through access management, retention of natural vegetation, invasive species management, and restoration or decommissioning of temporary disturbance areas where feasible. Some uncertainty will remain regarding the extent to which Project-related changes in access or habitat conditions could influence White-tailed Deer distribution, parasite transmission, or unauthorized human access.

The following key measures to mitigate the potential effects of the Project on terrestrial wildlife will be further detailed in an EPP and implemented prior to and during construction.

- Existing roads, harvested areas, and other previously altered areas will be used to the extent practicable. Construction activities will be limited to the areas required for Project development, where feasible.
- Signage will be posted in sensitive habitat or during periods of elevated wildlife interaction risk.
- Invasive species prevention and management measures will be implemented as part of the Project-specific EPP.

- Project personnel will be provided with Mainland Moose awareness information and procedures for reporting observations or suspected incidents involving Mainland Moose.
- The Proponent will develop and implement a Wildlife Management Plan.

10.3.2 Residual Effects

Residual effects on terrestrial wildlife are expected to vary among species and effects pathways. Following implementation of mitigation, residual adverse effects may include habitat loss and modification, localized habitat fragmentation, temporary or intermittent changes in wildlife movement and habitat use, mortality or injury risk, and indirect effects associated with changes in access and habitat conditions.

Habitat loss and fragmentation will result from vegetation clearing and development of permanent Project infrastructure. Based on the current Project design, effects will occur primarily within the PDA and are therefore characterized as immediate in geographic extent. Habitat associated with permanent infrastructure will remain altered throughout Project operation and is therefore considered long-term. Effects associated with temporary construction areas will be reduced through restoration and natural revegetation. The Project will use existing roads and previously disturbed areas where feasible, and remaining forested, wetland, riparian, and regenerating habitats within the LAA will continue to provide habitat and movement opportunities for terrestrial wildlife. Habitat loss and fragmentation are therefore expected to be minor to moderate in magnitude, with the higher end of the range reflecting the Project's overlap with Mainland Moose Core Habitat.

Disruption of life-history functions may occur as wildlife respond to construction activity, noise, lighting, vehicle traffic, and human presence. These effects are expected to be greatest during construction and decommissioning and less frequent during operation and maintenance. Behavioural responses may extend beyond the PDA into adjacent habitat and are therefore expected to be local in extent, short- to medium-term, and intermittent. These effects are expected to be generally reversible as the intensity of disturbance decreases following construction, although responses will vary among species and individuals.

Mortality and injury risk will occur primarily through interactions with Project-related vehicles and equipment, with the greatest potential during construction and decommissioning. Operational interactions are expected to occur less frequently because routine operation requires comparatively limited onsite activity. Traffic management, wildlife-awareness measures, wildlife encounter procedures, and implementation of the Wildlife Management Plan will reduce the likelihood of mortality and injury. Residual effects are therefore expected to be immediate to local in extent and intermittent in frequency. Potential indirect effects on Mainland Moose, including changes in White-tailed Deer access, parasite transmission risk, non-Project human access, and invasive species, will be

reduced through minimization of new road construction, retention of natural vegetation where feasible, management of temporary access, invasive species management, and Mainland Moose monitoring. The extent to which Project-related changes in access and habitat conditions may influence these pathways remains uncertain; however, Project-specific contributions are expected to be localized within the context of the existing road and disturbance network.

Overall, residual adverse effects on terrestrial wildlife are expected to range from minor to moderate in magnitude, occur primarily within the PDA and adjacent portions of the LAA, and vary in timing, duration, frequency, and reversibility according to the effects pathway. Permanent habitat loss will be long-term, while sensory disturbance and mortality risk are expected to be greatest during construction and decommissioning and will occur less frequently during operation. Considering the use of existing roads and previously disturbed areas where feasible, mitigation measures, implementation of the EPP and Wildlife Management Plan, and Mainland Moose monitoring and adaptive management, residual adverse effects on terrestrial wildlife are predicted to be not significant.

10.4 Monitoring

An environmental monitoring program will be developed prior to Project construction. Additional surveys or mitigations may be identified in consultation with regulators following review of the monitoring program.

A Mainland Moose monitoring program will be developed in consultation with NSDNR and submitted prior to construction. Monitoring will be implemented for two years following the commencement of Project operation, to assess effects of the Project. The results of the monitoring program will be submitted to NSDNR as required.

11 Bats

11.1 Overview

This chapter assesses the potential effects of the Project on resident and migratory bat species and their habitats. Wind energy projects may result in direct effects, including mortality or injury, and indirect effects associated with habitat loss or alteration, fragmentation, and sensory disturbance.

Potential effects on bats are also associated with changes to other VECs assessed in this EARD, including noise and lighting Chapter 5 (Atmospheric Environment), vegetation loss or modification Chapter 8 (Flora), and wetland loss or alteration Chapter 9 (Wetlands).

Desktop and field studies were conducted to characterize bat occurrence and activity and identify potential maternity roosting and hibernation habitat in the Study Area. The resulting information provides a baseline to support mitigations, post-construction monitoring, and adaptive management. Mitigation measures will be further developed in a Project-specific EPP prior to construction to minimize adverse effects on bat populations.

11.1.1 Regulatory Context

Assessment of bats considers the existing environment and measures effects using relevant provincial and federal legislation:

- Nova Scotia *Wildlife Act*
- NSESA
- SARA
- *Canadian Environmental Protection Act*
- Nova Scotia *Biodiversity Act*
- Nova Scotia *Environment Act*

11.1.2 Boundaries

The PDA represents the area within which Project infrastructure may be located and defines the maximum spatial extent considered for potential direct Project interactions. The final Project Footprint will occupy only a portion of the PDA. For the assessment of bats, the LAA includes the PDA, a 500 m buffer around the PDA, and associated airspace. The RAA extends 5 km from the PDA.

A broader Study Area, encompassing the PDA and APIA, is used to describe existing environmental conditions. The effects assessment focuses on the PDA, LAA, and RAA.

11.1.3 Assessment Methodology

The assessment of bats focused on identifying migratory and resident bat species and activity present in the Study Area. Data was collected through literature review, online databases and reports, habitat analysis, and field surveys.

Information obtained through the literature review and habitat analysis was used to inform the baseline field program, which was developed with consideration of applicable provincial and federal guidance and bat survey protocols such as *Guidance for Bird and Bat Surveys Pre- and Post-Construction Surveys and Monitoring – Wind Energy* (NSDNR, 2022), *Bats and Wind Turbines. Pre-siting and preconstruction survey protocols* (Lausen et al., 2010), *Pre-Construction Bat Survey Guidelines for Wind Farm Development in NB* (New Brunswick Department of Fish and Wildlife, 2009), and to a lesser extent, *Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds* (ECCC, 2007), and *Wind Energy & Birds Environmental Assessment Guidance Update* (ECCC, 2022).

Baseline field surveys were designed to determine the presence and diversity of bat species and their activity in the Study Area, as well as to identify suitable maternity roost habitat.

The description of the existing environment is based primarily on data collected through the following resources plus field surveys carried out for this Project:

- Karst Risk Map of Nova Scotia (Drange and McKinnon, 2019)
- Locations of Known Bat Hibernacula in Nova Scotia (Moseley, 2007)
- Nova Scotia Geoscience Atlas - Abandoned Mine Openings (GeoNOVA, 2024)
- Nova Scotia Significant Species and Habitats Database (NS DNR, 2026)
- AC CDC Data Report (AC CDC, 2026)
- Global Nature Watch Tree Cover Loss 2001-2024 and Gain 2000-2020 (Global Nature Watch, 2026)
- Nova Scotia Forest Inventory (GeoNOVA, 2024)
- Nova Scotia LiDAR Point Cloud (GeoNOVA, 2020)
- Nova Scotia Hydrographic Network (GeoNOVA, 2024)
- Nova Scotia Wetlands Inventory (NSDNR, 2021)
- Nova Scotia Predictive Ecosystem Mapping (GeoNOVA, 2024)

NSDNR and ECCC-CWS were consulted regarding the proposed bat survey methodology and available information on bat occurrences in the vicinity of the Project. Comments received on the proposed methodology were incorporated into the field program, where applicable (e.g., M. S. Wade, pers. comm., July 30, 2024; M. McGarrigle, pers. comm., July 5, 2026). NSDNR also identified a SAR bat occurrence approximately 3 km from the PDA and

confirmed that no identified SAR bat critical habitat occurs within or near the PDA (S. Spencer, pers. comm., October 14, 2026).

Habitat suitability modelling was developed to identify possible suitable bat maternity roost habitat for Little Brown Myotis (*Myotis lucifugus*) and Northern Myotis (*Myotis septentrionalis*) that may occur in the PDA and LAA. These maps were used to inform field survey design and evaluate Project impacts. Details of the habitat suitability modelling for these SAR bats are presented below.

11.1.3.1 SAR Bat Habitat Modelling

Habitat suitability modelling was conducted to assess the quality and quantity of possible suitable maternity roosting habitat for Myotis species. As the summer range of Tri-colored Bat (*Perimyotis subflavus*) is thought to be restricted to southwest Nova Scotia and does not overlap with the PDA or LAA (Quinn and Broders, 2007), habitat modelling to identify possible suitable maternity roost habitat for this SAR bat was not completed.

Spatial parameters representing biophysical attributes of maternity roost habitat were assigned based on peer-reviewed literature and expert knowledge. The spatial layers used to represent and measure suitable roosting habitat were retrieved from the following datasets:

- Nova Scotia Forest Inventory (GeoNOVA, 2024)
- Nova Scotia LiDAR Point Cloud (GeoNOVA, 2020)
- Nova Scotia Old Growth Potential Index (NSDNR, 2025)
- Nova Scotia Predictive Ecosystem Model (GeoNOVA, 2024)

As forest-dwelling species, natural roosting sites for *Myotis* are typically tall, large-diameter trees in older forest stands with open canopies (ECCC, 2018; COSEWIC, 2013; Balzer et al., 2022; Kalcounis-Ruppel et al., 2005; Barclay and Brigham, 1996). While species of *Myotis* have been recorded in both coniferous and deciduous stands, evidence suggests that they prefer deciduous and mixedwood forests for maternity roosts (Broders et al., 2006; Kalcounis et al., 1999; Patriquin and Leonard, 2011). Among these habitat factors, stand age is more important, likely because older stands contain more snags and decaying trees suitable for roosting (Patriquin and Leonard, 2011; COSEWIC, 2013; Fabianek et al., 2015).

The following biophysical attributes were used to model possible suitable maternity roosting habitat for Myotis species:

- Diameter at Breast Height – Any stand classified as having an average total diameter of 17 cm or greater
- Canopy Height – Any stand with a canopy height of 15 m or greater
- Predictive Ecosystem Mapping – Any stand classified at the 6th level as Acadian Deciduous Forest, Acadian Mixedwood Forest, Acadian Coniferous Forest, Wet Deciduous Forest, Wet Coniferous Forest, Wet Mixedwood Forest
- Old Growth Potential – Any stand with the potential to be old growth at any rank

11.1.4 Field Surveys

The objective of the field surveys was to gather baseline information on bats that use and move through the Study Area. Following the *Guidance for Bird and Bat Surveys Pre- and Post-Construction Surveys and Monitoring – Wind Energy* (NSDNR, 2022), other accepted survey protocols and guidance documents, and consultation with regulators, baseline survey protocols were developed.

The *Guidance for Bird and Bat Surveys Pre- and Post-Construction Surveys and Monitoring – Wind Energy* (NSDNR, 2022) recommends a minimum of two to three bat survey stations for wind energy projects with fewer than 10 turbines, with an additional survey station for every five turbines beyond this amount. To provide spatial coverage across the Study Area and characterize bat activity in habitats potentially used for foraging, commuting, and seasonal movements, acoustic monitoring was conducted at 15 ARU locations over the 2024 and 2025 survey periods (Figure 11.1, Appendix A).

In 2024, six ARUs were deployed from late April to November. In 2025, nine additional ARUs were deployed between June and September and retrieved in November. Deployment locations, habitats, and deployment and retrieval dates are summarized in Table 11.1.

ARU locations were selected based on a review of available mapping and aerial imagery, proposed Project infrastructure, habitat conditions, and applicable provincial guidance, followed by field verification of suitable deployment locations. Monitoring locations were distributed across representative habitats within the Study Area, including features that may support bat foraging and movement, such as wetlands, watercourses, valleys, and ridges. Locations were also selected to provide spatial coverage of areas relevant to the proposed Project.

Wildlife Acoustics Song Meter Mini Bat detectors and AudioMoths were used to passively record bat echolocation calls. ARUs were programmed to record from 30 minutes before sunset to 30 minutes after sunrise. Detector settings, including trigger frequency and recording length, were selected with consideration of the North American Bat Monitoring Program (NABat) and the *Acoustic Guide for Bat Monitoring in Atlantic Canada* (McBurney and Segers, 2020). Detectors were installed approximately 2 to 3 m above ground, generally on tree trunks at each monitoring location.

The monitoring program provided acoustic data from multiple locations and habitat types during portions of the breeding, migratory, and seasonal movement periods for bats. Data recorded by the ARUs were subsequently reviewed and classified to characterize the occurrence and level of bat activity among monitoring locations.

Table 11.1 Deployment Locations, Habitats, Deployment and Retrieval Dates for each Autonomous Recording Unit (ARU)

ARU ID	Deployed	Retrieved	Habitat
WB-ARU-01	29-Apr-24	11-Nov-24	Balsam Fir - Black Spruce Forest
WB-ARU-02	29-Apr-24	11-Nov-24	Recent or Regenerating Clearcut
WB-ARU-03	29-Apr-24	11-Nov-24	Black spruce - Aspen Mixedwood Forest
WB-ARU-04	29-Apr-24	11-Nov-24	Black spruce - Aspen Mixedwood Forest
WB-ARU-05	29-Apr-24	11-Nov-24	Black spruce - Aspen Mixedwood Forest
WB-ARU-06	29-Apr-24	11-Nov-24	Balsam Fir - Intolerant Hardwood Mixedwood Forest
ARU01	17-June-25	05-Nov-25	Red Spruce - Intolerant Hardwood Mixedwood Forest
ARU02	17-June-25	05-Nov-25	Sugar Maple Forest
ARU03	17-June-25	05-Nov-25	Red Spruce Plantation
ARU09	15-Sept-25	20-Nov-25	Recent or Regenerating Clearcut
ARU11	15-Sept-25	20-Nov-25	Recent or Regenerating Clearcut
ARU17	15-Sept-25	20-Nov-25	Recent or Regenerating Clearcut
ARU43	15-Sept-25	20-Nov-25	Shade Tolerant Red Maple - Sugar Maple Forest
ARU44	15-Sept-25	20-Nov-25	Red Spruce - Tolerant Hardwood Mixedwood Forest
ARU45	15-Sept-25	20-Nov-25	Sugar Maple Forest

Data were downloaded from the units every three to four weeks, at which time batteries were replaced. At these times, units were checked to confirm they were functioning and had no evidence of interference by animals or humans.

Analytical software (Kaleidoscope Pro Version 5.7.0) was used to interpret and analyze bat calls recorded during passive and active surveys. Recordings were processed using Kaleidoscope Pro to screen possible bat calls from non-bat noise. Possible bat calls were manually reviewed, and a subset of recordings classified as noise was also reviewed to assess possible misclassification.

When possible, recorded bat passes were identified to species. Where bat calls could not be identified to species with confidence, these calls were classified into groupings of bats with similar or overlapping call characteristics (Table 11.2). Myotis calls (Little Brown Myotis and Northern Myotis) were generally classified into one common group, *Myotis*.

Table 11.2 Species and Groupings used during Analysis of Data Recorded in the Project Area

Species	Code
Little Brown Myotis (*Myotis lucifugus*)	MYLU
Northern Myotis (*Myotis septentrionalis*)	MYSE
Tri-colored Bat (*Perimyotis subflavus*)	PESU
Eastern Red Bat (*Lasiurus borealis*)	LABO
Hoary Bat (*Lasiurus cinereus*)	LACI
Silver-haired Bat (*Lasionycteris noctivagans*)	LANO
Big Brown Bat (*Eptesicus fuscus*)	EPFU
Groupings	**Code**
Little Brown Myotis/Northern Myotis	*Myotis*
Eastern Red Bat/ Tri-colored Bat/Little Brown Myotis/Northern Myotis	HighF
Big Brown Bat/Silver-haired Bat	EPFULANO
Hoary Bat/Big Brown Bat/Silver-haired Bat	LowF

After identification, bat passes were analysed to determine seasonal and temporal activity patterns in the Study Area. Subsequent analysis was carried out to assess activity of migratory species—those at a higher risk of mortality.

11.2 Existing Environment

Seven species of bats have been recorded in Nova Scotia (Broders et al., 2003) and are protected under Nova Scotia's *Wildlife Act*. Of these, three species are listed as Endangered at both the provincial (NSESA) and federal (Schedule 1 of SARA) levels (Table 11.3).

Table 11.3 Bat Species of Nova Scotia and Conservation Status

Scientific Name	Common Name	NSESA	SARA	COSEWIC	AC CDC
Myotis lucifugus	Little Brown Myotis	Endangered	Endangered	Endangered	S1
Myotis septentrionalis	Northern Myotis	Endangered	Endangered	Endangered	S1
Perimyotis subflavus	Tri-colored Bat	Endangered	Endangered	Endangered	S1
Lasiurus cinereus	Hoary Bat	--	--	Endangered	SUB, S1M
Lasiurus borealis	Eastern Red Bat	--	--	Endangered	SUB, S1M
Lasionycteris noctivagans	Silver-haired Bat	--	--	Endangered	SUB, S1M

Scientific Name	Common Name	NSESA	SARA	COSEWIC	AC CDC
Eptesicus fuscus	Big Brown Bat	--	--	--	SNA

In Nova Scotia, three non-migratory bat species—Little Brown Myotis, Northern Myotis, and Tri-colored Bat—over-winter in caves and abandoned mines (Moseley, 2007). However, the Tri-colored Bat is primarily found in southern Nova Scotia and the Fundy coast of New Brunswick (Broders et al., 2003).

White-nose syndrome (WNS), caused by the fungus *Pseudogymnoascus destructans*, has resulted in substantial declines in hibernating bat populations throughout eastern North America, including Nova Scotia (COSEWIC, 2013; ECCC, 2018). Mortality exceeding 90% has been reported at some hibernacula following initial exposure, although evidence from some populations indicates stabilization and persistence following severe initial declines (Dobony and Johnson, 2018). WNS remains an important consideration in assessing additional sources of mortality for resident SAR bats.

The other four bat species known to occur in Nova Scotia are long-distance migratory species, three of which were assessed by COSEWIC in May 2023 as Endangered: Hoary Bat, Eastern Red Bat, and Silver-haired Bat. The fourth migratory species is Big Brown Bat. While the range and population of Big Brown Bat is largely unknown, there have been a few occurrence records for Nova Scotia (Broders et al., 2003).

The NSDNR Significant Species and Habitat Database contains two records of species and/or habitat records that relate to bats within a 100-km radius of the PDA. These records both relate to hibernacula sites for Little Brown Myotis and Northern Myotis.

The AC CDC (2026) Data Report indicates that no bat species occurrences or hibernacula have been reported in the LAA or within 5 km. Occurrence of all three SAR bat species have been recorded within a 100-km radius of the LAA (AC CDC, 2026). Occurrences of two of the migratory bat species, Eastern Red Bat and Hoary Bat, are also reported within 100 km of the PDA (AC CDC, 2026).

11.2.1 Bat Detections

Acoustic monitoring conducted between 2024 and 2025 identified variable levels of bat activity across the Study Area (Table 11.4). Across both survey years, a total of 1,041 bat passes were recorded, with the majority attributed to *Myotis* species. Overall activity was spatially variable, with detections concentrated at a subset of monitoring locations and low or no activity recorded at several ARUs.

Table 11.4 Summary of Acoustic Bat Passes Recorded at ARU Locations During Baseline Acoustic Monitoring Conducted in 2024 and 2025

ARU Location	Survey Year	*Myotis*	EPFU-LANO*	LowF*	High F*	Hoary Bat *	Total	No. of nights bats were detected
WB-ARU-01	2024	164	1	0	0	0	165	65
WB-ARU-02	2024	103	2	1	0	2	108	53
WB-ARU-03	2024	278	1	0	0	3	282	80
WB-ARU-04	2024	166	0	0	0	0	166	62
WB-ARU-05	2024	280	5	18	1	3	307	84
WB-ARU-06	2024	0	0	0	0	0	0	0
ARU01	2025	0	0	0	0	0	0	0
ARU02	2025	11	0	1	0	0	12	9
ARU03	2025	0	0	0	0	0	0	0
ARU09	2025	0	0	0	0	0	0	0
ARU11	2025	0	0	0	0	0	0	0
ARU17	2025	0	0	0	0	0	0	0
ARU43	2025	0	1	0	0	0	1	1
ARU44	2025	0	0	0	0	0	0	0
ARU45	2025	0	0	0	0	0	0	0

*Migratory bat species
EPFULANO = Big Brown Bat/Silver-haired Bat
LowF = Hoary Bat/Big Brown Bat/Silver-haired Bat
HighF = Eastern Red Bat/ Tri-colored Bat/Little Brown Myotis/Northern Myotis

In 2024, bats were detected at five of the six ARU locations, with a total of 1,028 bat passes recorded. Activity was dominated by *Myotis* species, which accounted for 991 passes (approximately 96%). Total activity at individual ARUs ranged from no detections at WB-ARU-06 to 307 passes at WB-ARU-05. At ARUs where bat activity was detected, detections occurred over 53 to 84 nights.

Bat activity recorded at the 2025 monitoring locations was generally low. Twelve bat passes were recorded at ARU03 over nine nights, and a single pass was recorded at ARU43, while no bat passes were identified at the remaining monitoring locations. Detections were predominantly attributable to *Myotis* species, with only isolated detections assigned to other acoustic groups. Differences in bat activity between the 2024 and 2025 monitoring periods may reflect a combination of factors, including spatial and temporal variation in bat activity and differences in monitoring effort. In particular, several detectors deployed in 2025 operated for shorter periods than those deployed in 2024, limiting direct comparison of activity levels between years.

The ARUs with the highest recorded bat activity were deployed within the southern portion of the Study Area, south of Highway 209 and spatially separated from the PDA. As such, the activity recorded at these locations are considered more representative of conditions in the southern portion of the Study Area than of conditions within or immediately adjacent to the PDA. Monitoring locations closer to the PDA generally recorded low or no bat activity.

Overall, bat activity was spatially variable across the Study Area, with detections concentrated at a subset of monitoring locations. Bat activity within and in proximity to the PDA was generally low relative to the higher activity recorded at some locations elsewhere in the Study Area.

11.2.2 Bat Habitat

Regions with limestone karst topography can yield features such as caves and sinkholes, which can be used by bats for roosting and hibernation. The LAA is primarily within areas of low karst risk, with a small area of medium karst risk in the southern portion of the LAA, outside the PDA (Figure 6.3, Figure 11.2, Appendix A) (Drange and McKinnon, 2019).

There are two abandoned mine openings in the Study Area that have been filled in (Figure 11.2, Appendix A). Additionally, no known hibernaculum occurs within the Study Area (Moseley, 2007). The closest known hibernaculum to the Study Area is the Lear Shaft in the Londonderry area; this is an entry to an underground mine network and is approximately 60 km to the east of the closest Project turbine (Moseley, 2007). Bats were recorded at the Lear Shaft entry to this mine network (Moseley, 2007).

There is no overlap between the Study Area and critical habitat defined by Environment Canada (2018) for SAR bat species, which is represented as 10 x 10 km standardized Universal Transverse Mercator (UTM) grid squares where the description of critical habitat is met (i.e., hibernacula have been identified).

Many bat species prefer roosting in older forest stands over younger ones. Older forests offer increased snag availability for roosting and provide foraging habitat with a relatively closed canopy (Barclay and Brigham, 1996; Crampton and Barclay, 1996; Krusic et al., 1996; Jung et al., 1999; as cited in ECCC, 2018). Based on habitat modelling, the LAA provides habitat (1,674.6 ha; 37%) that may serve as possible maternity roost habitat for Little Brown Myotis or Northern Myotis (Figure 11.3, Appendix A). The PDA contains a moderate amount of suitable maternity roosting habitat (247.9 ha; 30%), owing to the lack of mature forest stands that intersect with the PDA.

Suitable bat maternity roost trees were recorded when observed in the LAA. Maternity roost sites are typically located in tall, large-diameter trees (DBH >30 cm), in forests (Kalcounis-Ruepell et al., 2005; Olson, 2011; Olson and Barclay, 2013). One tree with suitable characteristics for use as a maternity roost was identified within the PDA; however,

no evidence of bat occupancy was observed. The tree is located approximately 15 m from an existing road.

Foraging Little Brown Myotis are commonly found in open habitats, including ponds, roads, and open forests, whereas Northern Myotis foraging sites include small ponds, forest canopies, and along paths and roadways (ECCC, 2018). Migratory species such as the Hoary Bat and Silver-haired Bat generally forage high above clearings, treetops, or over water. Therefore, portions of the LAA can serve as possible foraging habitats for resident and migratory bat species.

11.3 Effects Assessment

11.3.1 Potential Effects and Mitigation

Several measures were incorporated into Project planning and design to minimize potential direct and indirect effects on bats. Where practicable, the Project layout was refined to preferentially use previously disturbed areas, including existing roads and previously harvested areas, and to avoid or minimize disturbance to wetlands and other potential bat foraging and movement habitats. Approximately 43 km, or 84% of the proposed Project road network, consists of existing roads, reducing the extent of new clearing and habitat disturbance. As detailed design progresses, further micrositing will seek to avoid or minimize disturbance to wetlands and other habitats that may support bat foraging or movement.

Potential impacts on bats through multiple interconnected pathways, both direct and indirect, may arise. Construction activities (i.e. grubbing and vegetation clearing) have the potential to cause bat habitat loss and modification. If these activities occur during critical periods, such as migratory or breeding seasons, they can also result in mortality, injury, or displacement of bats.

Provincial and federal recovery strategies (NSDLF, 2020; ECCC, 2018) recognize anthropogenic disruptions as being additive effects to the challenges of WNS. Bats have the potential to be adversely affected, directly or indirectly, through Project activities during construction, operation and maintenance, and/or decommissioning. Collision of individuals with turbines and power lines can directly result in injury and fatality, as can barotrauma[2]. Indirectly, the installation of a wind project can result in habitat loss and fragmentation that can adversely affect long-term survival and reproductive success (Lemaitre et al., 2017). Removal of trees containing cavities or peeling bark could displace bats or directly injure roosting bats if removal occurs during their active period. Project activities can affect bats as indicated in Table 11.5; these potential effects do not account for the refined PDA or the implementation of the mitigation measures described herein.

[2] Barotrauma is injury resulting from a change in air pressure.

Table 11.5 Potential Environmental Effects of the Project on Bats

Project Activity	Potential Environmental Effects		
	Habitat Loss/ Fragmentation	Direct Mortality and Injury	Sensory Disturbance
Construction			
Site Preparation	X	X	X
Access Roads Construction and Modifications	-	X	X
Material and Equipment Delivery and Storage	-	-	X
Infrastructure Installation	-	-	X
Restoration of Temporary Areas	-	-	X
Testing and Commissioning	-	X	X
Operation and Maintenance			
Turbine Operation and Maintenance	-	X	X
Road Maintenance	-	X	X
Power Line and Substation Maintenance	-	X	X
Vegetation Management	-	X	X
Safety and Security	-	-	X
Decommissioning			
Removal of Infrastructure and Site Restoration	-	X	X

X = Potential Interaction
- = No Interaction

11.3.1.1 Habitat Loss and Fragmentation

The Project activities that result in removal of trees may affect roosting habitat for bats, and changes to riparian habitat or wetlands has the potential to impact foraging and drinking habitat for bats.

Construction-related vegetation clearing and grubbing may result in the loss or alteration of bat roosting, foraging, and movement habitat. Forest clearing associated with access roads, turbine locations, transmission infrastructure, and other Project components may remove potential tree-roosting habitat, while disturbance to wetlands, riparian areas, and forested habitats may affect areas used for foraging and movement.

For the purposes of the assessment, approximately 248 ha, or 30% of the PDA, has been identified as possible maternity roost habitat. The PDA represents the area within which Project infrastructure may be located and is larger than the ultimate Project Footprint;

therefore, this area does not represent the amount of maternity roost habitat that will be removed or altered. Direct habitat disturbance will be limited to the final Project Footprint.

Project design has emphasized the use of previously disturbed areas. Approximately 43 km, or 84% of the proposed Project road network, consists of existing roads, reducing the requirement for new road construction and associated habitat disturbance. One possible bat maternity roost tree was observed within the PDA. Further micrositing during detailed design will seek to avoid or minimize disturbance to wetlands, riparian areas, and other potential bat habitat (e.g., possible maternity roost trees), where practicable. No known hibernacula occur within the LAA, and the closest known hibernaculum is approximately 60 km from the PDA; therefore, direct effects on known hibernacula are not anticipated.

Although some bat species tend to avoid extensive clearcuts and open spaces, forested and vegetated edges have been observed to offer foraging opportunities for certain bats. These edges may additionally serve as protective zones against predators and wind, and they may concentrate prey (Krusic et al., 1996; Grindal and Brigham, 1998; Swystun et al., 2001; Henderson and Broders, 2008; as cited in ECCC, 2018).

Potential Project effects related to habitat loss and fragmentation can be effectively mitigated through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on bat habitat will be further detailed in a Project-specific EPP and will be implemented prior to and during construction.

- Existing roads, harvested areas, and other previously altered areas will be used to the extent practicable. Areas of clearing and grubbing will be limited to that needed to construct and operate the Project.
- Vegetated buffers around wetlands and watercourses will be maintained to support connectivity and foraging habitat where possible.
- Disturbed areas will be stabilized and revegetated as soon as practicable following completion of construction activities.
- Invasive species prevention and management measures will be implemented to reduce the introduction and control the spread of invasive species, as part of the Project-specific EPP.
- Vehicle traffic and equipment staging will be limited to designated access roads and laydown areas.

11.3.1.2 Direct Injury or Fatality

The Project presents the risk of direct bat mortality and injury during construction, primarily due to vegetation clearing and increased traffic. Once operational, most bat deaths at turbines are due to blunt force trauma from collisions with turbines, with a smaller component of deaths related to barotrauma due to rapid change in air pressure (Baerwald et al., 2008; Rollins et al., 2012). As per COSEWIC (2013), any additional mortality of SARA-listed bat species in WNS affected regions, including fatalities at wind turbines,

could adversely affect local population survival, hinder recovery efforts, and potentially impede the development of resistance to the WNS-causing fungus.
Construction activities, such as tree clearing and grubbing, pose a risk for bat mortality. Clearing trees any time during the active season poses a risk for individual bats as they will use trees for day roosting. Tree clearing should be scheduled to avoid the active season to avoid risk to SAR bats that may be passing through the Project area during construction.

Wind turbine collisions are the main direct cause of bat mortality once wind farms are operational, with an estimated loss of 50,000 bats per year through Canada (Zimmerling & Francis, 2016). Mortality levels from wind turbines vary based on species, location, season (Kunz et al., 2007; Arnett et al., 2008; Baerwald and Barclay, 2011), turbine height (Barclay et al., 2007; Anderson et al., 2022), wind speeds (Arnett et al., 2008; Horn et al., 2008), speed of turbine, and weather (Arnett et al., 2008). A recent study found that fewer Little Brown Myotis fatalities occurred at taller turbines than shorter (turbines ranged from 119 to 186 m (hub height plus blade length) but fatalities of migratory bats increased with increased turbine heights (Anderson et al., 2022).

While wind turbine collisions represent many bat mortalities, there is variability in bat mortality rates across different regions. One study of bat mortality across 64 Canadian wind farms found an average mortality rate of 15.5 ± 3.8 (95 % confidence interval) bats per turbine per year, but this encompasses a wide range of mortalities, from 0 to 103 bats per turbine per year at individual wind farms (Zimmerling & Francis, 2016). Data collected from wind farms in Nova Scotia was lowest of any province in the country with a mortality rate of 0.5 bats per turbine per year. Similarly, a study conducted by Birds Canada in 2016, focusing on data from wind farms in Atlantic Canada, estimated an average annual bat mortality rate within 50 m of the turbine base (from May 1 to October 31, 2016) to be 0.26 ± 0.11 bats per turbine. These findings emphasize the variability in bat mortality rates across different regions and highlight the importance of localized studies for accurate assessment.

Studies examining bat avoidance of wind turbines have produced variable results. One study conducted in the low mountain ranges of Germany found that gaps in the forest created by clearing around wind turbines attracted bat species, particularly those that tend to forage in open and forest-edge areas (Ellerbrok et al., 2023). The same study found that narrow-space foraging bats (e.g., species that are short-range echolocators and typically forage in the understory), including species of Myotis, also showed an increase in use of clear-cuttings from wind turbines, compared to nearby closed forests. However, another study found similar activity of Myotis between recently cleared areas and in closed forests, showing no increase of use in recently cleared areas (Kirkpatrick et al., 2017). Another study in a Finnish boreal forest investigated bat activity at various distances from wind turbines. This recent study reported significantly higher Myotis activity at sites located more than 800 m from wind turbines, indicating that Myotis species were more abundant farther from turbine infrastructure (Gaultier et al., 2023). Although the Myotis species in these European studies are not the same as the species of Myotis considered in this EA (Northern and Little

Brown), they share key similarities due to their common genus and adaptations to northern environments; including insectivorous diets, winter hibernation, and social behaviours (Blomberg et al., 2025; Tidenberg et al., 2019). These two European studies suggest that *Myotis* species, actively avoid wind turbines, which would therefore result in fewer collisions (Kirkpatrick et al., 2017; Gaultier et al., 2023).

There are several reasons why bats may collide with wind turbines. Behaviours such as breeding, swarming, and foraging can involve repeated passes around wind turbines and increase the risk of collision (Cryan and Brown, 2007; Arnett et al., 2008; Rydell et al., 2010a; Roeleke et al., 2016). A few studies have demonstrated that the number of insects present around wind turbines is influenced by the location and arrangement of the turbines (e.g., creation of an opening in the forest, aviation warning lights, roads, turbine colour, and air currents created by movement of the blades) (Horn et al., 2008; Rydell et al., 2010b).

Annual fluctuations in bat activity and the potential alteration of activity patterns in the vicinity of turbines (Barclay et al., 2007; Kunz et al., 2007; Horn et al., 2008; Cryan and Brown, 2007) imply that predicting project risk is challenging because pre-construction data might not accurately predict fatality rates (Hein et al., 2013). Hence, post-construction monitoring of fatalities is essential to monitor and assess bat mortalities.

A post-construction monitoring program will be developed in consultation with ECCC-CWS and NSDNR and implemented for two years. Carcass searches will be conducted during the spring (minimum of 6 to 8 weeks) and fall (minimum of 8 to10 weeks), regardless of the weather. The *Guidance for Bird and Bat Surveys Pre- and Post-Construction Surveys and Monitoring – Wind Energy* (NSDNR, 2022), *Wind Energy & Birds Environmental Assessment Guidance Update* (ECCC-CWS, 2022), and other accepted guidelines will be referenced when developing the monitoring program.

Ongoing monitoring and adaptive management strategies will be implemented to assess the effectiveness of Project-specific mitigation measures and detect unexpected impacts on bats during the construction, and operation and maintenance phases of the Project.

Potential Project effects related to direct injury or fatality can be effectively mitigated through planning and management of construction and operation activities. The following key measures to mitigate the potential risks of bat collision will be further detailed in a Project-specific EPP and will be implemented prior to and during Project construction, as well as during operation.

- Tree clearing will be conducted outside the active period for bats to avoid accidental injury or mortality of bats where feasible.
- During construction and operation, appropriate drainage will be installed around turbines to prevent formations of wetted areas or pooled water that might increase insect populations and attract bats.
- The Proponent will develop and implement a Wildlife Management Plan.

- Project personnel will receive information on bats that may occur within the PDA and procedures for reporting observations.
- A post-construction monitoring program will be developed and implemented in consultation with NSDNR and ECCC-CWS to assess the ongoing impact of wind turbines on wildlife, particularly bats, and inform adaptive management strategies.
- Adaptive management strategies will be employed through the lifespan of the Project, if required based on the findings of the post-construction mortality monitoring program.

11.3.1.3 Sensory Disturbance

Sensory disturbances from noise and lighting at wind projects are considered to pose lower risks than collisions. However, as outlined in the Recovery Strategy (ECCC, 2015), activities that cause excessive disturbance (e.g., light, noise, vibrations) could result in the arousal of bats from torpor. Noise can have an indirect effect on bats through disturbance and light pollution at night has the potential to attract bats to lit project infrastructure due to the potential of increased prey availability and potentially increasing the mortality risk (e.g., collision and barotrauma).

Noise will be generated during all phases of the Project. Heavy equipment during construction, operation and maintenance, and decommissioning will contribute to noise generation. Additionally, turbines will produce noise during operation. Because the closest known hibernaculum is 60 km from the PDA, disturbance to hibernating bats during construction and operation are not expected. Construction and decommissioning activities will primarily occur during daylight hours, limiting sensory disturbance to roosting bats.

Wind turbines during operation generate noise that may impact the ability of bats to carry out a wide range of behaviours such as communication, foraging, and predator avoidance (Oerlemans et al., 2007). Consequently, bats may avoid wind turbines—particularly forest-dwelling species like *Myotis*—and the operation of wind turbines erected at forested sites could represent indirect habitat loss (Ellerbrok et al., 2022). However, other sensory disturbances may be attracting bats to wind turbines (Cryan et al., 2014; Horn et al., 2008). Evidence suggests that wind turbines disrupt sensory cues such as vision, vibration, pressure, temperature, and olfactory cues, at both the scale of individual turbines and wind farms as a whole (Jonasson et al., 2024). Bats may be attracted to wind turbines because these structures have characteristics similar to favourable roost trees (Cryan et al., 2014; Guest et al., 2022). Transmission corridors and roads resemble natural linear features typically used by bats during commuting and migration (Jameson & Willis, 2014; Jonasson et al., 2024). Together, these cues can interrupt bat navigation and movement, especially in forested habitats.

Potential Project effects related to sensory disturbance can be effectively mitigated through planning and management of construction and operation activities. The following key measures to mitigate the potential effects that Project lighting and noise may have on bats will be further detailed in a Project-specific EPP and will be implemented prior to and during Project activities.

- Onsite lighting will be restricted during Project activities and minimized to the extent possible while maintaining regulatory and safety requirements, reducing insect attraction and subsequent attraction to infrastructure by bats. Movement detection lighting will be used where possible which will turn off when not in use. Construction will mostly occur during daytime hours and will be restricted at night, when possible.
- Where blasting is necessary, it will be undertaken in accordance with applicable regulatory requirements and conducted only by a certified blaster or other qualified blasting professional.
- Blasting patterns and procedures that minimize shock or instantaneous peak noise levels will be used, where possible.
- Blasting activities will be limited to that which is necessary.
- The Proponent will develop and implement a Wildlife Management Plan.

11.3.2 Residual Effects

Activities associated with the Project may induce short to long-term impacts on bats in the PDA and LAA, primarily due to vegetation clearing and cutting, collisions with wind turbines, and sensory disturbance.

The residual effects associated with habitat loss during construction are predicted to be long-term in duration and of minor magnitude. The effect will be restricted to the local area and is expected to occur once during a period of low sensitivity for bats.

During operation, some risk of bat mortality associated with turbine operation and maintenance phase are expected to be minor in magnitude, restricted to the PDA, and occur during times of moderate to high sensitivity. The magnitude of this effect cannot be predicted solely from pre-construction acoustic activity; however, baseline monitoring generally identified low bat activity within and near the PDA and reported mortality rates from wind facilities in Atlantic Canada are comparatively low, bat fatalities are expected to be intermittent. Post-construction mortality monitoring will be undertaken to characterize Project-specific effects and determine whether additional mitigation or adaptive management is warranted.

Project design has incorporated measures to avoid or minimize disturbance to bat habitat and reduce the potential for conditions that may attract bats to turbine locations. With implementation of these design measures, additional mitigation, post-construction monitoring, and adaptive management, significant adverse effects on bats are not anticipated. Residual effects on bats, including changes in habitat and mortality risk, are predicted to be not significant.

11.4 Monitoring

In addition to the onsite monitoring for all wildlife species conducted during site preparation and construction activities, a post-construction mortality monitoring program will be developed in consultation with ECCC-CWS and NSDNR and implemented for two years post-construction. Carcass searches will be conducted during the spring (minimum of 6 to 8 weeks) and fall (minimum of 8 to 10 weeks). The *Guidance for Bird and Bat Surveys Pre- and Post-Construction Surveys and Monitoring – Wind Energy* (NSDNR, 2022), *Wind Energy & Birds Environmental Assessment Guidance Update* (ECCC-CWS, 2022), and other accepted guidelines will be referenced when developing the monitoring program.

The results of the post-construction mortality monitoring program will be submitted to the appropriate regulatory agencies as required. Additional surveys or mitigations may be identified in consultation with regulators following review of the results. An Adaptive Management Plan will be prepared in consultation with NSDNR and ECCC-CWS.

Data from post-construction mortality surveys may also be shared with the AC CDC and *The Wind Energy Bird and Bat Monitoring Database* (NatureCounts - Wind Energy Bird & Bat Monitoring Database) (Birds Canada, 2022).

12 Birds

12.1 Overview

This chapter assesses the potential effects of the Project on migratory and resident bird species and their habitats. Wind energy developments can affect birds through direct pathways, such as collision mortality with turbines and associated infrastructure, and through indirect pathways, including habitat loss or alteration, fragmentation, and sensory disturbance. Iterative refinements to the Project layout, such as removing turbines from old-growth forest stands and wetland areas, have reduced the potential for adverse effects.

Project interactions with birds are closely connected to environmental effects on other VECs, including noise and lighting Chapter 5 (Atmospheric Environment), vegetation removal or alteration Chapter 8 (Flora), and wetland loss or modification Chapter 9 (Wetlands). These VECs, and the Project effects on them, influence habitat availability, quality, and use by birds and therefore inform the effects analysis presented in this chapter.

Four-season field studies were completed across three years to characterize bird presence, distribution, and habitat use in the Study Area. Pre-construction survey results informed Project infrastructure siting decisions, supported the effects assessment, and guided the development of mitigation measures for all phases of the Project (construction, operation and maintenance, and decommissioning). Baseline data will also support post-construction mortality monitoring and adaptive management. Mitigation measures presented in this chapter will be refined and integrated into a Project-specific EPP prior to construction to minimize adverse effects.

12.1.1 Regulatory Context

Assessment of birds considers the following relevant provincial and federal legislation and guidelines:

- *Migratory Birds Convention Act, 1994* and Migratory Birds Regulations, 2022
- SARA
- *Canadian Environmental Protection Act*
- NSESA
- Nova Scotia *Wildlife Act*
- Nova Scotia *Biodiversity Act*

- Nova Scotia *Environment Act*

12.1.2 Boundaries

The PDA represents the area within which Project infrastructure may be located and defines the maximum spatial extent considered for potential direct Project interactions. The final Project Footprint will occupy only a portion of the PDA. For this assessment, the LAA for birds includes the PDA, a 500 m buffer, and associated airspace. The RAA is a 5 km buffer around the PDA.

A Study Area, encompassing PDA and the APIA, is discussed in the existing environment. However, the effects assessment focuses on the PDA, LAA, and RAA.

12.1.3 Assessment Methodology

The assessment of birds focused on identifying migratory and resident bird species present or likely to occur in or near the Study Area, with emphasis on SAR, SoCC, and their habitats. Information was collected through a combination of literature review, online databases and reports, habitat analysis, and field surveys conducted across all seasons.

Information gathered during the desktop review and habitat analysis informed the design of baseline field surveys that are reflective of the Project site sensitivity and risk level (Category 4) as outlined in the *Wind Energy & Birds Environmental Assessment Guidance Update* (ECCC, 2022), *Wind Turbines and Birds: A Guidance Document for Environmental Assessment* (ECCC, 2007a) and *The Guide to Preparing an EA Registration Document for Wind Power Projects in Nova Scotia* (NSDNR, 2022a). Survey methods followed protocols outlined in *Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds* (ECCC, 2007b), *Wind Energy & Birds Environmental Assessment Guidance Update* (ECCC, 2022), and *Guidance for Bird and Bat Surveys Pre- and Post-Construction Surveys and Monitoring – Wind Energy* (NSDNR, 2022b).

Baseline field surveys were designed to document bird presence, diversity, and abundance of bird species and their habitats in the Study Area and to evaluate the potential impacts of the Project. The results were used to inform and refine infrastructure siting and to develop mitigation measures to avoid or minimize adverse effects on birds during construction, operation and maintenance, and decommissioning. The data collected through the assessment process will also serve as a baseline to support post-construction mortality monitoring and adaptive management.

The description of the existing environment in this chapter is based primarily on data from the following sources, supplemented by field surveys completed for this Project:

- Critical Habitat for Species at Risk National Dataset – Canada (ECCC, 2026)
- Nova Scotia Significant Species and Habitats Database (NSDNR, 2026a)
- Important Bird Areas (IBAs) (Birds Canada & Nature Canada, 2026)
- Migratory Bird Areas and National Wildlife Areas (NWAs)

- Species at Risk Public Registry documents for federal SAR
- AC CDC Data Report (AC CDC, 2026; Appendix F)
- Second Atlas of Breeding Birds of the Maritime Provinces (Maritimes Breeding Bird Atlas (MBBA)) (Stewart et al., 2015)
- eBird (2026)
- Global Nature Watch Tree Cover Loss 2001-2024 and Gain 2000-2020 (Global Nature Watch, 2026)
- Old-Growth Potential Index V2 (NSDNR, 2025b)
- Predictive Ecosystem Mapping for Nova Scotia (GeoNOVA, 2024)
- Nova Scotia Hydrographic Network (GeoNOVA, 2025a)
- Nova Scotia Wet Areas Mapping and Flow Accumulation Channel (GeoNOVA, 2025b)
- Nova Scotia Wetlands Inventory (NSDNR, 2021b)
- Nova Scotia LiDAR Point Cloud (GeoNOVA, 2020)

A habitat assessment was completed for SAR and SoCC bird species known or expected to occur within a 100-km radius of the LAA. This assessment used available habitat information and spatial data, including federal critical habitat and provincial core habitat data layers.

A SAR biologist with the Wildlife Division of NSDNR, the Environmental Protection Operations Directorate – Atlantic, ECCC, and the Environment Stewardship Branch of ECCC were consulted regarding the proposed bird survey methodologies. Comments received from reviewers (M. McGarrigle, pers. comm., August 16, 2024; S. Wade, pers. comm., July 30, 2024), were incorporated into the survey methodologies. Details of these surveys are presented below in subsection 12.1.3.2.

Detailed habitat suitability models were developed to identify suitable breeding habitat for five SAR birds in the Study Area (Table 12.1). These spatial analyses informed field survey design and supported the evaluation of Project effects. Details of the SAR habitat suitability models are described in the subsections that follow.

Table 12.1 SAR Birds for which Habitat Suitability was Modelled in the West Bay LAA.

Scientific Name	Common Name	Status			
		NSESA	SARA	COSEWIC	AC CDC
Cardellina canadensis	Canada Warbler	E	SC	SC	S3B
Chordeiles minor	Common Nighthawk	T	SC	SC	S3B
Coccothraustes vespertinus	Evening Grosbeak	V	SC	SC	S3B,S3N,S3M
Contopus virens	Eastern Wood-pewee	V	SC	SC	S3S4B
Contopus cooperi	Olive-sided Flycatcher	T	SC	SC	S3B

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

12.1.3.1 SAR Bird Habitat Modelling

Spatial parameters representing key biophysical attributes of breeding habitat were selected based on peer-reviewed literature, jurisdictional guidance, and expert knowledge. The spatial layers used to develop the habitat suitability models were obtained from the following datasets:

- Nova Scotia Hydrographic Network (GeoNOVA, 2025a)
- Nova Scotia Wet Areas Mapping and Flow Accumulation Channel (GeoNOVA, 2025b)
- Nova Scotia Interpreted Forest Inventory (GeoNOVA, 2021)
- Nova Scotia Wetlands Inventory (NSDNR, 2021)
- NSDNR Old Growth Potential Index V2 (NSDNR, 2025)
- Nova Scotia LiDAR Point Cloud (GeoNOVA, 2020)

Canada Warbler

Canada Warbler generally breeds in wet deciduous or mixedwood forests with a dense understory and high canopy (Haché et al., 2014; NSDLF, 2021a; COSEWIC, 2020). In Nova Scotia, Westwood (2016) found that Canada Warbler habitat was correlated with mixedwood forests dominated by Black Spruce and Red Maple, with lesser quantities of Red Spruce and Balsam Fir. However, overall forest structural diversity appears to be a more important predictor of habitat suitability than tree species composition alone (Stewart et al., 2015).

The following parameters were used to model suitable breeding habitat for Canada Warblers in the LAA (Figure 12.8, Appendix A):

- Depth to water table – Sites with a depth to water table less than or equal to 2 m depth to water has been identified as a strong predictor of habitat suitability for forested wetland–associated species such as Canada Warbler (Westwood, 2016; Westwood et al., 2019).
- Stand type – Forest stands classified as deciduous forest and mixedwood forest.
- Canopy closure – Forest stands with a canopy closure between 5 and 85% (Westwood et al., 2017).

Common Nighthawk

Common Nighthawk nests on open ground and in clearings. A variety of habitats provide suitable breeding conditions, including open forests (particularly those with recent cuts, burns, or rocky outcrops), grasslands, wetlands, rocky areas such as quarries, gravel pits, and railway margins, and cultivated lands such as orchards and blueberry fields (COSEWIC, 2018a; ECCC, 2016).

The following parameters were used to model suitable breeding habitat for Common Nighthawks in the LAA (Figure 12.9, Appendix A):

- Land classification – Areas classified as clearcut, barren, rock barren, agriculture, blueberries, gravel pits, old field, open peatland, powerlines, railways, and urban areas.

Eastern Wood-pewee

Eastern Wood-pewee primarily inhabits open deciduous and mixedwood forests with high canopies, as well as forest edges and clearings (ECCC, 2023c). In Nova Scotia, both treed swamps and mature upland forests provide important habitats for the species (Brazner & MacKinnon, 2020). Eastern Wood-pewee generally avoids human-occupied areas and regenerating forests (NSDNR, 2022; COSEWIC, 2012).

The following parameters were used to model suitable breeding habitat for Eastern Wood-pewees in the LAA (Figure 12.10, Appendix A):

- Forest inventory – Any stand classified as forested.
- Canopy closure – Forested stands among the above types with canopy cover between
- 55% and 70%.
- Distance to clearings – Forested stands located within 150 m of a clearing or habitat edge.

Evening Grosbeak

Evening Grosbeak prefers to breed in mature, old coniferous and mixedwood stands, often dominated by fir, spruce, Tamarack, pine, and aspen with relatively low canopy cover (COSEWIC, 2016; ECCC, 2022b). Nests are typically located in trees greater than 40 m in height (Bekoff et al., 1987).

The following parameters were chosen to model suitable breeding habitat for Evening Grosbeaks in the LAA (Figure 12.11, Appendix A):

- Old-Growth Potential Index - All Values (7 to 11).
- Stand type – Forest stands classified as coniferous forest and mixedwood forest.

Olive-sided Flycatcher

Olive-sided Flycatcher prefers to breed in moist, coniferous, or mixedwood forest, and is often associated with wetlands, forest edges (particularly adjacent to wetlands), and gaps created by recent burns or clearcuts (NSDLF, 2021b). In Nova Scotia, this species is typically found in stands dominated by spruce, Balsam Fir, and Red Maple, with lesser amounts of pine and Tamarack (Staicer et al., 2015). While the species prefers forested areas for nesting, Olive-sided Flycatchers rely on open areas or clearings in their breeding habitat to forage for insects on the wing. Nests are built in tall trees, typically 5 to 20 m above ground, with snags nearby (COSEWIC, 2018b). Studies in Nova Scotia indicate a preference for stands with lower canopy cover but greater canopy height (Staicer et al., 2015).

The following parameters were chosen to model suitable breeding habitat for Olive-sided Flycatchers in the LAA (Figure 12.12, Appendix A):

- Canopy height – Stands with an average canopy height of 5 m or greater.
- Forest inventory – Stands classified as coniferous and mixedwood forest.
- Tree cover – Forested stands with a canopy closure between 20 and 70%.
- Wet area mapping – Areas with a depth to water table of 2 m or less.

12.1.3.2 Field Surveys

The objective of the field surveys was to collect baseline information on bird species using and moving through the Study Area through all four seasons. Survey protocols followed seasonally appropriate guidance, including *Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds* (ECCC, 2007b), *Wind Energy & Birds Environmental Assessment Guidance Update* (ECCC, 2022), and *Guidance for Bird and Bat Surveys Pre- and Post-Construction Surveys and Monitoring – Wind Energy* (NSDNR, 2022b), other standard survey protocols and guidance documents, and consultation with regulators.

Surveys within the Study Area were designed to target areas of potential impact, including the PDA and associated airspace near proposed turbine locations. Winter surveys identified resident species present during the general non-breeding season for migratory birds; breeding bird surveys, including nocturnal owl and nightjar surveys, assessed species diversity and abundance during the general nesting period for migratory birds; and migration surveys, including point counts, passage counts, radar, and acoustic monitoring, assessed species at potential risk of turbine collisions during spring and fall migration periods.

Winter Bird Surveys

Winter bird surveys were conducted in the Study Area across two seasons, in 2025 and 2026, to document species presence and abundance. During the 2025 winter season, area searches were conducted on January 14, January 15, February 10, February 11, March 3, and March 4. Over the 2026 season, point counts and area searches were conducted on February 16, February 17, March 6, March 7, March 25, and March 28. Survey areas included access roads, areas near proposed infrastructure at the time of the surveys and representative habitat types across the Study Area (Figure 12.1).

Nocturnal Owl Surveys

Nocturnal owl surveys were conducted in the Study Area over two years, in 2025 and 2026. In 2025, observer-based nocturnal owl surveys were conducted on March 14 under suitable weather conditions (e.g., minimal wind and precipitation). Surveys generally followed the protocols described in *Guidelines for Nocturnal Owl Monitoring in North America* (Takats et al., 2001) and *Nova Scotia Nocturnal Owl Survey: Guide for Volunteers* (Birds Canada, 2019).

Nine survey stations were established across representative habitat types (see Figure 12.2, Appendix A). Owl vocalizations provided by Birds Canada were broadcasted at each survey station. Although the survey targeted nocturnal owls, all bird species detected were recorded, including species that vocalize or display at dusk, such as American Woodcock (*Scolopax minor*).

In 2026, six AudioMoth autonomous recording units (ARUs) were deployed within the Study Area during March and April to record owl vocalizations. Recordings were analyzed in 20-minute increments at the top of each hour between 8:00 p.m. and 5:00 a.m. In total, 128

ARU-nights of recordings were analyzed for owl vocalizations across the six ARUs, representing an average of approximately 21 nights per ARU.

Migration Surveys

Migration monitoring was conducted over three years (2024 to 2026) and included point counts, transects, passage migration surveys, and radar and acoustic monitoring to assess the presence, abundance, and movement of birds within the Study Area during migration periods.

Migration Point Count and Transect Surveys

Ten-minute, unlimited radius point counts were conducted between dawn (30 minutes before sunrise) and approximately 10:00 a.m. in suitable weather conditions (e.g., minimal wind and precipitation). Survey locations were typically spaced apart 250 m or more and stratified across major habitat types to provide representative coverage of the Study Area. Survey locations were selected based on GIS-based habitat mapping and field conditions and were generally situated along existing and proposed access roads near prospective turbine locations.

At each survey location, all species seen or heard were recorded as well as an estimate of the number of individuals of each species during the survey period. The distance to each bird was estimated using fixed distance categories (0 to 50 m, 51 to 100 m, and further than 100 m) and individuals were monitored for the duration of each point count to limit double counting. General observations including date, time, and weather conditions (temperature, wind speed, presence of any precipitation) were also recorded.

Spring migration point counts were conducted over two seasons, in 2025 and 2026. In 2025, three survey rounds were completed between April 2 and May 28. In 2026, five survey rounds were completed between April 18 and May 31. Ten survey locations were established in 2025, with an additional 29 locations established in 2026, for a total of 39 unique survey locations (Figure 12.3, Appendix A).

Fall migration surveys were conducted over two seasons, in 2024 and 2025. In 2024, point counts were completed over four survey rounds on August 27, September 12, October 24, and November 8 at 10 locations.

In 2025, fall migration surveys included both point counts and transects and were completed over five survey rounds on September 10 and 15, September 20 and 24, September 30 and October 1, October 14 and 15, and October 22 and 25. Transects ranged from approximately 600 m to 800 m in length and were distributed across the northern portion of the Study Area to sample representative habitat types. Each transect was walked, and all species detected by sight or sound and the estimated number of individuals of each species were recorded. An additional 20 survey locations were established in 2025, for a total of 30 unique fall migration survey locations across the two seasons (Figure 12.4, Appendix A).

Passage Migration Surveys

Passage migration surveys were conducted during fall 2024 and 2025 and spring 2025 and 2026 (Figures 12.3 and 12.4, Appendix A). The passage migration counts were conducted at suitable observation points in the Study Area, particularly where turbines are proposed to be built, and in locations that provided a clear view of multiple proposed turbine locations.

Data recorded over the passage migration surveys included the species observed, the number of individuals observed, the direction, and the estimated height of passing birds. The fall 2024 and spring 2025 passage migration surveys started as early as between 8 and 9 a.m. and continued for 1 to 6 hours. A few surveys were terminated early due to inclement weather conditions (e.g., heavy rain or fog). Five rounds of passage migration surveys were conducted fall 2024, and three rounds of passage migration surveys were conducted spring 2025.

Passage migration surveys conducted in fall 2025 and spring 2026 recorded the same survey parameters. Fall surveys were conducted at three locations, comprising a total of 25 30-minute surveys, while spring surveys were conducted at four locations, comprising a total of 40 30-minute surveys.

Radar Monitoring

Nocturnal migration monitoring was completed using radar technology, which detects volume and flight height (i.e., passage rate) of nocturnal migrants that traverse the Study Area. The radar unit detects all organisms using the airspace, which may include birds, bats, and insects. During data analysis, particular filters are placed on values to remove clutter and non-target individuals (i.e., insects and bats) from the data, but it is difficult or impossible to know if this is 100% effective. Therefore, detections are generically referred to as targets. The full radar and acoustic monitoring report can be found in Appendix I.

An automated magnetron radar unit was deployed in the Study Area and monitored by Tabanid Consulting Ltd during the fall 2024 and spring 2025:

- July 14 through November 15, 2024, for a total of 120 operational nights
- March 15 through June 7, 2025, for a total of 76 operational nights

The radar functioned properly for most of the fall 2024 season, except for a short 4-day period due to an under-powered solar power system from an unexpected high number of foggy days. After this failure, additional storage was added to the power system and no more outages occurred. The radar was operational for most of the spring migration season; however, due to below normal solar inputs, the radar was deliberately stopped during several nights.

The radar unit operated from sunset to sunrise each night. The location of the radar unit was selected to maximize detection of nocturnal migrants that pass through the Study Area at the height of the rotor-swept zone (RSZ), in an area with a clear, unobstructed view of

the overhead sky. The unit was oriented to align with the expected movement of targets through this area during migration. Further details can be found in Appendix I.

Acoustic Monitoring

A network of six automatic recording units (ARUs; AudioMoths) was deployed within the Study Area by Tabanid Consulting Ltd, concurrent with radar monitoring during the spring and fall migration periods. These ARUs were deployed to record nocturnal flight calls of migrating birds through the Study Area. They were set up to record between sunset and sunrise, on a 10 minute on/off duty cycle to capture approximately half of the night while extending battery life. The ARUs were positioned in open areas with minimal clutter (e.g., branches) surrounding the microphone, which were pointed up towards the sky and covered in a protective plastic film.

Breeding Bird Surveys

Breeding bird surveys were conducted in the Study Area in 2024 and 2025 to determine which species regularly use the area for nesting, for foraging during the breeding season, or for raising their young.

Breeding Bird Point Count Surveys

Following the point count methodology used during migration surveys, 10-minute, unlimited radius point counts were conducted between dawn (half an hour before sunrise) and approximately 10:00 a.m. in suitable weather conditions (e.g., minimal wind and precipitation). Observed breeding evidence was recorded using standard MBBA breeding bird codes. Point count surveys were conducted in 2024 and in 2025.

In 2024, 15 point count locations were distributed across the Study Area, and in 2025, 13 point count locations were distributed across the Study Area to target the different habitat types and in suitable breeding habitat for SAR birds that may breed in the Study Area (refer to Section 12.1.3.1) (Figure 12.5, Appendix A). Each survey point was surveyed twice with the aim to detect early and late breeders.

Nightjar Surveys

Common Nighthawk is listed under the federal SARA as Special Concern and Eastern Whip-poor-will (*Antrostomus vociferus*) is listed under the federal SARA as Threatened; both are listed under the provincial NSESA as Threatened. Because Common Nighthawk are crepuscular and Eastern Whip-poor-will are nocturnal, these species are not typically detected during standard breeding bird surveys (as outlined above) and targeted surveys are needed to determine the presence of these species in a particular geographical area.

Following the general methodology outlined in the Canadian Nightjar Survey Protocol (Birds Canada, 2022), nightjar surveys were conducted over two seasons, in 2024 and 2025. Nine survey locations were surveyed in 2024, with two survey rounds completed on June 21 and June 24. An additional six locations were surveyed in 2025, with two rounds completed on June 16 and July 8 (Figure 12.6, Appendix A).

Surveys began approximately 30 minutes before sunset and continued until approximately two hours after sunset to coincide with the Eastern Whip-poor-will survey window. Given the potential presence of Eastern Whip-poor-will within the Study Area, surveys were timed to coincide with the full moon in both years. At each survey location, a six-minute listening period was completed, during which all species detected by sight or sound were recorded. Other species that vocalize or display at dusk, such as American Woodcock, were also recorded.

Pileated Woodpecker

While targeted surveys for Pileated Woodpecker were not conducted, suitable nesting habitat was recorded when it was encountered in conjunction with the completion of other field surveys in the Study Area. The nests of Pileated Woodpeckers are protected year-round under the Migratory Birds Regulations, 2022, and there is suitable nesting habitat in the Study Area. Evidence of current or historical nesting was recorded during the execution of bird surveys and other biological field programs conducted in the Study Area between 2024 and 2026. These incidental observations are included in the assessment of the existing environment.

12.2 Existing Environment

Bird conservation and wilderness areas occurring in proximity to the Study Area are shown on Figure 12.7, Appendix A. The Study Area borders the Kelley River Wilderness Area, which is one of the largest wilderness areas in the province. It is an area of mature and older contiguous forest and provides habitat for numerous species of birds that require expansive, contiguous forests, such as American Goshawk (*Astur atricapillus*).

The IBAs nearest to the Study Area are the Shepody Bay West IBA (NS009; approximately 33 km northwest from the closest turbine), the Dorchester Cape and Grand Anse IBA (NS038; approximately 30 km northwest from the closest turbine), the Upper Cumberland Basin IBA (NS002; approximately 22 km north from the closest turbine), the Cobequid Bay IBA (NS019; approximately 33 km southeast from the closest turbine), and the Southern Bight, Minas Basin IBA (NS020; approximately 31 km south from the closest turbine) (Birds Canada, n.d.). All these IBAs provide important habitat for congregatory species and shorebird concentrations. As these five IBAs are coastal, they provide salt marsh/brackish marsh habitats, mud flats, and tidal rivers and/or estuaries. Millions of shorebirds use the mud flats at the head of the Bay of Fundy for staging prior to fall migration. These IBAs are often the last and most important stop for species of sandpipers, as they will build up fat stores prior to flying over the ocean over three to four days straight to their wintering grounds. In addition to the great diversity of shorebirds supported by these IBAs, substantial migrations of Canada Geese pass through the area. Additionally, several of these IBAs overlap with other provincially or federally designated or protected lands. The Southern Bight, Minas Basin IBA overlaps with Provincially Significant Migratory Bird

Habitat. The Upper Cumberland Basin IBA overlaps with the Chignecto Natural Wildlife Area. Furthermore, all the nearby IBAs overlap with areas of Bank Swallow Critical Habitat.

In addition to the Kelley River Wilderness Area, there are several other Wilderness Areas in proximity to the PDA that provide important habitat for birds:

- Raven Head Wilderness Area (approximately 20 km northwest from the closest turbine)—approximately 5,650 ha, 44 km of coastline, and features fossil-bearing cliffs, sheltered coves, beaches, salt marshes, and forests (NSECC, n.d. a)
- Economy River Wilderness Area (approximately 21 km east from the closest turbine)—11,640-ha patch of forest in the heart of the Cobequid Mountain (NSECC, n.d. b)
- Polly Brook Wilderness Area (approximately 31 km northeast from the closest turbine)—11,640-ha patch of forest in the heart of the Cobequid Mountain (NSECC, n.d. c)
- Chase Lake Wilderness Area (approximately 40 km northeast from the closest turbine)—873-ha patch of older forest near Oxford (NSECC, n.d. d)
- Portapique Wilderness Area (approximately 46 km east from the closest turbine)—3024 ha centered around a mixed forest canyon of the Portapique River, with stands of mature to old growth coniferous forest (NSECC, n.d. e)
- Walton River Wilderness Area (approximately 40 km southeast from the closest turbine)—2246 ha forested corridor following the Walton River that drains into the Minas Basin at Walton in Hants County (NSECC, n.d. f)

There are several small Nature Reserves in the region including the Diligent River Nature Reserve (approximately 7 km southwest from the closest turbine), the Harrison Woods Nature Reserve (approximately 27 km north from the closest turbine), the Petite Bog Nature Reserve (approximately 47 km southeast from the closest turbine), and the Tenycape River Nature Reserve (approximately 49 km southeast from the closest turbine). While Wilderness Areas offer the public opportunities to interact with nature, many of them having trails, Nature Reserves are mainly restricted to scientific research and education. Heavy recreation, hunting, and fishing are typically prohibited. Whereas Wilderness Areas are typically intended to protect large pieces of land, Nature Reserves are often smaller and focus on specific ecological hotspots, including old growth forest, rare bogs, and/or specialized bird and plant habitat (Province of Nova Scotia, 2012).

There are several provincial parks in proximity to the closest turbine as well, the Chignecto Provincial Park (approximately 35 km west from the closest turbine), the Five Islands Provincial Park (approximately 23 km southeast from the closest turbine), the Cape Split Provincial Park (approximately 16 km south from the closest turbine), and the Blomidon Provincial Park (approximately 17 km south from the closest turbine). While provincial parks are typically managed mostly for recreation rather than for wildlife conservation, they still restrict development and heavy disturbance such as mining and logging, thereby indirectly conserving wildlife habitat while allowing the public to engage with wildlife and nature. These four provincial parks are located on the province's coast, each offering

recreational opportunities including coastal kayaking, hiking, birdwatching, and camping (except for Cape Split).

Based on the Critical Habitat for Species at Risk National Dataset (ECCC, 2026), several areas of Bank Swallow (*Riparia riparia*) Critical Habitat, and one area of Piping Plover (*Charadrius melodus melodus*) Critical Habitat are in proximity to the PDA. The closest Bank Swallow critical habitat occurs approximately 14 km southeast from the closest turbine in Two Islands, and the Piping Plover Critical Habitat being approximately 34 km northwest from the closest turbine near Cape Enrage in New Brunswick. Critical Habitat is managed and protected by SARA, and areas of Critical Habitat are identified in species' recovery strategies or action plans.

The abundance of bird conservation areas in proximity to the Project (Figure 12.7, Appendix A) signifies the region's importance for migratory and breeding bird species. Collectively, these protected areas conserve a diverse range of habitats, including coastal cliffs, beaches, salt marshes, wetlands, rivers, mature forests, and old growth stands that support birds throughout the different stages of their life cycles. The presence of Wilderness Areas, IBAs, Nature Reserves, provincial parks, and federally designated Critical Habitat in proximity to the Study Area demonstrates the ecological value of the broader landscape and its continued importance for avifauna in Nova Scotia.

The NSDNR Significant Species and Habitat Database contains 81 records of species and/or habitat records that relate specifically to birds within a 100 km radius of the PDA. These records include Migratory Bird (30 records), Species at Risk (14 records), Species of Concern (8 records), and Other Habitat (29 records). No records overlap the PDA. The nearest record is associated with Bald Eagle and occurs within 5 km of the PDA, outside the LAA. Some records in the database may not reflect current species conservation status (e.g., Common Loon).

The details of these records include the following:

- Migratory Bird – shorebirds (unclassified) (19), Double-crested Cormorant (*Phalacrocorax auritus*) (4), Great Blue Heron (*Ardea herodias*) (3), waterfowl (unclassified) (2), and Canada Goose (*Branta canadensis*) (2).
- Other Habitat – Bald Eagle (*Haliaeetus leucocephalus*) (28) and American Black Duck (*Anas rubripes*) (1)
- Species at Risk – Peregrine Falcon (*Falco peregrinus*) (7), Bay-breasted Warbler (*Dendroica castanea*) (2), Bald Eagle (1), Common Loon (1), Eastern Wood-Pewee (1), Golden-crowned Kinglet (*Regulus satrapa*) (1), and shorebirds (unclassified) (1).
- Species of Concern – Bald Eagle (2), Northern Goshawk (2), Bay-breasted Warbler (1), Common Loon (1), Semipalmated Sandpiper (*Calidris pusilla*) (1), and shorebirds (unclassified) (1).

Different bird groups demonstrate differences in potential sensitivity to wind turbines (Kingsley and Whittam, 2004). Based on the species observed in the Study Area, Project-

specific functional groups were selected (Table 12.2). One of these functional groups are Nightjars, which include Common Nighthawks (*Chordeiles minor*). Common Nighthawks may be susceptible to collision with turbines and associated blades due to foraging and breeding behaviour. Common Nighthawk is an aerial insectivore known to occupy open habitat areas in search of flying insects at various heights and defend their territories by aerial displays (wing booms). Additionally, songbirds (passerines) are the bird group reported to be most affected by wind energy facilities in North America (Zimmerling et al., 2013); as such, this group is separate from the functional group Other Landbirds.

Table 12.2 Project-specific Functional Groups

Functional Group	Description
Waterfowl	Order Anseriformes (e.g., Ducks, Geese, and Swans), Order Suliformes (Cormorants)
Waterbirds	Includes seabirds (i.e., marine birds), Order Podicipediformes (e.g., Grebes), Order Gaviiformes (e.g., Loons), Order Pelicaniformes (e.g., Herons), Order Coraciiformes (e.g., Kingfishers), Order Guriformes (e.g., Rails, Gallinules, Coot)
Shorebirds	Order Charadriiformes (Sandpipers, Plovers, Snipes, Woodcocks)
Diurnal Raptors	Eagles, buteos, accipiters, Northern Harrier, Osprey and falcons. Turkey Vultures were included in this group due to their similarity to many soaring raptors
Nocturnal Raptors	Order Stringiformes (i.e., Owls)
Nightjars	Order Caprimulgiformes (e.g., Nighthawks and Whip-poor-wills).
Passerines	Order Passeriform (songbirds)
Other Landbirds	Orders Apodiformes (e.g., Swifts, Hummingbirds), Order Columbiformes (e.g., Pigeons), Order Cuculiformes (i.e., Cuckoos), Order Galliformes (e.g., Grouse, Pheasants), Order Piciformes (e.g. Woodpecker, Flicker, Sapsucker)

The desktop habitat assessment identified that the LAA is predominantly forested, with hardwood, softwood, mixedwood forests representing the principal landcover types. Wetlands and other non-forested habitat types are also present. As described above and in Chapter 8 (Flora), portions of the forested landscape have been subject to forestry activities, and available provincial forest inventory data do not fully reflect current site conditions.

Based on historical eBird records, 29 species of birds from three functional groups were observed within 1 km of the LAA (Appendix I, Table 12.3). These species may currently use the Study Area during their life cycle. Most of the species observed in the Study Area are passerines.

Table 12.3 Functional Groups and Species Diversity Known to Occur within 1 km of the LAA based on eBird data.

Functional Group	Total Species	% of Total
Diurnal Raptors	3	10
Other Landbirds	2	7
Passerines	24	83
Total	29	100

The following historical records of bird species in or in proximity to the LAA have been documented:

- AC CDC (2026) Data Report – 119 SAR and SoCC bird species within a 100 km radius of the LAA and 26 were observed within 5 km of the LAA (AC CDC Report, Appendix F)
- eBird – 66 records representing 29 species within 1 km of the LAA (Appendix I, Table 12.3)
- MBBA – The PDA overlaps two MBBA squares. Of the 97 species recorded, 55 were classified as confirmed breeders in one or both of the atlas squares. Three of the species categorized as confirmed breeders are listed federally or provincially at risk (Table J3 in Appendix I)

The PDA and LAA contain suitable breeding habitat for five SAR birds, although suitable habitat for most SAR is limited (Table 12.4; Figures 12.8 to 12.15, Appendix A). The most abundant suitable habitat present in the PDA is for the Eastern Wood-pewee (34.1%), and the Common Nighthawk (43.3%). The high availability of suitable Common Nighthawk habitat reflects the prevalence of forestry-cleared lands, existing roads, and agricultural field complexes within the PDA.

Table 12.4 Summary of Suitable SAR Breeding Habitat in the LAA and PDA

Species	Amount of Suitable Habitat in the LAA (ha)	% of LAA	Amount of Suitable Habitat in the PDA (ha)	% of PDA
Canada Warbler	821.9	17.9	166.5	19.8
Eastern Wood-pewee	1600.4	34.9	286.5	34.1
Evening Grosbeak	833.2	18.2	107.8	12.8
Common Nighthawk	1870.1	40.8	364.2	43.3
Olive-sided Flycatcher	354.8	7.7	45.4	5.4

Between the field surveys and incidental observations that occurred 2024-2026, a total of 6,699 individuals, representing 121 species, including nine unidentified taxa (finch species, grouse species, hawk species, passerine species, raptor species, scaup species, small raptor species, warbler species, and woodpecker species) were observed in the Study Area (Table I2 in Appendix I). Of the 121 species identified, 16 SoCC and seven SAR were observed (Table 12.5). The most abundant species observed include Dark-eyed Junco (*Junco*

hyemalis, 380 individuals), White-throated Sparrow (*Zonotrichia albicollis*, 362 individuals), American Robin (*Turdus migratorius*, 339 individuals), and the Black-capped Chickadee (*Poecile atricapillus*, 306 individuals). Of the 23 SAR and SoCC species listed in Table 12.5, four have been categorized in the MBBA as confirmed breeders in the Study Area: Canada Warbler (*Cardellina canadensis*), Canada Jay (*Perisoreus canadensis*), Barn Swallow (*Hirundo rustica*), and American Kestrel (*Falco sparverius*).

Survey information and weather conditions at the time of each survey are outlined in Table I4 in Appendix I.

Table 12.5 Summary of SAR and SoCC Recorded Across all Bird Surveys Completed in the West Bay Study Area between 2024 and 2026.

Functional Group	Scientific Name	Common Name	Status				Numbers of Observations Recorded during 2024-2026 Field Surveys								
									Spring Migration		Fall Migration				
			NSESA	SARA	COSEWIC	AC CDC	Nocturnal Owls	Winter Residency	Point Counts	Passage Migration and Hawk Surveys	Point Counts	Passage Migration and Hawk Surveys	Breeding Birds	Nightjar	Total
Waterbirds	*Antigone canadensis*	Sandhill Crane				S1B				2					2
Passerines	*Pooecetes gramineus*	Vesper Sparrow				S1S2B,SUM					1				1
Passerines	*Cardellina canadensis*	Canada Warbler	E	SC	SC	S2S3B					2				2
Passerines	*Euphagus carolinus*	Rusty Blackbird	E	SC	SC	S2S3B						1			1
Passerines	*Pinicola enucleator*	Pine Grosbeak				S2S3B,S5N		21	1		1		1		24
Passerines	*Perisoreus canadensis*	Canada Jay				S3		3	8	1	1	1	1	1	24
Passerines	*Poecile hudsonicus*	Boreal Chickadee				S3		4	1	1	6	3	1		16
Passerines	*Setophaga pinus*	Pine Warbler				S3?B					1				1
Passerines	*Setophaga striata*	Blackpoll Warbler				S3?B,S5M			2		139	2	4		147
Passerines	*Contopus cooperi*	Olive-sided Flycatcher	T	SC	SC	S3B			4				2		6
Shorebirds	*Charadrius vociferus*	Killdeer				S3B			3						3
Passerines	*Hirundo rustica*	Barn Swallow	E	SC	SC	S3B					1				1
Passerines	*Coccothraustes vespertinus*	Evening Grosbeak	V	SC	SC	S3B,S3N		3	9		1	2	3		18
Diurnal Raptors	*Falco sparverius*	American Kestrel				S3B,S4M			2	2	1	1			6
Diurnal Raptors	*Circus hudsonius*	Northern Harrier			NAR	S3B,S4M				3	1	1			5
Passerines	*Cardellina pusilla*	Wilson's Warbler				S3B,S4M					2				2
Passerines	*Leiothlypis peregrina*	Tennessee Warbler				S3B,S5M			1						1
Diurnal Raptors	*Astur atricapillus*	American Goshawk				S3S4			1	2	1	1			5
Other Landbirds	*Picoides arcticus*	Black-backed Woodpecker				S3S4					2				2
Nightjars	*Chordeiles minor*	Common Nighthawk	T	SC	SC	S3S4B								7	7
Passerines	*Contopus virens*	Eastern Wood-Pewee	V	SC	SC	S3S4B							2		2
Passerines	*Pheucticus ludovicianus*	Rose-breasted Grosbeak				S3S4B							1		1
Shorebirds	*Tringa flavipes*	Lesser Yellowlegs			T	S3S4M						1			1

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

12.2.1 Winter Birds

A total of 296 individuals, consisting of 29 species, including two unidentified woodpeckers, were recorded during the 2025 and 2026 winter bird surveys. Of these species, four are considered SAR/SoCC: Pine Grosbeak (*Pinicola enucleator*), Boreal Chickadee (*Poecile hudsonicus*), Canada Jay, and Evening Grosbeak (*Coccothraustes vespertinus*). The most abundantly observed species were the Black-capped Chickadee (61 observations), the Common Raven (*Corvus corax*; 57 observations), and the Golden-crowned Kinglet (*Regulus satrapa*; 30 observations) (Table I2 in Appendix I).

12.2.2 Owls

During the 2025 observer-based nocturnal owl survey, no owl species were recorded. However, several owls were observed during other observer-based bird surveys including Barred Owl (*Strix varia*; five observations), Great Horned Owl (*Bubo virginianus*; one observation), and Northern Saw-whet Owl (*Aegolius acadicus*; one observation). Of note, a pair of Barred Owls were observed entering a tree cavity with food during the breeding season.

Results of nocturnal owl acoustic monitoring during March and April 2026 included detections of Northern Saw-whet Owl (three detections), and Barred Owl (three detections). American Woodcock was also detected on several occasions during the nocturnal acoustic monitoring.

12.2.3 Migration

12.2.3.1 Spring Migration

A total of 2,182 individuals across 79 species (including an unidentified woodpecker species) were recorded during the spring migration point count surveys in the Study Area between spring 2025 and spring 2026 (Table I2 in Appendix I). Of these 79 species, two are SAR, and eight are SoCC (Table 12.5). Passerines (72%) represent the most species detected.

A total of 312 individuals across 57 species (including unidentified scaup species, warbler species, and raptor species) were observed during the spring passage migration surveys conducted in the Study Area in spring 2025 and spring 2026 (Table I2 in Appendix I). Of these 57 species, six are SoCC (Table 12.5). The most commonly observed species were Passerines (62.5%), followed by Diurnal Raptors (18%).

No large flocks were observed during spring passage migration surveys. When altitude of flight was noted, most individuals (36%; 65 individuals) were recorded 51 to 100 m above ground level, followed by those flying between 0 to 50 m above ground level (34%, 62 individuals), and the remaining were flying greater than 101 m above ground level (30%, 54 individuals). These results suggest that more than half of the individuals recorded were

within the RSZ; the area between the lowest and highest rotor tip height or where the blades are moving (i.e., approximately 43 to 207 m above ground level).

No large concentrations of raptors were observed during spring migration point counts or passage migration surveys, the largest group observed was a group of eight Bald Eagles (*Haliaeetus leucocephalus*) flying southeast between 51 and 100 m above ground level. Many other raptors were also observed during spring migration counts and passage migration surveys, including American Kestrel, American Goshawk (*Astur atricapillus*), Broad-winged Hawk (*Buteo platypterus*), Northern Harrier (*Circus hudsonius*), Red-tailed Hawk (*Buteo jamaicensis*), Sharp-shinned Hawk (*Accipiter striatus*), Turkey Vulture (*Cathartes aura*), an unknown buteo species, and an unknown raptor species. The American Goshawk, the American Kestrel, and the Northern Harrier are all considered SoCC in Nova Scotia.

12.2.3.2 Fall Migration

Eighty-four species (including unidentified warbler species and hawk species), totalling 2,544 individuals, were recorded in the Study Area during the fall migration transect and point count surveys in 2024 and 2025 (Table I2 in Appendix I). Of the 84 species, three are SAR, and 11 are SoCC. A summary of these species is provided in Table 12.5. Most of the species observed, 75%, were Passerines.

A total of 443 individuals, representing 51 species (including unidentified warbler species, an unidentified raptor species, another small unidentified raptor species, an unidentified finch species, and an unidentified passerine species), were observed in the Study Area during the fall passage migration surveys conducted fall 2024 and fall 2025 (Table I2 in Appendix I). Of the 51 species identified, two are SAR and seven are SoCC (Table 12.5). The most commonly observed functional group were Passerine species, representing 58% of all observed species.

The most abundant species observed during the fall passage migration surveys and raptor surveys were the Blue Jay (*Cyanocitta cristata*; 88 individuals), the American Robin (55 individuals), and the White-winged Crossbill (*Loxia leucoptera*; 44 individuals). The majority of the individuals observed during the passage migration surveys and the raptor surveys (72%) were flying between 0 to 50 m above ground level. The largest flock of birds observed during the fall passage migration and raptor surveys was a group of 40 Blue Jays. No large groups of raptors were observed during these surveys, the largest being a group of three Turkey Vultures and a group of three unidentified small raptor species. Along with Red-tailed Hawk, Bald Eagle, Sharp-shinned Hawk, Broad-winged Hawk, American Goshawk, American Kestrel, Northern Harrier, and another unidentified raptor species were also observed. The American Goshawk, the American Kestrel, and the Northern Harrier are all considered SoCC in Nova Scotia.

Flight altitude data indicated that most individuals (72%) were observed flying at heights of 0-50 m above ground level, while an additional 22% were observed flying between 51 and

100 m. These results suggest that the majority of individuals may utilize airspace within the turbine RSZ.

12.2.3.3 Radar Monitoring

Radar monitoring conducted during fall 2024 and spring 2025 demonstrated that nocturnal migration in the Study Area is episodic and influenced by weather conditions. Approximately 50 % of total spring migration activity occurred over eight nights concentrated within three migration periods (April 30 to May 1, May 11-13, and May 26-28, 2025). During fall migration, approximately 60% of total migration activity occurred over nine nights between late August and mid-October (August 22, September 13-14, September 19-20, October 5, and October 16-18, 2024) (refer to Appendix I – West Bay Radar and Acoustic Monitoring Report).

In both seasons, most peak migration nights were characterized by activity above 200 m above ground level (magl) than below. During spring, all but one of the major migration nights exhibited activity above 200 magl, with only May 11 showing a higher proportion of individuals flying below this altitude. During fall, three of the nine major migration nights (August 22, September 14, and October 16, 2024) showed greater activity above 200 magl. The proportion of individuals flying below 200 magl varied seasonally and was influenced by prevailing weather conditions, particularly wind conditions.

Across all monitoring nights, individuals were detected across a broad altitudinal range extending from approximately 70 m to over 1,000 magl. Detections were generally most numerous at lower altitudes, with the number of individuals decreasing as altitude increased. However, this pattern is influenced in part by declining radar detection probability with increasing distance from the radar and therefore does not necessarily indicate a true decline in migrant density with height. During both seasons, peak migration events were typically associated with greater concentrations of individuals above 200 magl, although some migration nights showed elevated activity within the approximate RSZ. In spring, increased migration intensity was generally associated with reduced proportions of individuals below 200 magl, particularly during the middle portion of the night when most migration activity occurred. A similar pattern was observed during fall migration.

Migration intensity increased with favorable tailwind assistance and generally decreased with increasing relative humidity in both spring and fall. Statistical modelling identified tailwind assistance, relative humidity, temperature, time of night, and season as important factors influencing migration activity. The highest levels of migration activity generally occurred during the middle portion of the night under favorable tailwind conditions. Overall, the radar results indicate migration patterns typical of Atlantic Canada, with migrants moving through a wide range of altitudes and weather conditions influencing both migration intensity and flight height.

12.2.3.4 Acoustic Monitoring

Spring nocturnal acoustic monitoring results indicated that sparrows were the dominant group detected early in the season, with warbler detections increasing later in spring migration. Two periods of elevated nocturnal flight call (NFC) activity recorded by acoustic monitoring coincide with major migration events identified by radar monitoring in early and late May. Most NFC detections were sparrows and warblers. Most sparrow detections occurred before mid-May, with a peak around May 15, whereas warbler detections were concentrated in late May. Very few NFCs were recorded during April.

Shorebirds and thrushes were detected in relatively low numbers throughout the spring monitoring periods, whereas nightjars were absent from the dataset. Of note, American Woodcock detections were common throughout the night during the spring monitoring period and likely reflected the presence of these birds performing their courtship displays.

During the fall monitoring period, most of the detections early in the season were warblers, followed by thrushes and sparrows later in the fall migration period. Shorebirds were detected in relatively low numbers throughout the fall monitoring period, and herons and nightjars were recorded infrequently. Species diversity was greater during fall migration than during spring migration, reflecting both the longer monitoring period and increased detection of migratory species. The overall number of NFC detections declined substantially by November, indicating that the monitoring period was suitable for capturing most of the fall migration through the area.

Overall, the composition and timing of species migrating through the Study Area were consistent with migration patterns expected in northern Nova Scotia. Sparrows migrated early spring and late fall, whereas warbler migration was highest during late spring and early fall. Acoustic monitoring results aligned closely with radar observations, with major periods of nocturnal flight activity occurring during the same migration windows identified by radar monitoring. The absence of Common Nighthawk detections suggests that the Study Area is potentially not an important migratory route for this species.

12.2.4 Breeding Birds

Through the 2024 and 2025 breeding bird point count surveys in the Study Area, 912 individuals from 58 species were observed (Table I2 in Appendix I). Of these 58 species, three are SAR, and an additional five are SoCC. Fifty of the species were Passerines, the remaining being Other Landbirds, Diurnal Raptors, and Waterbirds. The most abundant species included the White-throated Sparrow (89 individuals), Magnolia Warbler (*Setophaga magnolia*; 67 individuals), and Black-throated Green Warbler (*Setophaga virens*; 64 individuals). A summary of SAR and SoCC and associated breeding evidence codes are provided in Table 12.6. There was no evidence of colonial breeding (e.g. Bank Swallows) or roosting birds observed in the Study Area. As mentioned in Section 12.2.2 (Owls), a pair of Barred Owls were observed entering a tree cavity with food for young, which may indicate some of the habitat in the Study Area is suitable for owl species.

According to the Second Atlas of Breeding Birds of the Maritime Provinces (MBBA; Stewart et al., 2015), the three SAR observed during the breeding bird surveys are not categorized as confirmed breeders in the Study Area, and only the Eastern Wood-Pewee is categorized as a possible breeder in the Study Area. However, based on modelling results, there is suitable breeding habitat for these three SAR birds in the Study Area. Confirmed breeding evidence is often difficult to obtain, so CBCL conservatively assumes individuals and species observed by CBCL are likely breeding in the Study Area.

Of the five SoCC observed during the breeding bird surveys, one is categorized as a confirmed breeder (Canada Jay), two are categorized as probable breeders (Boreal Chickadee (*Poecile hudsonicus*), Rose-breasted Grosbeak (*Pheucticus ludovicianus*)), and two are not recorded in the MBBA records for the atlas squares covering the Study Area. Pine Grosbeak, Boreal Chickadee, Canada Jay, and Rose-breasted Grosbeak were only observed once during the breeding surveys, whereas Blackpoll Warbler was observed several times, including observations of vocalizations, indicating their use of the area during the breeding bird survey program.

Table 12.6 Summary of SAR and SoCC Recorded during the Breeding Bird Point Count Surveys in 2024 and 2025.

Scientific Name	Common Name	NSESA	SARA	COSEWIC	S-Rank	No. of records	MBBA Breeding Category
Setophaga striata	Blackpoll Warbler	-	-	-	S3?B,S5M	4	-
Poecile hudsonicus	Boreal Chickadee	-	-	-	S3	1	Probable
Perisoreus canadensis	Canada Jay	-	-	-	S3	1	Confirmed
Contopus virens	Eastern Wood-Pewee	V	SC	SC	S3S4B	2	Possible
Coccothraustes vespertinus	Evening Grosbeak	V	SC	SC	S3B,S3N	3	-
Contopus cooperi	Olive-sided Flycatcher	T	SC	SC	S3B	2	-
Pinicola enucleator	Pine Grosbeak	-	-	-	S2S3B,S5N	1	
Pheucticus ludovicianus	Rose-breasted Grosbeak	-	-	-	S3S4B	1	Probable

E – Endangered, T – Threatened, SC – Special Concern, V - Vulnerable

Breeding evidence observed included a direct observation of an American Robin at their nest, several individuals being flushed from an area, and individuals foraging and carrying food. Additionally, several breeding pairs were observed in suitable breeding habitat. Many

birds were also observed calling or singing in suitable breeding habitat in the Study Area, establishing territories and attracting mates for the breeding season.

12.2.5 Nightjar Surveys

Seven Common Nighthawk observations were made during the 2024 and 2025 Nightjar surveys in the Study Area. Other species observed were Ruffed Grouse (one observation) and American Woodcock (two observations), Common Nighthawks were observed flying overhead, likely foraging. The American Woodcocks were observed during a breeding display, in which the males of this species will fly upward in a wide spiral up to 60 to 110 m high and then zigzag back down to the ground (Cornell Lab of Ornithology, 2026).

12.3 Effects Assessment

12.3.1 Potential Effects and Mitigation

Several measures were incorporated into the Project design to minimize potential direct and indirect effects on birds, within engineering and design constraints. Where practicable, the Project layout was refined to avoid natural habitats, including wetlands, and to preferentially use previously disturbed areas, such as existing roads and previously harvested areas, thereby reducing potential interactions between the Project and birds.

The Project could impact birds through several interconnected pathways, both directly and indirectly. During construction, activities such as earthworks and vegetation clearing can lead to habitat loss and alteration. If these activities occur during the nesting season, these activities could kill, injure, or displace nesting birds, their young, or their eggs.

Project related vehicle traffic poses a risk of mortality and injury due to collisions with birds. Collisions with turbine blades, towers, and transmission lines are possible during the operation and maintenance phase of the Project. Project activities can affect birds as indicated in Table 12.7; these potential effects do not consider the implementation of mitigation measures described herein.

Table 12.7 Potential Environmental Effects of the Project on Birds

Project Activity	Potential Environmental Effects		
	Habitat Loss/ Fragmentation	Direct Mortality and Injury	Sensory Disturbance
Construction			
Site Preparation	X	X	X
Access Roads Construction and Modifications	X	X	X

Project Activity	Potential Environmental Effects		
	Habitat Loss/ Fragmentation	Direct Mortality and Injury	Sensory Disturbance
Material and Equipment Delivery and Storage	-	X	X
Infrastructure Installation	-	-	X
Restoration of Temporary Areas	-	-	X
Testing and Commissioning	-	X	X
Operation and Maintenance			
Turbine Operation and Maintenance	-	X	X
Road Maintenance	-	X	X
Power Line and Substation Maintenance	-	X	X
Vegetation Management	-	X	X
Safety and Security	-	-	X
Decommissioning			
Removal of Infrastructure and Site Restoration	-	X	X

X = Potential Interaction
- = No Interaction

12.3.1.1 Habitat Loss and Fragmentation

The Project may result in habitat loss, degradation, and fragmentation for bird species in the LAA. Construction activities such as vegetation clearing and grubbing will result in a short-term and long-term loss of habitat. Vegetation clearing will occur in the PDA for the construction or installation of access roads, turbines, transmission lines, and other Project infrastructure.

Three SAR bird species were observed during breeding bird surveys: Eastern Wood-Pewee (two observations), Evening Grosbeak (three), and Olive-sided Flycatcher (two). Approximately 287 ha (34%) of the PDA is modelled as suitable breeding habitat for Eastern Wood-Pewee, 108 ha (13%) for Evening Grosbeak, and 45 ha (5%) for Olive-sided Flycatcher. Despite the presence of modelled suitable habitat within the PDA, few individuals of these species were observed, and no confirmed breeding evidence was documented through the MBBA or the 2024 and 2025 field surveys, suggesting that much of the modelled suitable habitat was unoccupied by these species during the breeding season.

The estimate of habitat loss is greater than the final Project footprint (e.g., roads will not be as wide as the PDA) and includes area currently occupied by roads and areas cleared for forestry. Therefore, the amount of clearing required for the Project construction will be less than what has been estimated for the purpose of this EA.

The impact of roads and trails on migratory birds is unclear. Some studies show that access roads and trails have a negative impact on bird nest survival, species richness, diversity, fitness, and increased predation by providing travel corridors for predators (Kroeger et al., 2022; Khamcha et al., 2018; Summers et al., 2011; Pescador & Peris, 2007). Roads can also lead to habitat fragmentation (Quiles & Barrientos, 2024). Some research suggests that roads and trails may not have as much of an impact on birds as might be expected. For example, some studies show no significant effect of roads on nest predation (Ortega & Capen, 2002; Cull et al., 2025). In addition, other studies have shown that certain common and omnivorous bird species increase in abundance with exposure to roads and recreational trails, likely due to an increase in food sources (Cooke et al., 2020; Bötsch et al., 2018). Overall, these findings indicate that the effect of access roads on birds is variable and depends on factors such as habitat type, road type, and traffic intensity.

The Project will require approximately 51 km of access roads. To reduce habitat disturbance (e.g., clearing and ground alteration), 84% (43 km) of this total will be pre-existing roads. However, even minor amounts of vegetation clearing creates edges and can alter bird communities occupying these areas. The clearing required for transmission lines and new access roads in the PDA will lead to loss of bird habitat for some species, but it will simultaneously provide habitat for edge- associated species and species that prefer open environments (e.g., Yellow-rumped Warbler, Pine Siskin, White-throated Sparrow).

Not all habitat alterations will be permanent, and the areas reclaimed during restoration will return to the site's pre-disturbance condition.

Potential Project effects related to habitat loss and fragmentation can be effectively mitigated through planning and management of construction and operation activities. The following key measures to mitigate the potential effects of the Project on bird habitat will be further detailed in a Project-specific EPP and will be implemented before and during construction.

- Existing roads, harvested areas, and other previously altered areas will be used to the extent practicable.
- Areas of clearing and grubbing will be limited to that needed to construct and operate the Project.
- Project personnel will receive wildlife awareness training, including information on terrestrial wildlife SAR and procedures for reporting wildlife encounters and reducing associated stress to wildlife
- Temporary disturbance areas will be revegetated/restored following construction where practicable and compatible vegetation will be maintained in areas that do not interfere with Project infrastructure or site access (i.e., cutting trees while preserving low shrubs).
- Invasive species prevention and management measures will be implemented to reduce the introduction and control the spread of invasive species, as part of the Project-specific EPP.
- The Proponent will develop and implement a Wildlife Management Plan.

12.3.1.2 Direct Mortality and Injury

Project construction including activities such as vegetation clearing and increased traffic may result in direct mortality and injury to birds. During the operational phase, birds may collide with turbines and transmission lines, leading to injury and mortality.

Construction activities, including vegetation clearing and grubbing, pose a high risk of increased mortality for birds. Without mitigation measures, there is a potential for nest destruction and subsequent mortality of nesting birds, young birds, and eggs, especially if these activities occur during the migratory bird nesting period. To address these risks, vegetation clearing will be scheduled outside of the general nesting period for migratory birds (e.g., mid-April to late August for Nesting Zone C3 (ECCC, 2025)).

During the construction and decommissioning phases, there is an increased threat of birds colliding with vehicles due to higher levels of traffic and activity on site. This threat primarily arises from the transportation of materials, heavy machinery, and personnel to and from the PDA. This risk will be greater during periods of increased bird activity, including fall and spring migration, and the nesting period. To mitigate this risk, vehicle speed will be limited in the LAA. Project-related traffic associated with maintenance during the Project operation is expected to be minimal.

The Project can result in a direct increase in mortality risk for birds during operation through collisions with transmission lines, wind turbines, and collisions with other Project infrastructure. Transmission lines have the potential to harm, injure, or kill migratory birds through increasing risks of collision and electrocution. In Canada, annual bird mortality estimates from transmission line collisions are anywhere between 1 million and 229.5 million (Rioux et al., 2013). Larger birds with low maneuverability, such as waterfowl (i.e. ducks, geese, etc.), are particularly vulnerable (Quinn et al., 2011). To increase line visibility, line-marking devices will be installed, as necessary, and vegetation around transmission poles and lines will be appropriately managed to enhance visibility of infrastructure and reduce the risk of electrocution.

Mortality from wind turbine collisions at 43 Canadian wind farms was found to be an average of 8.2 (± 1.4) birds per turbine per year, with a large variation among wind farms, between 0 to 26.9 birds (Zimmerling et al., 2013). Additionally, data from five Atlantic Canadian wind projects (2008 to 2012) showed non-raptor turbine mortality at approximately 1.17 (± 1.01) birds per turbine, ranging from 0 to 7.09 birds, with no recorded raptor fatalities (Birds Canada, 2016).

Predicting collision risk between turbines and nocturnally migrating birds using baseline radar and acoustic data remains challenging to achieve with confidence. The primary indicator of risk is the volume of birds migrating within the RSZ, although only a small fraction of these birds may collide with turbine rotors. Various models have been developed to estimate collision risk based on factors such as flight volume, species, rotor height, and RSZ. However, post-construction research suggests that these models often

underestimate actual mortality rates, emphasizing the need for post-construction monitoring, especially following nights with unfavourable conditions.

During both spring and fall, peak migration generally occurred above 200 magl in altitude. In addition, during both spring and fall migration periods, most of the peak migration nights had a greater number of individuals above the RSZ rather than below it. The radar report also notes that across all monitoring nights, most individuals were observed at lower altitudes, with the number of individuals generally decreasing with increasing altitude. However, this pattern likely overestimates the proportion of migrants at lower altitudes because radar detection probability decreases with distance from the radar. Migration intensity was positively associated with tailwind assistance during both spring and fall. As tailwind assistance increased, the proportion of individuals below 200 m generally decreased, suggesting that migrants tended to fly at higher altitudes under favourable migration conditions. Overall, the radar monitoring results indicate that a substantial proportion of migration through the PDA occurred above the RSZ, particularly during periods of high migration activity, which may reduce collision risk relative to a scenario in which most migration occurs within the RSZ (Appendix I, West Bay Radar and Acoustic Monitoring Report).

A post-construction mortality monitoring program will be developed and implemented for two years. Carcass searches will be conducted to target periods of increased activity (e.g., migration and breeding) and periods following unfavourable weather conditions (e.g., rain and headwinds). Surveys will be designed to account for searcher efficiency and scavenger rates. Additionally, ongoing monitoring and adaptive management strategies will be implemented to assess and mitigate potential impacts on birds during all phases of the Project.

Potential Project effects related to direct mortality and injury can be effectively mitigated through planning and management of construction and operation activities. The following key measures to mitigate the potential risks of bird mortality will be further detailed in a Wildlife Management Plan and will be implemented prior to and during construction and during operation and maintenance.

- Project personnel will receive awareness training, including information on migratory and resident bird species present or likely to occur in or near the PDA, with emphasis on SAR, SoCC, and their habitats and procedures to avoid harm to birds, actions/steps to take should a nest or unfledged birds be discovered, and appropriate buffers based on disturbance activities.
- Vegetation clearing will be completed outside of the general nesting period for migratory birds. If clearing needs to occur within this period, the guidelines to avoid harm to migratory birds (ECCC, 2023) and regulators will be consulted for guidance on developing additional mitigation measures.
- Speed limits will be enforced, with additional measures implemented during sensitive seasonal windows for wildlife.
- The Proponent will develop and implement a Wildlife Management Plan.

- Overhead power line installation, operation and maintenance will follow, at minimum, the NSPI nesting birds and vegetation management protocols (NSPI, 2023).
- Vegetation around the transmission poles and lines will be managed to reduce the risk of electrocutions with birds and other wildlife.
- Transmission line visibility will be increased by bird flappers or other bird-flight diverters, as indicated by regulation.
- A two-year post-construction mortality monitoring program will be developed and implemented in consultation with NSDNR and ECCC-CWS to assess the ongoing impact of wind turbines on birds and inform adaptive management strategies.
- If post-construction mortality monitoring identifies significant annual bird mortality or significant bird mortality events, adaptive management strategies will be implemented and will be outlined in the Adaptive Management Plan.

12.3.1.3 Sensory Disturbance

The Project has the potential to result in indirect effects to bird habitat through sensory disturbances, including noise, light pollution, dust, and vibrations. This disturbance may cause birds to abandon or avoid habitat and can lead to stress or other physiological effects. These effects pose the greatest risk during periods of migration and nesting.

The Project lighting infrastructure can present a risk to birds, particularly through attraction to lights during low-visibility conditions or night. Birds flying in these conditions are known to aggregate around artificial light, which can lead to disorientation and collisions (Adams et al., 2021; Lao et al., 2020). This risk is the greatest during migration periods, as artificial light can interfere with migration cues that birds use to navigate. Birds may start to circle artificially lit areas, becoming disoriented and depleting their energy reserves needed for migration. This may result in exhaustion or forced landings, increasing their vulnerability to predators. Poor weather conditions exacerbate these effects, as they lower flight heights, potentially moving within the RSZ. Artificial light can also change birds' perceptions of habitat quality, resulting in selection or avoidance of illuminated areas (Adams et al., 2021).

To reduce disruptions to birds, seasonality will be considered when planning construction and maintenance activities. Only lighting essential to meeting safety and security needs during the Project activities will be used. For essential lighting, spill-over light will be minimized, side-shielded, and directed downwards to reduce the attraction of birds, where possible. Construction activities will be limited to daylight hours, where possible, and will avoid illuminating habitat adjacent to worksites. Turbine and transmission lighting will be minimized where possible, while maintaining Transport Canada's requirements for aeronautical safety. With these mitigations, impacts on birds pertaining to lighting is expected to be low through the Project lifespan.

Noise generated by Project activities can impact birds in several ways, particularly during sensitive periods, such as the nesting period. Noise can disrupt bird communication, directly impact the health of birds by triggering stress responses, and disrupt foraging and reproductive behaviours, potentially leading to decreased breeding success (Quinn et al.,

2006; Mockford & Marshall, 2009; Mockford et al., 2011; Blickley et al., 2012). Noise disturbance can cause birds to avoid certain areas and potentially displace them from their important habitats (Marques et al., 2020). Project noise may also mask environmental cues for birds, such as predator detection. Thus, careful planning and consideration of noise impacts is essential to minimize adverse effects on birds near the Project.

To reduce potential disturbance to birds, loud or intermittent noise-generating activities (e.g., blasting) will be scheduled with consideration of seasonal periods of increased sensitivity, where feasible. Construction equipment and vehicles will be kept in good working order, and loud machinery will be muffled.

Dust deposition during construction and decommissioning may cause birds to avoid or abandon habitat in the LAA. Impacts from dust generated from the Project are captured in Chapter 5 (Atmospheric Environment). Through the implementation of mitigation and management plans, these impacts are expected to be low. Temporary sensory disturbance during construction and decommissioning is expected to have minimal impact on bird populations. This disturbance will be mostly restricted to daylight hours. There are no significant environmental effects expected.

Potential Project effects related to sensory disturbance can be effectively mitigated through planning and management of construction and operation activities. Effects of light, noise, and dust to birds in the LAA will be low and can be mitigated through strategies to reduce these effects. The following key measures to mitigate the potential effects of the Project on birds will be further detailed in a Project-specific EPP and will be implemented prior to and during construction.

- Seasonal construction restrictions or phased construction plans will be implemented to avoid sensitive bird periods (including the general nesting season) to the extent possible.
- Onsite lighting will be restricted during Project activities and minimized to the extent possible while maintaining regulatory and safety requirements. Site lighting will be shielded downward to minimize light pollution to the surrounding environment and adjacent habitat, without compromising safety. Turbine lighting will not exceed the minimum standards in the Canadian Aviation Regulations (i.e., Standard 621, Section 12.2 and Figure 5.3 (Appendix A)) (Transport Canada, 2026).
- Movement detection lighting will be used where possible, which will turn off when not in use.
- Work areas and travel paths will be designed to reduce the amount of time that equipment must operate in reverse to reduce the use of back-up alarms.
- Idling of heavy machinery and vehicles will be minimized as practicable.
- Where blasting is necessary, it will be undertaken in accordance with applicable regulatory requirements and conducted only by a certified blaster or other qualified blasting professional.
- Blasting patterns and procedures that minimize shock or instantaneous peak noise levels will be used, where possible.

- Construction equipment and vehicles will be kept in good working order, and loud machinery will be muffled where possible.
- The Proponent will develop and implement a Wildlife Management Plan.

12.3.2 Residual Effects

Activities associated with the Project may induce short to long-term impacts on birds in the PDA and LAA, primarily due to vegetation clearing and cutting; collisions with wind turbines, transmission lines, vehicles, equipment, or infrastructure; and sensory disturbance.

Residual effects related to habitat loss during construction are predicted to be long-term, minor to moderate in magnitude, with this being a conservative estimate, assuming all habitat in the LAA is suitable and occupied. The extent of the effect will be local and will occur once during periods of low to moderate sensitivity (i.e., clearing will occur outside the general nesting period for migratory birds) and reversible.

Residual effects related to direct mortality and injury during the operation and maintenance phases are expected to be moderate in magnitude, immediate (i.e., restricted to the PDA, and will be further refined to impact less area than the PDA presented herein), occurring during times of moderate to high sensitivity, long-term, intermittent, and reversible.

Through detailed design and further refinement of the PDA to avoid SAR habitat, and the implementation of post-construction monitoring and adaptive management planning, potential significant effects can be mitigated and are therefore not expected.

12.4 Monitoring

Onsite monitoring for all wildlife species will be conducted during site preparation and construction activities, including birds.

As outlined in Section 12.3.1.2, a post-construction mortality monitoring program will be developed and implemented for two years. Carcass searches will be conducted to target periods of increased activity (e.g. migration and breeding) and periods following unfavourable weather conditions (e.g., rain and head winds). The radius searched around each turbine will be determined based on the height of the turbine (as this affects fall distance of fatalities) and field conditions. Surveys will be designed to account for searcher efficiency and scavenger rates. These results will be used to measure mortality rates for the Project.

The results of the post-construction mortality monitoring program will be submitted to the appropriate regulatory agencies as required. Additional surveys or mitigations may be identified in consultation with regulators following review of the results. An Adaptive Management Plan will be prepared and submitted to NSECC, NSDNR and ECCC-CWS.

13 Socio-Economic Environment

13.1 Overview

The socio-economic environment includes components of the human environment that may be affected by the Project, such as population, economic activity, land and resource use, access to utilities and transportation, recreational opportunities, and human health. The Project is expected to provide economic benefits through municipal tax revenue, regional employment opportunities, and contributions to provincial greenhouse gas emission reduction targets. Potential adverse effects may occur on other socio-economic components, including recreation and land use. Changes to other VECs, such as air quality and water quality, may also indirectly affect human health and well-being. Potential health-related effects associated with air quality and groundwater are assessed in Chapter 5 (Atmospheric Environment) and Chapter 6 (Geophysical Environment), respectively, and are not further considered in this chapter.

It is predicted that the Project will interact with the socio-economic environment via several pathways during construction, operation and maintenance, and decommissioning. While existing roads will be used to the extent possible, construction of the Project may cause temporary disruptions to recreational trails and traffic. During operation and maintenance, there will be changes in the visual landscape, where turbines will be visible from communities around West Bay. Consultation with stakeholders and careful design were conducted to avoid interactions with communication and radar systems.

The potential effects, mitigation measures, and residual impacts of the Project on the socio-economic environment are assessed in this chapter. Additional mitigation measures will be developed and implemented through a Project-specific EPP, as well as supporting management and contingency plans, prior to construction. Overall, the Project is expected to provide positive socio-economic benefits through job creation, training opportunities, community investment, support for local businesses, and increased municipal tax revenues. As such, the Project is expected to make a positive contribution to the local and regional economy while minimizing potential adverse effects on the socio-economic environment.

The Project will provide economic, and social benefits to the Municipality of the County of Cumberland and more broadly, the Province of Nova Scotia. Locally, it will generate

sustained revenue through municipal taxes (approximately $1.5 million annually), annual landowner royalties, and a community benefit fund. Additional benefits include capacity building funding and initiatives for the Nova Scotia Mi'kmaq, and training and employment opportunities for local workers, including individuals with disabilities. At the provincial level, the Project will support renewable-energy expansion, contribute to GHG reduction goals, attract private investment, and strengthen Nova Scotia's clean-energy workforce.

13.1.1 Regulatory Context

Assessment of the socio-economic environment considers the legislation, regulations, and guidelines or policies that are relevant to Project activities:

- *Crown Lands Act*
- *Electricity Act*
- *Environment Act*
- *Environmental Goals and Climate Change Reduction Act*
- *Forestry Act*
- *Mineral Resources Act*
- *Motor Vehicle Act*
- *Off-highway Vehicles Act*
- *Public Utilities Act*
- *Special Places Protection Act*
- *Trails Act*
- *Wilderness Areas Protection Act*
- *Wind Turbine Facilities Municipal Taxation Act*
- Canadian Aviation Regulations
- Plan Cumberland Land Use By-Law (Municipality of the County of Cumberland, 2026a)
- Plan Cumberland Municipal Planning Strategy (Municipality of the County of Cumberland, 2026b)
- ECCC Guidelines for Wind Turbine and Weather Radar Siting
- A Proponent's Guide to Environmental Assessment (NSECC, 2025a)
- Nova Scotia Class I Environmental Assessment Checklist (NSECC, 2025b)
- Environmental Assessment Supplemental Checklist: Wind Energy Projects (NSECC, 2025c)
- Guidelines for Environmental Noise Measurement and Assessment (NSECC, 2023)

13.1.2 Boundaries

The PDA represents the Project footprint and the maximum limit of potential direct physical disturbance associated with the Project. The LAA and RAA boundaries are defined as follows for each subcomponent of the socio-economic environment VEC.

- **Human Health:** A 2 km LAA was selected to encompass the assessment areas for air quality, groundwater, noise, ambient light, and shadow flicker.
- **Land Use and Value, Visual Landscape, and Recreation and Tourism:** The LAA is defined as 2 km from the PDA, where construction, operation and maintenance, and

decommissioning may be visible and audible. An RAA of 5 km for these effects is used in consideration of other ongoing or planned activities.
- **Population and Economy, Electricity, and Other Utilities, Communication and Radar Systems, and Transportation:** The LAA is defined as the Municipality of Cumberland and the RAA extends through the North Shore of Nova Scotia.

13.1.3 Assessment Methodology

The description of the existing environment is based primarily on publicly available online data sources such as the following:

- Statistics Canada (StatCan)
- Health Canada
- Non-government organizations, such as the Community Foundation of Nova Scotia (CFNS), the ATV Association of Nova Scotia (ATVANS), and the Snowmobilers Association of Nova Scotia (SANS)
- The Municipality of Cumberland
- The community of Parrsboro
- Public and stakeholder engagement
- Aerial and topographic imagery
- The Nova Scotia Mineral Rights Online Registry System
- The Nova Scotia Civic Address File (NSCAF)
- Nova Scotia Geographic Data Directory
- Other federal and provincial government websites and publications

Feedback received through public, Indigenous, community, and non-government organization engagement, as outlined in Chapter 3 (Consultation and Engagement), was also incorporated.

The following studies were undertaken to support effects assessment relevant to the socio-economic VECs:

- Visual Impact Assessment (Nortek Resource Solutions Inc. (Nortek), 2026a; Appendix J)
- Shadow Flicker Analysis (Nortek, 2026b; Appendix K)
- Noise Assessment (Nortek, 2026c; Appendix D)

13.1.3.1 Visual Impact Assessment

The visual impact assessment provides graphics that illustrate how the public viewscape is expected to appear following project construction. The visual simulations for the Project, completed by Nortek Resource Solutions Inc. (Nortek, 2026a; Appendix J), are presented as panoramic photocompositions (Nortek, 2026a; Appendix J). At each viewpoint, a zone of visual influence was calculated from existing aerial LiDAR data to determine positions from which the Project may be visible. Professional grade cameras and lenses were used to obtain imagery at those pre-designated sites. The resulting images were produced using georeferenced images with camera/lens specific parameters to determine the orientation

of each image. Model turbines were then added to the image to depict the same scene after construction of the proposed Project (Nortek, 2026a; Appendix J).

13.1.3.2 Shadow Flicker Analysis

Shadow flicker is the alternation of shadow and light that occurs when a wind turbine is between the sun and a receptor. The sun shining through the spinning turbine blades causes this effect (NSECC, 2021). Nortek Resource Solutions Inc. (Nortek) (2026b) completed a shadow flicker assessment (Appendix K) using the method in Environmental Assessment Supplemental Checklist: Wind Energy Projects (NSECC, n.d.). A total of 41 receptors within 2 km of the Project turbines were identified through satellite/aerial imagery and field verification, and these were used in the analysis. There a number of buildings located within the wind farm which are situated on properties where the landowners have entered into agreements with West Bay Wind Inc. for the development and operation of the wind project. These buildings are considered to be participating receptors and therefore have been excluded from this analysis.

The shadow flicker analysis used the WindPro software package and included locations of the turbine and nearby dwellings, ancillary structures, and camps. Shadow flicker assessments typically include receptors located within a maximum of 2 km from wind turbines, beyond that, the intensity of the shadow cast has diminished.

The shadow flicker analysis evaluated two conservative modelling scenarios: the theoretical worst-case scenario and the realistic case. The theoretical worst-case scenario makes several key assumptions: that the sun shines 100% of the time when it is above the horizon, that the turbine rotor is always perpendicular to the sun, shadow flicker starts as the sun moves above three degrees from the horizon, shadows dissipate at a maximum distance from the blade as a result of atmospheric conditions and light diffusion, and that the rotor blades are always spinning. The realistic case assessment incorporated site-specific wind conditions and monthly sunshine probabilities. Both these assessment cases applied conservative assumptions that receptors are sensitive to shadow flicker in every direction (i.e. each receptor assumed to have windows facing in all directions).

13.1.3.3 Noise Assessment

The acoustic assessment for the Project evaluated potential sound effects on receptors in the vicinity of the Project using turbine-specific sound power data and spatial analysis. Modelling of operational sound levels was completed using the current version of WindPRO software by Nortek Resource Solutions Inc. (Nortek) (2026c). The model incorporated the proposed turbine specifications, hub height, digital elevation model, and the location of identified receptors.

Sound propagation and attenuation was calculated in accordance with International Organization for Standardization (ISO) 9613-2: Acoustics—Attenuation of sound during propagation outdoors, Part 2: General method of calculation (ISO, 1996). The computer

modelling incorporated wind turbine sound emissions and environmental conditions known to influence noise propagation (e.g., ground attenuation, temperature, and humidity).

As described in Chapter 5 (Atmospheric Environment), Nortek (2026c) established an assessment area for the noise assessment as a 2 km buffer from the Project turbines and substation, based on provincial guidance (NSECC, n.d.). The assessment used a baseline acoustic value recommended by Health Canada, 35 dBA. This is considered to be the average baseline acoustic level in quiet, rural areas during the night (Health Canada, 2023).

13.2 Existing Environment

13.2.1 Population and Economy

Much of the information about the local and regional economy, such as demographics and employment data, presented in this section was garnered from the 2016 and 2021 Census reports available online from Statistics Canada (StatCan, 2023; StatCan, 2019). This was supplemented through Proponent meetings with the Municipality of the County of Cumberland. Meetings occurred in person or online (see Chapter 3: Consultation and Engagement).

The proposed Project lies in the Cumberland County census division, which is further divided into several subdivisions and municipal units. These are the Town of Amherst, the Town of Oxford, Springhill, Cumberland Subdivision A, Cumberland Subdivision B, Cumberland Subdivision C, and Cumberland Subdivision D. The PDA is with the Cumberland Subdivision A, on the edge of Subdivision B. Comparing the results of the past two census surveys (2016 and 2021), Cumberland County had a lower population growth of 1.75% compared with the provincial growth rate of 5.0%. Population density is lower in the county than that of the province, averaging 7.1 people per km^2.

Table 13.1 Local Populations

Census Area	2021	Change from 2016 (%)	2021 Population Density (per km^2)
Cumberland County Division	30,538	+1.75	7.1
Cumberland Subdivision A	3,201	+2.6	2.8
Cumberland Subdivision B	6,786	-1.1	5.8
Nova Scotia Province	969,383	+5.0	18.4

StatCan, 2023

Between 2016 and 2021, the average monthly shelter costs for rented and owned properties in Cumberland County increased by 8% and 4.9%, respectively (StatCan, 2023). The median after-tax income in 2020 was $30,800. Of the population of Cumberland

County census division, 95.1% of that population speak English only, 4.8% speak English and French, and 0.1% speak another language. In 2021, 2.7% of the population of Cumberland County identified as Indigenous (StatCan, 2023).

The Municipality of the County of Cumberland is located within Nova Scotia's North Shore Region. The region has an estimated working-age population of 130,700 and a labour force of approximately 72,800 people. Of those employed, approximately 83% work full-time and 17% work part-time, while an estimated 69% of jobs are permanent positions (Nova Scotia Works, 2026). The region's largest employment sectors include healthcare and social assistance, wholesale and retail trade, manufacturing, and construction.

Employment trends indicate continued growth in the regional labour market, with full-time and part-time employment increasing by 2.2% and 5.4%, respectively (Nova Scotia Works, 2025). Employment gains were observed in the healthcare and wholesale and retail trade sectors, while employment in the manufacturing and construction sectors declined. Overall, these trends suggest a relatively stable and growing workforce capable of supporting Project-related employment and business opportunities during construction and operation.

13.2.2 Land Use and Value

Land in and surrounding the PDA is primarily forested interspersed with blueberry fields, and agricultural lands and residential areas to the south and east. Most of the land in the general area is private land, with small segments of Crown land located to the north and to the east of the PDA. The predominant industries are commercial forestry and agriculture (blueberries). Furthermore, most of the lands on which the PDA is situated are owned by a family-operated forestry company, C. Ernest Harrison & Sons Ltd.

During biophysical surveys on site, active clear-cutting was observed on private lands and interpreted aerially on private land. Additionally, access points to the PDA are through large expanses of blueberry fields. Many fields of blueberries were observed in the general area.

Although not within the LAA and RAA, the PDA is approximately 27 km from one of the most commercially important coalfields in Canada. Many communities in Cumberland County were built around coal mines, including Springhill and Joggins. Approximately fifty underground mines operated in this coalfield, up until the 1980s (Calder, 1995), including the Springhill Coal Mines. The Springhill Coal Mines were made infamous by a series of disasters, including fires, explosions, and mine bumps. The Springhill Coal Mines permanently shut down in 1958 following the bump of 1958, which killed many miners (Calder, 1995). The mine site is now a National Historic Site of Canada (Parks Canada, 2022).

There is one privately held quarry within the LAA, owned and operated by a participating landowner. Aside from this quarry, the closest quarry is located 10 km from the closest turbine, the New Canaan Aggregate Quarry operated by OSCO Aggregates. Additionally, the

closest quarry to the Project that has undergone an environmental assessment is the Williamsdale Quarry operated by Dexter Construction Company Limited, located approximately 47 km away from the closest turbine. The second closest quarry expansion that has required an environmental assessment to the PDA is the Westchester Quarry Expansion project, approximately 51 km from the closest Project turbine.

There are ten active mineral exploration licences that overlap with the PDA, as listed on the NovaROC database (Province of Nova Scotia, 2026). The expiration dates for these licences are listed as December 2027, March 2027, April 2027, and in March 2028. There is currently no active oil and gas production taking place in the PDA, LAA, and RAA.

Seventeen civic addresses located in the PDA are recorded in the Nova Scotia Civic Address File (NSCAF), associated with Harrison Settlement and surrounding communities. Of these 17 civic addresses, one of them has a civic address of '0' according to the NSCAF. These civic addresses are associated with residential properties and/or farms. The nearest numbered civic address is located approximately 1 km from a proposed turbine location.

Homeowners in the Cumberland County census division estimated that the average value for their single-detached dwelling was $150,000 (StatCan, 2019); in 2021 estimates averaged $193,200 (StatCan, 2023).

13.2.3 Visual Landscape

The Study Area is located within the Cobequid Hills and the Parrsboro Shore ecodistricts, an area characterized by rolling hills of tolerant hardwood forests, coastal plains with farmlands, rolling hills of red spruce forests, and blueberry fields. In the Parrsboro Shore ecodistrict, elevation rarely exceeds 125 masl; however, the highest points on the NS mainland are found in the Cobequid Hills at Nuttby and Dalhousie Mountains, at 355 masl (Ecological Stratification Working Group, 2019).

Being in mountainous, fragmented terrain, high points of the PDA are visible from lower elevations including at Canaan Road and Highway 2, Cross Roads, Prospect Road, Yorke Settlement, the Lions Recreation Center, Cape Split. No turbines are visible from the Partridge Island viewpoint. The visual simulations captured photos of the area as it currently exists from several viewpoints (Appendix J).

13.2.4 Utilities

13.2.4.1 Energy

Although renewable energy accounts for approximately 13% of electricity generation in Nova Scotia, the province's electricity system remains largely dependent on fossil fuel-based generation (CanREA, 2021). Local governments in the region, including the Municipality of the County of Cumberland, have been exploring the merits of renewable energy for over a decade. By 2040, the Municipality of the County of Cumberland has

committed to power 100% of municipal facilities by renewable energy sources. By 2050, the municipality has committed to using 100% renewable energy for all homes and businesses in the county (Municipality of the County of Cumberland, 2025).

The NSPI website (NSPI, 2026) lists other wind power producers currently operating nearby in the Municipality of the County of Cumberland that are owned or partially owned by NSPI and contribute to the provincial grid:

- Springhill, Cumberland – two turbines, 2.1 MW
- Amherst Wind, Cumberland – 15 turbines, 30 MW
- Amherst Community Wind Farm, Cumberland – two turbines, 6 MW
- Town of Amherst, Cumberland – one turbine, 0.05 MW

Two of these projects, the Town of Amherst wind project, and the Amherst Community Wind Farm, are part of the provincial Community Feed-In Tariff (COMFIT) program. The COMFIT program provides municipalities, First Nations, co-operatives, not-for-profit, and other eligible groups with an opportunity to participate in renewable energy generation, and the profits. The energy generated from COMFIT programs provide the local communities with power and provide associated economic development opportunities (NSPI, 2026; Province of NS, n.d.).

There is one existing NSPI power corridor to the east of the PDA. It is a 69/138 kV line, and travels from the community of Parrsboro to just below the Amherst area. The Project will tie into this transmission corridor.

13.2.4.2 Other Utilities and Waste Management

Rural residents located in and closely surrounding the LAA use domestic water wells and on-site wastewater disposal systems. The Municipality of the County of Cumberland also has five protected source water areas in the County:

- North Tyndal
- McElmon Brook
- MacAloney Lake
- Leamington Brook
- Pugwash

Parrsboro, the community closest to the PDA, benefited from the installation of a new municipal sewer system in 2018. The project was completed in response to a federal government order requiring the construction of a wastewater treatment facility and associated sewer infrastructure by 2020 (Municipality of the County of Cumberland, n.d.a).

Solid waste in the Municipality of the County of Cumberland is managed by the Cumberland Regional Waste Services. Garbage, recycling, and compost are collected on the same day every two weeks. Solid waste is disposed of at the Cumberland Central Landfill in Nappan, NS. Waste separation in the County follows the province-wide program, led by Circular Materials. There are several recycling programs within the County, including a

battery recycling program, a construction and demolition program, an electronics program, a household hazardous waste program, a paint recycling program, a safe sharps program, a scrap metal recycling program, a tire recycling program, and a waste oil and filters program (Municipality of Cumberland, n.d. b).

13.2.5 Communication and Radar Systems

As described in Chapter 3 (Consultation and Engagement), stakeholders and regulators were contacted with information regarding turbine technical specifications and locations to determine potential concerns due to EMI caused by Project turbines. The area of consultation for EMI varies by signal source, referred to in the RABC and CanWEA Guidelines (2025).

An EMI assessment was conducted by Nortek, in accordance with the RABC and CanWEA Guidelines (2025) (Appendix L; Nortek, 2026). No proposed turbines were located within the consultation zone for local Point-to-Point radio links, AM Radio Transmitters, FM transmitters, and TV transmitters.

Confirmation was received from DND, the RCMP, the Canadian Coast Guard, ECCC, NavCan, and ISED that they did not expect any interference with their communications and radar systems by the Project. However, the RCMP did advise that the area in which the Project is sited does receive radio coverage through infrastructure leased by Bell Canada. Through consultation with Bell Canada, they confirmed that the proposed Project does not interfere with this radio coverage.

13.2.6 Transportation

13.2.6.1 Road Network and Project Access

The proposed PDA access roads branch off the Harrison Settlement Road and directly off Highway 2. The access roads off Harrison Settlement Road include Pettigrew Road, and two other unnamed roads. The other two Project access roads will be off Highway 2. The existing roads to be used as part of the Project are all unpaved. Several other roads that intersect with the PDA but are not part of the Project and are K-class roads or roads that have been abandoned or roads now used for recreational purposes.

The primary route to enter the PDA during construction for delivery of turbine components is expected to be via Highway 2 and Harrison Settlement Road. The route for other construction components is expected to follow a similar route.

The Province of Nova Scotia regularly conducts traffic counts along its 100 Series Highways, 1 to 99 Series Trunks, and 200/300 Series Routes, and makes the dataset available online (NS DPW, 2023). Data from the traffic count locations for the roads in this network closest to the PDA are summarised in Table 13.2. Information from the province included the location and date of the count, and the average daily traffic (ADT) and annual average daily

traffic (AADT). The AADT is more reflective of long-term average daily traffic conditions, and is the metric used in this assessment.

Table 13.2 NSDPW Traffic Count Summary for Nearby Roads

Road	Date	Description	ADT	AADT
Highway 2 (SB)	20-09-2023	Parrsboro North Line to Boars Back Road	575	510
Highway 2 (NB)	20-09-2023	Parrsboro North Line to Boars Back Road	594	530
Highway 209	26-07-2022	TK 2 (Parrsboro) to Ramshead River Road (Diligent River)	1128	800
Highway 209	19-07-2022	Sand River Bridge to Fields Bridge	177	150

SB = Southbound
NB = Northbound
Source: NS DPW, 2023

13.2.6.2 Alternative Transportation

The main interprovincial CN rail line enters Nova Scotia from New Brunswick across the Tantramar Marshes and passes directly through the Municipality of the County of Cumberland. There are stops and/or freight service areas in Amherst and Springhill Junction, but its main stops are in Truro and in Halifax. A VIA rail passenger train route travels through Cumberland County as it crosses the NS border; however, it makes no stops in the County.

Most residents in the Municipality of the County of Cumberland travel by car, as there is no major bus service in the region. However, there is a small bus service run by Cumberland County Transportation Services (CCTS). CCTS is a registered non-profit organization and accepts charitable donations to help sustain their services. CCTS has five accessible vehicles and one non-accessible vehicle in their fleet and operates a door-to-door service that operates on a pre-booking format. CCTS vehicles will drive across the province, and into parts of New Brunswick and Prince Edward Island. Services are reserved for residents within the County (Rural Transportation Association, 2026).

13.2.6.3 Airports

There are no active commercial or municipal airports located directly within the Municipality of the County of Cumberland. The two closest airports are in Halifax, the Halifax Stanfield International Airport, and in Moncton, the Moncton Romeo LeBlanc International Airport.

13.2.7 Recreation and Tourism

The private and Crown properties that constitute the LAA are used year-round for off-roading activities, particularly by ATVs and snowmobiles.

As described in Chapter 3 (Consultation & Engagement), the Proponent has engaged with special interest groups pertaining to recreation in the area. These groups included the Chignecto-Glooscap Snowmobile Club, the Snowmobile Association of Nova Scotia (SANS), the Cumberland Trails Association, and the Cumberland Wilderness group.

There are several trails that intersect the PDA managed by the ATV Association of Nova Scotia (ATVANS), including Secondary Trail 31, and several offshoots of Trail 31 (ATVANS, 2026). These trails are maintained by the Chignecto and Area ATV Club. Many of these same trails are used by snowmobiles and are managed by the Snowmobilers Association of Nova Scotia (SANS) (SANS, n.d.).

The PDA is approximately 1 km from the Kelley River Wilderness Area, which is one of the province's largest wilderness areas, at approximately 21,000 ha. It is an area of extensive mature and older forests, and provides habitat for several SAR: Wood Turtle, Inner Bay of Fundy Salmon, and Mainland Moose. There are no facilities, parking, or roads within the wilderness area (apart from small forest resource roads), but the area provides opportunities for a wide range of outdoor activities, including hunting, fishing, canoeing, camping, hiking, and bird watching. Part of the wilderness area overlaps with the Chignecto Game Sanctuary, which only allows for long-bow hunting (NSECC, n.d. a).

Approximately 4.5 km south of the PDA is the Diligent River Nature Reserve. It is approximately 139 ha. It is located on the coast and includes 1.5 km of coastline. The nature reserve provides key habitat for various shorebirds. The Diligent River Nature Reserve is characterized by expansive estuarine flats, salt marsh, and mature coniferous forest. It offers opportunities for coastal hiking, sea kayaking, bird watching, and other nature-based recreational activities. There are no managed trails within this nature reserve (NSECC, n.d. b).

The closest Provincial Parks to the PDA are the Five Islands Provincial Park (approximately 25 km to the southeast) and the Cape Chignecto Provincial Park (approximately 33 km to the southwest). The Five Islands Provincial Park is located in Five Islands, NS, where park visitors enjoy hiking, kayaking, and camping. It has 93 campground sites, an unsupervised beach, hiking trails, and various amenities (Tourism Nova Scotia, n.d. a). The Cape Chignecto Provincial Park is located in Advocate Harbour, NS, and offers pristine coastline, deep valleys, sheltered coves, rare plants, and old-growth forests. Along with a day-use park, it also has 92 wilderness walk-in camp sites, a bunkhouse, and four cabins. There are limited amenities in the Cape Chignecto Provincial Park, and the most popular activities in the park are hiking, back-country camping, and kayaking (Tourism Nova Scotia, n.d. b).

The RAA and surrounding areas support a variety of recreational, cultural, and tourism attractions, including the Ship's Company Theatre, Fundy Geological Museum, and Ottawa House Museum By-the-Sea in Parrsboro; the Fundy Ocean Research Centre for Energy (FORCE) in West Bay; the Age of Sail Heritage Museum in Port Greville; and scenic natural features such as Wards Falls and Jeffers Brook Waterfall. These attractions contribute to the region's tourism economy and provide opportunities for visitors to experience the area's natural and cultural heritage.

13.2.8 Human Health

This section describes the existing human health conditions in the LAA and provides context for assessing how the Project may affect public health, including social and environmental determinants.

Social and economic conditions that are contributing determinants of human health in a community, such as community demographics, landscape characteristics, and infrastructure, are described in the previous sections in this chapter. Human health also relies at least partially on several environmental factors. Ambient light and acoustic environments are described in Sections 5.2.3 and 5.2.4, respectively.

Both air and drinking water quality, previously discussed in this document (Chapter 5: Atmospheric Environment and Chapter 6: Geophysical Environment), can affect human health, with potential for adverse effects if unacceptable exposure to elevated chemical concentrations occurs. The potential for accidents and malfunctions, such as ice throw, and mitigation for such are discussed in Chapter 17 (Accidents and Malfunctions).

13.2.8.1 Air and Water Quality

As discussed in Chapter 5, Nova Scotia evaluates air quality against the CAAQS which were developed by the CCME to protect the health of all Canadians. Based on the 2022 air quality monitoring data, the most current available during the EA preparation, the CAAQS have been met in the northern air zone where the Project is located (NSECC, 2024).

The Nova Scotia Groundwater Database (NSECC, 2023b) has a limited amount of information available for registered wells, particularly for results of laboratory analysis. Of the 18 wells identified within the PDA, only four include some chemical parameters (Table 13.3). These wells are underlain by the same types of bedrock that influence groundwater quality in the PDA (Chapter 6: Geophysical Environment; Figure 6.1, Appendix A).

Health Canada lists maximum acceptable concentrations (MACs) for contaminants associated with risks to human health (Health Canada, 2025). None of the four wells had been tested for Arsenic. However, all four had been tested for Iron and Manganese. Of the four records that included analytical results for manganese, none of them had a concentration of manganese that exceeded the MAC value for that parameter. Iron concentrations exceeded the aesthetic objective in three of the four available records

(75 %) that included analytical results for that parameter. The exceedance of the aesthetic objective value is not a health concern but affects the palatability of the water; iron can also stain laundry and plumbing fixtures.

Table 13.3 Well Water Quality

Parameter	MAC (mg/L)	Number of Records	Number and Rate of Exceedances
Iron	0.3*	4	3 (75%)
Manganese	0.12	4	0 (0%)

*Indicates an aesthetic objective

Radon readily vaporizes from water and is therefore more of a health concern for release and concentration in indoor air than a concern for drinking water. Health Canada, therefore, does not list a MAC value for radon (Health Canada, 2025).

Effects and mitigation for changes specific to air quality and groundwater are presented in Chapter 5 (Atmospheric Environment) and Chapter 6 (Geophysical Environment) and are not further assessed in this chapter.

13.2.8.2 Healthcare and Emergency Response Services

The region lies in the Nova Scotia Health Authority's Northern management zone. The closest healthcare/treatment centre to the PDA is the Parrsboro Urgent Treatment Centre, approximately 7 km to the south. The Urgent Treatment Centre is open from Monday to Saturday from 9am to 5pm. The closest hospital to the PDA is located in Springhill, the All Saints Springhill Hospital. It is approximately 32 km to the northeast.

The closest RCMP detachments to the PDA are located in Parrsboro and Springhill. The RCMP office in Parrsboro is located approximately 7 km to the south, and the Springhill RCMP office is located approximately 31 km to the northeast.

The Nova Scotia Department of Emergency Management is responsible for emergency planning and response in the province, including storm preparation and support, and administers the 911 phone system to dispatch paramedics and RCMP first responders. The closest fire stations to the PDA are the Parrsboro Volunteer Fire Department (252 Willow St, 7.5 km from the nearest turbine), the FPW Volunteer Fire Brigade and Fire Hall in Port Greville (8484, NS-209, Port Greville, 11.6 km from the nearest turbine), the Southampton Volunteer Fire Department in Southhampton (8845 NS-2, Southampton, 15.8 km from the nearest turbine), the Springhill Fire Department (37 Miners Memorial Drive, Springhill, 30.1 km from the nearest turbine), and the River Hebert Fire Department (1495 NS-242, River Hebert, 21.6 km from the nearest turbine).

13.3 Effects Assessment

13.3.1 Potential Effects and Mitigation

Findings from environmental baseline studies and feedback received through regulatory and public engagement processes were used to refine the Project and, where reasonable, minimize potential direct and indirect adverse effects on the socio-economic environment. Project-related effects on socio-economic components may arise through multiple interconnected pathways over the life of the Project.

Most effects to the socio-economic environment will be positive. There will be employment opportunities and a stimulus to local businesses during all phases, and the Project will create a source of revenue to the Municipality of the County of Cumberland during operation and maintenance. Access to natural resources and recreational activities may be adversely affected during construction but positively overall during operation and maintenance with improved access in the LAA. The Project will contribute toward the Municipality's renewable energy objectives. Project activities can affect the socio-economic environment as indicated in Table 13.4 without implementation of mitigation measures described herein.

Table 13.4 Potential Environmental Effects of the Project on the Socio-Economic Environment

Project Activity	Potential Interactions						
	Change in Population and Economy	Change in Land Use and Value	Change in Visual Landscape	Change in Utilities	Change in Transportation	Change in Recreation and Tourism	Change in Human Health
Construction							
Site Preparation	X	X	-	-	X	X	X
Access Roads Construction and Modifications	X	X	-	-	X	X	X
Material and Equipment Delivery and Storage	X	-	-	-	X	X	X
Infrastructure Installation	X	-	X	-	-	X	-
Restoration of Temporary Areas	X	-	-	-	-	X	X
Testing and Commissioning	X	-	-	-	-	-	-
Operation and Maintenance							
Turbine Operation and Maintenance	X	X	X	X	-	X	X
Road Maintenance	X	X	-	-	X	X	X
Power Line and Substation Maintenance	X	-	-	-	-	-	-
Vegetation Management	X	-	-	-	-	-	X
Safety and Security	-	-	-	-	-	-	-
Decommissioning							
Removal of Infrastructure and Site Restoration	X	-	-	-	X	X	X

X = Potential Interaction
- = No Interaction

13.3.1.1 Population and Economy

During Project planning and construction, the Proponent intends to prioritize the use of local labour, expertise, and services to support Project development. In addition to engaging local professionals in environmental sciences, engineering, archaeology, public relations, and land surveying, Project construction will require regional labour, equipment, materials, and other associated services. Many of these activities will involve conventional construction work and are not expected to require specialized wind turbine training, thereby creating employment and business opportunities that can be readily filled by the local and regional workforce.

Staffing will be needed for the lifetime of the Project. Approximately 200 to 250 workers will be employed during the construction phase; a part-time and full-time staff complement of 3 to 8 will be needed to support operation and maintenance. The influx of workers to the region during Project planning, construction, operation, and decommissioning will further contribute to the local economy through spending on goods and services, including accommodations, restaurants, fuel, and retail businesses. Given the number of wind energy projects that have been developed in Nova Scotia, it is expected that many specialized workers, such as turbine commissioning personnel, crane operators, and specialized transportation contractors, can be sourced from within the province. This will help maximize the retention of Project-related economic benefits within Nova Scotia while supporting existing expertise within the provincial wind energy sector.

Local businesses will have the opportunity to provide construction materials, such as crushed rock for the construction and modifications to access roads, concrete for foundations, and general construction equipment. Engagements with local businesses are discussed in Chapter 3 (Consultation and Engagement).

The Proponent has also committed to several direct benefits to members of the community.

- The Proponent will pay annual tax revenues of approximately $1.5 million to the Municipality of the County of Cumberland as per the provincial *Wind Turbine Facilities Municipal Taxation Act*.
- The Proponent will establish landowner royalties.
- The Proponent will establish a Community Benefit Fund
- The Proponent will implement capacity building funding and initiatives for the Mi'kmaw people in the region

Overall, the economy of the Municipality of the County of Cumberland will benefit from Project implementation.

13.3.1.2 Land Use and Value

Implementation of a wind facility will impose limitations for other land uses in the PDA, but road upgrades and new access road construction may facilitate the use of land in the LAA.

Harvesting of natural resources, such as forestry, may be adversely affected in the LAA during construction, as access will be interrupted intermittently during road upgrades, and when construction equipment is brought to site. However, existing access roads in the LAA would not all be under construction at once, so there will be some access to the area even through these intermittent road access interruptions.

During Project operation, there may be less overall forested land due to clearing activities associated with the Project; however, these adverse effects are expected to be offset on the private lands, as there will be increased revenue for the landowners through land lease agreements. Additionally, those using the area for the harvest of natural resources may benefit from road upgrades, as improved roads will reduce wear on equipment. Approximately 43 km of existing roads will be used, and 8 km will be new roads.

Although property values were not identified as a concern during public engagement for the Project, potential effects have been considered in this assessment. Numerous studies have examined the relationship between wind energy developments and property values, with findings often influenced by site-specific factors such as community characteristics, project design, and perceptions of visual effects. While many studies have found no significant relationship between wind farms and property values, some research suggests that effects may occur for properties located near turbines. For example, a peer-reviewed study of a 133-turbine wind farm in rural Ontario found that, although the project did not generally affect property values across the broader study area, some nearby properties experienced adverse effects, which may have been influenced by levels of community support for the project (Vyn, 2015). Similarly, Brunner and Schwegman (2022) reported that property values may decline temporarily during construction but subsequently increase following the commencement of operation. Overall, the available literature suggests that effects on property values, where they occur, are typically localized and influenced by a range of project- and community-specific factors.

A study published in 2024 examined residential property transactions and the proximity of commercial wind turbines between 2005 and 2020 across both urban and rural regions of the United States (Brunner et al., 2024). The authors found that homes located more than 2.4 km from a wind turbine in urban areas did not experience any measurable effects on property values. For homes located within 2.4 km of a turbine, declines in property values of approximately 11% were observed primarily in large urban communities with populations exceeding 250,000 people. In contrast, the study found no measurable effect on property values in rural agricultural and forested areas, including properties located near wind turbines in communities with populations below 250,000. The authors concluded that the effects of wind energy developments on property values may vary based on the surrounding land use and community context, with rural areas generally showing little to no evidence of adverse effects. Given that the Cumberland County census division has a population of approximately 30,538 people, and the Project turbines are located a minimum of approximately 1 km from all numbered civic addresses, available research

suggests any potential effects on property values are likely to be localized and influenced by site-specific factors.

Early consultation with the Municipality of the County of Cumberland, as well as information gained through the EA process and public engagements resulted in commitments to promote positive effects to land use and value.

Potential Project effects related to land use and value can be effectively mitigated through planning and management of construction and operation activities. The following key measures to mitigate the potential effects of the Project land use and value will be further detailed in a Project-specific EPP.

- Existing roads, harvested areas, and other previously altered areas will be used to the extent practicable. Once permission is granted, long-term leasing fees will be paid to private property owners for land in the PDA. If Crown land is to be used, leases and leasing fees will be paid to the province.
- Nearby residents will be notified about scheduled activities with the potential to impact land use to reduce disruption.
- Merchantable timber will be salvaged and used in accordance with Project agreements.
- The Proponent will continue to engage with local resource stakeholders about effects to resource use and the planned mitigation measures.

Areas of clearing and grubbing will be limited to that needed to construct and operate the Project within the PDA. Waste management measures will be implemented to identify and control waste generated during construction and operation, as part of the Project-specific EPP.

13.3.1.3 Visual Landscape

Visual impacts are based on public perception of wind turbines, including lighting, paint colour, and degree of visual contrast from the surrounding landscape (Sullivan et al., 2012). The visual impact of wind turbines can also be influenced by its operating status. Visual impacts associated with an operating turbine are lower than that of one that is stationary (Saidur et al., 2011). When the blades are in motion, they can be less visible from a distance.

Hamza et al. (2022) examined changes in public perceptions of wind turbines over the past three decades and found that attitudes toward wind energy developments have generally become more positive over time. The study also identified notable differences in aesthetic perceptions based on landscape context. Using visual imagery depicting varying site characteristics, turbine proximities, landscape settings, and stages of technological development, the authors found that respondents generally viewed wind turbines favourably when situated in coastal and rural landscape settings. In contrast, perceptions were less favourable when turbines were integrated into urban environments. While perceptions did not differ significantly by gender, younger respondents were more likely to view wind energy developments positively. The authors suggested that increased exposure

to wind turbine landscapes may be contributing to a gradual shift toward more favourable public perceptions of wind energy projects.

Visual simulations of the proposed turbine locations, conducted by Nortek (2026a, Appendix J), show the number of turbines visible from various points surrounding West Bay. Turbines will be visible from all viewpoints that were included in visual simulations, except for at Partridge Island. Turbines will be visible from Canaan Road and Highway 2, Cross Roads, the Lions Recreation Center (barely visible), Prospect Road, Yorke Settlement, and a lookoff from the Cape Split Trail (Appendix J). Although turbines will be visible from these viewpoints, landscape, topography, and tree cover reduce the visibility of turbines from inhabited areas. Furthermore, per the visual simulations, at most of these locations, only a few turbines will be seen at a time.

13.3.1.4 Utilities

Utilities, such as water distribution lines and local power lines, may be temporarily affected by construction of the Project. Construction of the transmission line traversing roads with water lines or power lines and upgrades of existing roads leading to temporary disruptions will be mitigated by careful construction planning, notifications to local utility providers, and obtaining necessary permits and crossing agreements.

13.3.1.5 Communication and Radar Systems

Confirmation was received from DND, the RCMP, the Canadian Coast Guard, ECCC, and NavCan, that they did not expect any interference by the Project and had no objections to it as proposed. The RCMP did request that the Proponent consult with Bell Canada, as the area receives TMR2 radio coverage through infrastructure leased from Bell. Upon consultation, Bell Canada provided a response stating that the proposed Project does not interact with their network.

The Proponent will be submitting a final notification prior to construction and will request a final response from all the agencies previously consulted (Chapter 3).

13.3.1.6 Transportation

During construction, there will be an increase in traffic from crew commuters; trucks to transport soil, rock, and waste; and flatbed trailer trucks transporting construction equipment. There will be traffic interruptions as a result of increased road users and slower moving vehicles.

The following key measures to mitigate the potential effects of the Project on transportation resources will be implemented prior to and during construction:

- Permits for work in public roads and crossing agreements will be obtained with the Department of Public Works.

- A Special Move Permit will be procured for vehicles with weights or dimensions greater than those listed in the Weights and Dimensions of Vehicles Regulations under the Nova Scotia *Motor Vehicle Act*.
- The regional RCMP will be notified of equipment deliveries that require Special Move Permits expected to affect traffic.
- Nearby residents will be notified of the expected equipment delivery schedule.
- Access to and from the Project should follow predefined travel routes. Multiple entrances are being evaluated to minimize effects.
- The routing of Project traffic through residential areas will be avoided during the peak traffic periods.
- Adequate safety signage, fencing, guardrails, and/or warning tape will be installed to indicate restricted Project areas to advise members of the public.
- Safety warnings and signage will be clearly posted to advise hikers, cyclists, snowmobilers, and other resource users of the Project activities.
- Vehicle traffic and equipment staging will be limited to designated access roads and laydown areas. Speed limits will be enforced.

13.3.1.7 Recreation and Tourism

The effects that a wind farm may have on local recreation and tourism depend on the visibility of wind turbines, the number of tourist attractions and tourists that frequent the area, and the area's degree of existing disturbance (Sæþórsdóttir et al., 2021), as well as perception of wind energy (Frantal and Kunc, 2011).

Some of the trails that cross or are in the PDA (Figure 13.1, Appendix A) may be temporarily unavailable during the construction period and may see traffic on access roads during operation and maintenance, where light-duty trucks, snowmobiles, and tracked vehicles will travel to access turbine sites. Several designated off-highway vehicle routes managed by SANS and ATVANS travel though the lands in and adjacent to the Project. The potential for incidents is discussed further in Chapter 17 (Accidents and Malfunctions).

During construction, snowmobile and ATV users may temporarily lose access to sections of trail and need to adapt to detours during road upgrades and clearing. Such effects may occur during operation and maintenance as well, but only in the event that a turbine would require major works (such as a blade replacement). The Proponent will work with local clubs to maintain access to all trails in the PDA for snowmobilers and ATV users during Project operation through considerations in layout design, construction practices, and operational strategies. During the operation phase, ongoing communication with snowmobile and ATV users will remain a top priority to ensure shared use of access roads in the PDA.

Access road routes and the transmission line RoW will be widened in some areas, which could lessen the natural experience of hikers where an existing access road forms part of the trail. Conversely, increasing access routes and the transmission line RoW may increase opportunities for some snowmobile and ATV users. Significant effects on hunting and

fishing opportunities are not expected since access to the surrounding area will not be severed, and new or improved access may be created.

Although the PDA layout was strategically sited to use existing roads as much as possible, increased traffic on access roads during construction may lead to temporary interruptions or detours to ATV and/or snowmobile operators as well as hikers due to re-routing to avoid areas of construction in the PDA as well as decrease the probability of traffic incidences (further discussed in Chapter 17: Accidents and Malfunctions).

The Project commits to keeping recreation spaces open to local users and working proactively with clubs to engage and communicate with the members. The following key measures to mitigate the potential effects of the Project on recreation and tourism will be further detailed in a Project-specific EPP.

- Open engagement will be continued with SANS and the Chignecto-Glooscap Snowmobile Association. These organizations will be notified regularly about Project activities that may affect trail use to minimize disturbance.
- Public notifications of construction and traffic disruption will be issued.
- Temporary detour and traffic control signage will be erected when and where necessary.
- Where trail paths enter safety setbacks, the Proponent will establish trail detours.

13.3.1.8 Human Health

Sensitivity to nighttime lighting, noise, shadow flicker, and electromagnetic fields (EMF) has been identified as a public concern associated with wind energy developments. Sensory disturbances may also be associated with vibration and visual effects, including changes to viewsheds and landscape aesthetics (Health Canada, 2025). Some Nova Scotians have identified wind turbines as a source of annoyance (Union of Nova Scotia Municipalities, 2015). Annoyance is typically self-reported and may be influenced by an individual's attitudes and perceptions toward wind turbines (Ellenbogen et al., 2012). Health Canada recognizes annoyance as a potential health effect because it can affect an individual's quality of life, and the World Health Organization similarly considers annoyance to be an adverse health outcome (Union of Nova Scotia Municipalities, 2015). Potential effects on human health associated with accidents and malfunctions, including ice throw, structural failure, and fire, are discussed separately in Chapter 17, Accidents and Malfunctions.
This Project fully complies with provincial setback requirements for residences. All turbines are located approximately 1 km from all numbered civic addresses. Legislated requirements and best practices associated with shadow flicker and noise exposure are also met. At these distances, adverse effects on human health are not expected.

Although concerns regarding potential health effects associated with wind energy projects have been identified in the literature, studies generally indicate that proper turbine siting and adherence to established setback requirements, such as those proposed for the Project, can effectively minimize potential adverse effects. In addition, wind energy projects can provide indirect benefits to human health by displacing electricity generation from

higher-emission energy sources, thereby contributing to improved air quality and reduced greenhouse gas emissions. Overall, the Project is expected to have a low potential for adverse effects on human health.

Ambient Light

Aside from National Parks and Dark Sky Preserves, in Nova Scotia and in Canada there are no guidelines applicable to outdoor ambient light levels and/or effects on human health. Potential effects of the Project on ambient light are assessed in Chapter 5 (Atmospheric Environment) and are not further assessed in this section. The key measures to mitigate the potential effects of the Project on human health as a result of changes to ambient light levels are itemized in Section 5.3.1.2 and will be further detailed in a Project-specific EPP to be implemented during all Project phases.

Acoustic Environment

The 2014 Health Canada study on the impacts of wind turbines on community health and wellbeing found that self-reported instances of sleep disturbance, illnesses, chronic diseases, and stress were not affiliated with wind turbine noise exposure. Nonetheless, increasing wind turbine noise levels statistically correlated with increasing annoyance levels (Health Canada, 2025).

Health Canada (2023) and the Union of Nova Scotia Municipalities support WHO's recommendation for a nighttime noise limit of 40 dBA at the exterior of homes as being protective of sleep, general health, and does not exacerbate pre-existing medical conditions (Union of Nova Scotia Municipalities, 2015). The Project noise assessment has adopted this value (Nortek, 2026b; Appendix D).

Wind turbines produce noise from two main sources, the generator and the wind passing over the blades. Low frequency noise is not usually heard by humans, but there is potential that it could make small vibrations more noticeable (Canadian Centre for Occupational Health and Safety, 2023). Low frequency noise has been used to describe frequencies less than approximately 30 hertz (Hz), the perception of which is often described as a feeling or pressure rather than something that is heard (Health Canada, 2021). Health Canada has found that the scientific evidence base in relation to wind turbine noise exposure and health is limited, which includes uncertainty as to whether it contributes to the observed community response and potential health impacts (Health Canada, 2019).

Changes to noise levels from baseline during all phases of the Project were assessed in the context of human health in Chapter 5 (Atmospheric Environment). In combination with natural and non-industrial anthropogenic sources, Nortek (2026b) determined that Project operation will comply with the permissible sound levels outlined in the provincial noise guidelines for all 41 receptors included in the modelling (Appendix D).

Potential noise effects during Project construction are short-term (expected to take less than two years) and will vary based on the type of construction activities and the shifting

proximity to receptors during this phase (Nortek, 2026b). The primary noise sources associated with construction will include trucks and other vehicles, backhoes and graders, cranes, and smaller equipment such as welding units as well as back-up alarms on mobile equipment. Noise levels at receptors during construction will depend primarily on the number, type, and proximity of noise sources. Construction noise levels will decrease as the distance between the receptors and construction activities increases and nighttime construction activities will be avoided as much as possible.

The key measures to mitigate the potential effects of the Project on human health as a result of changes to the acoustic environment are itemized in Section 5.3.1.3 and will be further detailed in a Project-specific EPP to be implemented prior to and during construction.

Shadow Flicker

Shadow flicker occurs when sunlight passes through the blades of an actively rotating wind turbine and reaches an observer on the ground, resulting in flickering light. The distance of the shadow flicker depends on several factors such as the time of day and season as well as the location of the observer relative to the wind turbine (Ellenbogen et al., 2012). Turbines have also been known to produce glint (i.e., flashes of reflected light) when the turbine blades are reflective. However, modern wind turbine blades, including those proposed for the Project, are treated with a non-reflective coating to minimize glint.

Studies suggest that shadow flicker is not experienced beyond 1.4 km from the turbine for large-scale turbines (Ellenbogen et al., 2012). Other studies reveal that, beyond 15 rotor diameters from a wind turbine, shadow flicker is decreased to a point where it is not observable (Haac et al., 2022). A scientific review of turbines and human health noted that, by 2014, there were roughly 60 scientific peer-reviewed articles that studied the links between turbines and human health and that the available scientific evidence suggested that shadow flicker is not likely to affect human health (Knopper et al., 2014).

NSECC standards stipulate a maximum of 30 hours of flicker over the course of a year or no more than 30 minutes per day. The shadow flicker assessment using the theoretical worst-case found that none of the 41 receptors would experience greater than 30 hours of shadow flicker per year or more than 30 minutes per day. The maximum predicted shadow flicker under the theoretical worst-case scenario occurs at Receptor I, with 8 hours and 5 minutes per year and a maximum of 22 minutes per day. The realistic case also found that all receptors comply with the less than 30 hours of shadow flicker per year. Daily shadow flicker duration was not assessed under the realistic-case scenario because monthly sunshine probabilities cannot be resolved to shorter temporal increments. The realistic case scenario is more comprehensive, as compared to the theoretical worst-case scenario, in which assumptions are quite conservative in nature. Under the realistic case, Receptor I is expected to experience 2 hours and 59 minutes of shadow flicker per year, well below the 30 hours per year threshold. The realistic case is also conservative, as it does not account for obstacles or trees, assumes turbines are always operating, and assumes

receptor windows are always facing the turbines. Modeled results indicate that the Project is not expected to result in unacceptable shadow flicker effects. (Appendix K, Nortek, 2026).

Electromagnetic Field Exposure

EMF is composed of invisible waves that travel through space and exert force on charged particles in the frequency range of 1 Hz to 3 kilohertz, which is outside the visible range of the electromagnetic spectrum. In Canada, electrical distribution has a frequency of 60 Hz (Health Canada, 2022), which is considered extremely low frequency EMF. Common sources of extremely low frequency EMF include household wiring, electrical appliances and household electrical products, power lines, transformer boxes, and electrical substations. The technical specifications for the turbines selected for this Project list a frequency of 50 and 60 Hz for the electrical system and transformer.

There has been public perception that EMF exposure from wind turbines can lead to adverse health effects (McCallum et al., 2014). Available scientific evidence suggests that EMF associated with the operation of wind turbines is not likely to adversely impact human health (Knopper et al., 2014) and that EMF levels in the vicinity of wind turbines are less than those produced by common household electrical devices (McCallum et al., 2014).

Health Canada, along with WHO, monitors scientific research on EMF and human health as part of its mission to help Canadians maintain and improve their health (Health Canada, 2012). International exposure guidelines for exposure to EMF have been established by the International Commission on Non-Ionizing Radiation Protection. Health Canada does not consider that any precautionary measures are needed regarding daily exposures to EMF. There is no conclusive evidence of any harm caused by exposures at levels found in Canadian homes and schools, including those just outside the right-of-way of power lines (Health Canada, 2022). EMF exposures in Canadian homes, schools, and offices are far below these guidelines. Therefore, there is no indication that EMF levels from the Project wind turbines, collector lines, or the associated transmission line will affect public health in the LAA.

The key measures to mitigate the potential effects of the Project on human health as a result of changes to the acoustic environment are itemized in Section 5.3.1.3 and will be further detailed in a Project-specific EPP to be implemented prior to and during construction.

The Proponent is committed to operating the Project in compliance with applicable regulations. Key measures to mitigate the potential effects of the Project on human health as a result of changes to the acoustic environment or changes to ambient light levels are itemized in Section 5.3.1.3 and Section 5.3.1.2, respectively. The following additional measures to mitigate the potential effects of the Project on the human health, will be further detailed in a Project-specific EPP and will be implemented prior to construction.

- Turbine blades will have a non-reflective coating to minimize blade glint.

- Onsite lighting will be restricted during Project activities and minimized to the extent possible while maintaining regulatory and safety requirements. Site lighting will be shielded downward to minimize light pollution to the surrounding environment and adjacent habitat, without compromising safety.
- Movement detection lighting will be used where possible which will turn off when not in use.
- Turbine lighting will not exceed the minimum standards in the Canadian Aviation Regulations (i.e., Standard 621, Section 12.2 and Figure 5.3 (Appendix A)) (Transport Canada, 2026).

13.3.1 Residual Effects

13.3.1.1 Changes in Economy

Construction and decommissioning of the Project will generate medium-term employment opportunities for local residents within the Regional Assessment Area (RAA), as well as for workers and businesses throughout Nova Scotia through the procurement of goods and services. During operation, the Project will provide opportunities for long-term employment and training, including for Indigenous peoples. The Project will also contribute to the local economy through community benefit funding, long-term lease agreements with participating landowners, and annual tax payments to the Municipality of the County of Cumberland under the *Wind Turbine Facilities Municipal Taxation Act*. In addition, the Proponent has committed to supporting local initiatives through community benefit programs and bursaries. As a result, the Project is expected to provide a continuous, significant, and long-term positive contribution to the local and regional economy.

13.3.1.2 Changes in Land Use and Value

Based on stakeholder engagement and the current Project design, the magnitude of change to land use and property values within the Local Assessment Area (LAA) is expected to be moderate and positive over the life of the Project. Long-term benefits are expected for participating landowners leasing land to the Proponent and for users of existing and upgraded access roads associated with natural resource activities. Most effects will be reversible following Project decommissioning; however, where landowners choose to retain constructed or upgraded access roads, improved access through the PDA may remain as a permanent benefit. Overall, the Project is not expected to result in significant adverse effects on land use or property values.

13.3.1.3 Changes in Visual Landscape

Based on stakeholder engagement and changes made to the originally proposed design, the magnitude of change with respect to the visual landscape for those in the LAA is expected to be moderate in the LAA. Turbines will be visible continuing long-term through the life of the Project, but this residual effect is reversible through decommissioning. The perception of wind turbines is subjective among demographics, and individuals tend to be more receptive to wind farms in rural locations such as the Project area.

13.3.1.4 Changes in Transportation

There will be moderate and intermittent traffic disturbances in the LAA. Existing access roads are normally used for slow-moving, off-road vehicles. Those roads will be upgraded to manage the turning radius needed for the expected trailer lengths, which will improve movement inside the LAA for the long-term, and those effects will be reversible.

Increased traffic in the RAA during construction and decommissioning is expected to be minor on an intermittent basis. Turbine components will be transported mainly via the Trans-Canada Highway, which is already a high-traffic route capable of handling large transport vehicles. Adverse effects during those phases will be more apparent on Highway 2 and Harrison Settlement Road, where the proposed access roads to the PDA are located. Effects will be temporary during the construction phase. The timing is considered to have a low effect on this VEC.

13.3.1.5 Changes in Recreation and Tourism

Changes to recreation and tourism are expected to be moderate in magnitude, medium-term in duration, and limited to the Local Assessment Area (LAA). During construction and decommissioning, portions of recreational trails may be intermittently inaccessible or diverted where they overlap with existing access roads within the Project RoW or where temporary safety setback areas are required. The timing of these residual effects is considered moderate, as the trails are used year-round. These effects will be reversible following completion of construction and decommissioning activities. The Proponent has engaged with recreational trail user organizations throughout Project planning and will continue to do so to enhance trail sustainability and user experience while minimizing disruptions. During operation, the Project site will remain accessible to the public. In addition, the mitigation measures identified for visual and noise effects will further reduce potential effects on recreation and tourism. Overall, the Project is not expected to result in significant adverse effects on recreation and tourism.

13.3.1.6 Changes in Human Health

Changes in human health related to changes in air quality, groundwater water quality, ambient light, shadow flicker, and noise are expected to be minor in magnitude in an LAA of up to 2 km, where there may be discernible noise, light, dust, and vehicle emissions during Project activities. These effects will be predominantly isolated to the construction and decommissioning phases, will occur intermittently, and Project-related changes in human health factors will be reversible.

13.4 Monitoring

Monitoring is not required for these VEC components, although the Proponent will be responsive to complaints. As noted in Chapter 6 (Geophysical Environment), pre-blast well water quality surveys will be completed for domestic water wells within 800 m of blasting

as per a Blasting Management Plan to be submitted to NSECC prior to construction. As part of that plan, notification protocols will be developed for contacting NSECC and NSDNR should elevated levels of uranium be encountered.

14 Heritage and Cultural Resources

14.1 Overview

The assessment of Project effects on heritage and cultural resources considers sites of archaeological, historical, cultural, and architectural significance, as well as resources of social, cultural, or spiritual importance to the Mi'kmaq.

Kelman Heritage Consulting is currently conducting the Archaeological Resource Impact Assessment (ARIA) under Heritage Research Permit (HRP) A2026NS144. The desktop study is complete and onsite visual surveys are underway. The desktop study identified 28 areas exhibiting elevated archaeological potential. These areas will need to be field verified through the visual assessment. Also, the visual assessment may identify additional areas of elevated archaeological potential not identified through the desktop study. The ARIA will be completed before the end of 2026, and results will be submitted to Nova Scotia Communities, Culture, Tourism and Heritage (NSCCTH). NSECC will be provided with the acceptance letter from NSCCTH prior to any disturbance in identified areas of elevated archaeological potential.

Clearing and ground disturbance during construction, such as grubbing, excavation, and blasting, can damage archaeological and heritage artifacts and/or features that lie within the Project area. During decommissioning and site restoration, previously undisturbed archaeological resources may be moved, damaged, and/or buried deeper when infrastructure is removed and the ground smoothed.

Effects, mitigation measures, and residual effects to these resources as a result of the Project have been outlined in this chapter. Field investigation results will be used to confirm areas of elevated archaeological potential and Project-specific mitigation measures will be included in a Project-specific EPP and a Contingency Plan prior to ground disturbance to minimize adverse effects.

To identify Indigenous Cultural Resources that may be impacted by the Project, a Mi'kmaq Ecological Study (MEKS) is currently being undertaken by Membertou Geomatics Solutions (MGS).

14.1.1 Regulatory Context

Assessment of heritage and cultural resources considers relevant provincial and federal legislation and guidelines:

- *Constitution Act, 1982*
- *Special Places Protection Act*
- *Heritage Property Act*
- *Cemeteries and Monuments Protection Act*
- NSCCTH (2014) Archaeological Resource Impact Assessment Guidelines
- Mi'kmaq Ecological Knowledge Study Protocol, 2nd Edition (Assembly of Nova Scotia Mi'kmaq Chiefs, n.d.)

14.1.2 Boundaries

The PDA represents the Project footprint and the maximum limit of potential direct physical disturbance associated with the Project. The boundaries are defined as follows for each subcomponent of the heritage and cultural resources VEC:

- **Archaeological and Indigenous Cultural Resources:** Effects to archaeological artifacts and features as a result of the Project will be isolated to the PDA for the lifetime of the Project; therefore the PDA, LAA, and RAA have the same boundary for this subcomponent.
- **Indigenous Cultural Resources**: The LAA for Indigenous Cultural Resources is defined as a 5 km buffer around the PDA, defined by MGS, undertaking the MEKS. The RAA will be defined as the Mi'kma'ki districts Sipekne'katik and Siknikt districts, which overlap with the PDA.

14.1.3 Assessment Methodology

14.1.3.1 Desktop Archaeological Study

As part of the background research, environmental factors were reviewed, as well as historical settlement and development patterns in the general vicinity of the PDA. The background study included a review of documentation available at the Nova Scotia Archives, the Nova Scotia Land Information Centre and the Nova Scotia Museum. Research focused on land grant records, legal survey records and historic maps, as well as local and regional histories. The goal of the desktop-based study is to reconstruct a general land-use history for the Project area and to identify areas of elevated archaeological potential to be field-verified through the ARIA (Kelman Heritage, 2026).

Topographic maps and aerial photographs, both current and historic, were also used in the archaeological evaluation of the PDA. Base mapping was reviewed to identify environmental and physiographic features such as topography and surface water that would have influenced human settlement and resource exploitation patterns. The historical and cultural information was integrated with the environmental and physiographic data to identify areas of archaeological potential.

14.1.3.2 Field Surveys

Following completion of the background study, field investigations will be undertaken within the PDA to assess areas identified as having archaeological potential. These investigations will include pedestrian surveys of the PDA, documentation of any archaeological resources identified through background research and field observations, and identification of areas of archaeological sensitivity. The results of the field investigations will be used to inform recommendations regarding the protection and preservation of archaeological resources, where warranted. Archaeological field surveys are anticipated to occur in November 2026.

14.1.3.3 Mi'kmaq Heritage and Cultural Resources

As part of the archaeological study, per HRP (Category C) guidelines for an ARIA, contact was initiated with the Mi'kmaq regarding the Project. Contact was made through the Archaeological Research Division (ARD) of Kwilmu'kw Maw-Klusuaqn (KMK). The information provided by KMK-ARD was integrated into the ARIA (Kelman Heritage, 2026).

Additionally, a MEKS for the Project is currently underway by MGS, the results of which will be submitted to the EA Branch of NSECC under separate cover. As described in MGS', there will be four components of the MEKS. The first is a desktop review of the PDA to identify land claims, past occupation, archaeological sites, and present-day occupation. This initial desktop review will also identify potential Mi'kmaq resources, including species at risk. The second is review of traditional use and Mi'kmaq occupation of the PDA and LAA, which will provide a detailed understanding of Mi'kmaq use of the land and waters. The third component is a present-day use survey, which will be conducted by contacting various Mi'kmaw communities within the RAA that are identified as using the PDA and LAA. Interviews with various individuals from these communities that may possess information regarding Mi'kmaq use and ecological knowledge of the area are ongoing. The fourth component of the MEKS will be a Mi'kmaq Significant Species Survey, which will be done in partnership with at least one Mi'kmaq individual. This survey will identify species in the PDA and LAA of significance to the Mi'kmaq community and will help predict the effects of the Project on Mi'kmaq culture, learning, or practices.

As the MEKS will not be completed at the time of the EA submission, the results will be submitted to NSECC at a later date. The description of Indigenous Cultural Resources for the existing environment section below will be based on the initial ARIA desktop study.

14.2 Existing Environment

14.2.1 Archaeological and Heritage Sites

14.2.1.1 Background

A review of the Maritime Archaeological Resource Inventory (MARI), the provincial archaeological sites registry, identified ten registered archaeological sites within 5 km of the PDA. Four historic sites have been recorded south of the PDA along the shore or within proximity of the Minas Basin. A further six Mi'kmaw sites have been recorded approximately 4 km northeast of the Project area along the shores of Newville Lake. The lack of registered sites within the PDA may be a reflection of a lack of archaeological investigation in the area, rather than a lack of sites themselves (Kelman Heritage, 2026).

14.2.1.2 Desktop Study: Euro-Canadian Resources

Euro-Canadian settlement in the region began with a small number of Acadians who settled around Partridge Island. By the mid-eighteenth century, several dispersed Acadian settlements occupied the north shore of the Minas Basin west of Masstown. Compared to other regions of Acadia, these settlements exhibited a lower degree of social cohesion (Clark, 1968).

In the 1760s, New England Planters began moving into the region. Settlement tended to stick to the shorelines of the Minas Basin and the inland rivers. The PDA itself remained unsettled. The town of Parrsboro slowly grew, and as the southern end of an already established transportation route, the town became an important port along the Minas Basin. A road was built in the early 1800s following Farrells and Hebert rivers, and with regular shipping and ferry service across the Minas Basin, travellers and goods were able to cut some distance off the overland journey to the New Brunswick border (Dawson, 2012). Little settlement occurred north beyond Parrsboro, apart from a few scattered farms located along the rivers.

The nineteenth century saw an increase in industrial activity in the region. Forest resources in New England were dwindling, and Nova Scotia lumber became sought after. The timber-rich southern section of Cumberland County, with its access to the port at Parrsboro, became popular (Parker, 2010). Forestry operations began in the PDA in the mid-to-late nineteenth century. An 1873 map shows a few logging roads within the PDA, but nothing further (Church, 1873). By the early twentieth century, many mills had started up in the region, and the network of logging roads running through the PDA had increased (Fletcher, 1905). In 1877, a railway was built along the river valley to ship coal from the Springhill area for export. A coal wharf was built at Parrsboro and for many years Parrsboro was important for both its industries and its port facilities (Kelman Heritage, 2026).

The desktop study identified 28 areas of elevated archaeological potential, eight of which were associated with possible Euro-Canadian sites (Kelman Heritage, 2026). The assessment of elevated potential was based on georeferencing the Project layout on

historic maps and identifying where historic features intersected with some element of the Project layout. Due to possible spatial inaccuracies in historic mapping, ground-truthing through field surveys will be necessary to confirm the locations assessed as having elevated potential (Kelman Heritage, 2026).

14.2.1.3 Field Assessment

Based on the results of the desktop study, Kelman Heritage is completing onsite archaeological reconnaissance to ground truth the PDA and delineate areas exhibiting elevated archaeological potential (Kelman Heritage, 2026).

14.2.2 Indigenous Cultural Resources

14.2.2.1 Desktop Study: Mi'kmaw Resources

The land within the Project area straddles what was once part of two greater Mi'kmaw territories. The northern portion falls within Siknikt meaning 'drainage area' and the southern within Sipekne'katik, meaning 'area of wild potato/turnip' (Sable & Francis, 2012). The Minas Basin and its many tributaries provided abundant resources, facilitated travel, and supported the development of trade routes. The significance of the area is reflected in the prevalence of Mi'kmaw names for the area's various landscape features. For example, the name for Newville Lake is Qospemk, meaning 'at the lake'; the name for Blomidon Strait is Pli'kn, meaning 'the opening (as in broken beaver dam)'; the name for Cape Split is Plekteaq, meaning 'split by handspike'; Farrells River is known as Owokun, meaning 'shortcut or passage' and, finally, the name for Parrsboro is Taqamiku'jk, meaning 'crossing place' (Kelman Heritage, 2026).

A well-known ancient Mi'kmaw travel route connecting the Bay of Fundy and Cumberland Basin originates at Parrsboro and follows Farrells River north to River Hebert. The topography of this area is shaped by Ice Age glacial valleys, featuring a recessional moraine and carrying place separating the south-flowing Parrsboro drainage, and the north flowing River Hebert drainage. Near Newville Lake, the trail and the waterway align with what is known as the 'Boar's Back', a long, narrow esker that served as a natural raised highway above the marshy terrain. The travel route was later used by Euro-Canadians.

The region would have provided important hunting and harvesting grounds capable of supplying the Mi'kmaq with a variety of plants and animals, both terrestrial and marine. Shorelines and riverbanks are considered to represent areas of elevated archaeological potential for Mi'kmaw resources. Encampment and/or processing sites likely existed along watercourses in the region from Precontact through modern times. Information provided by KMK-ARD identified 56 traditional-use sites within 1 km of the PDA, including those used for hunting, fishing/aquatic harvesting, foraging, resource procurement and encampments.

Further evidence of the longstanding presence of the Mi'kmaq in the Parrsboro and Minas Basin region is preserved in the Mi'kmaw legend of Glooscap (Klooscap) and the giant beaver. According to the story, Glooscap lived at Blomidon and used the Minas Basin as a

beaver pond, with a dam extending across Cape Split. When the giant beaver became prideful, Glooscap broke the dam, releasing the waters (Sable & Francis, 2012). The dam is thought to represent the sand and gravel barrier that once separated the Minas Basin from the Bay of Fundy. As such, the story may preserve an oral account of a catastrophic natural event witnessed by people living in the region approximately 3,400 years before present (Shaw et al., 2010).

Historic records also document Mi'kmaq living in the region. Most notably, several nineteenth and early twentieth century maps identify the area around Newville Lake as 'Indian Village' (Church, 1873; Fletcher, 1905).

The desktop study identified 28 areas of elevated archaeological potential within the PDA, 23 of which were associated with possible Mi'kmaw sites. Three of these sites are identified as both Euro-Canadian sites and Mi'kmaw sites. The assessment of elevated potential was based on proximity to watercourses that intersected with the PDA and was based on available mapping. These areas of elevated archaeological potential are being field verified through pedestrian-based surveys (Kelman Heritage, 2026).

14.3 Effects Assessment

14.3.1 Potential Effects and Mitigation

Changes were implemented for the Project to minimize potential direct and indirect impacts on heritage and cultural resources, where reasonable, while meeting engineering and design constraints.

Direct and indirect effects of the Project on heritage and cultural resources could occur through several interconnected pathways. During construction of the Project, blasting and/or excavation will occur in some locations of the PDA, including excavation in some areas where drainage infrastructure will be installed to prevent flooding and ground subsidence. Fill will also be used in the PDA for developing access roads and turbine pads. These activities could damage artifacts not visible at the surface or underground in the PDA or could damage or obscure culturally significant Mi'kmaw resources. Restoration of the PDA during decommissioning of the Project could also damage and/or move artifacts not previously disturbed. Similarly, heritage features, such as historical foundations, may be discovered in the PDA and Indigenous cultural resources could be disturbed. As indicated in Table 14.1, Project activities can affect heritage and cultural resources. These potential effects consider the detailed design of the Project, but not the mitigations outlined herein.

Table 14.1 Potential Environmental Effects of the Project on Heritage and Cultural Resources

Project Activity	Potential Environmental Effects
	Effects on Archaeological, Heritage, and Cultural Resources
Construction	
Site Preparation	X
Access Roads Construction and Modifications	X
Material and Equipment Delivery and Storage	-
Infrastructure Installation	X
Restoration of Temporary Areas	X
Testing and Commissioning	-
Operation and Maintenance	
Turbine Operation and Maintenance	-
Road Maintenance	X
Power Line and Substation Maintenance	-
Vegetation Management	X
Safety and Security	-
Decommissioning	
Removal of Infrastructure and Site Restoration	X

X = Potential Interaction
- = No Interaction

Specific Project activities could adversely affect buried artifacts and archaeological or heritage features (including historical foundations and/or infrastructure) in the PDA.

- Site preparation involving earthworks could cause exposure of, or damage to, buried artifacts and heritage features.
- Site preparation activities, such as clearing and grubbing, can cause damage to surficial, unnoticed, artifacts and features.
- Construction and upgrades of access roads will introduce new material that could further cover or compact buried artifacts and heritage features.
- Site drainage and erosion during operation and maintenance can result in exposure or damage to artifacts and features that were undisturbed during construction activities.
- Site restoration activities involving earthworks could cause exposure of, or damage to, buried artifacts and heritage features.

The desktop archaeological assessment identified 28 areas of elevated archaeological potential, 23 of which were associated with possible Mi'kmaw sites. All 28 areas will be further investigated through field surveys. Based on these results, the overall conclusions

of the ARIA and the recommendations it makes, the PDA and turbine layout may need to be microsited to avoid these areas. If these areas, or parts thereof, cannot be avoided, subsurface assessments will be completed prior to construction at these areas.

All identified mitigation measures will be included in the Project-specific EPP and a Contingency Plan. These plans will provide information on response and communications should there be a suspected archaeological or heritage artifact or feature discovered during the Project life cycle.

Archaeological and heritage sites fall under the jurisdiction of the *Special Places Protection Act*, administered by NSCCTH and the Nova Scotia Museum. A Contingency Plan for discovery will be established prior to construction activities. The plan will contain elements of the province's Generic EPP for the Construction of 100 series highways (Nova Scotia Department of Transportation and Public Works, 2007) for archaeological discovery response.

- A chain of communications will be established for reporting a discovery that includes the environmental monitor, the Proponent, the Project Archaeologist, and NSCCTH.
- Should a possible archaeological or heritage resource be encountered during construction, all work will be halted immediately.
- Construction crews will flag off the area of concern, prevent public entry, and not attempt to move or remove any artifacts unless the integrity of those artifacts is threatened.
- The Project Archaeologist will conduct an initial investigation and, if necessary, report the findings to the relevant authorities. The Project Archaeologist will, at a minimum, contact the Curator of Archaeology, Nova Scotia Museum, and the Coordinator of Special Places at NSCCTH.
- Work activities at that location will not recommence until approval is given by NSCCTH.
- Should human remains be encountered, work shall immediately stop, and the RCMP will be notified. If the resources are suspected to be of Mi'kmaq origin, KMK will also be contacted.

14.3.2 Residual Effects

14.3.2.1 Archaeological and Heritage Resources

The desktop assessment was based on background research to identify areas of elevated potential for archaeological and heritage resources. There are risks, however, for encountering buried heritage features in low potential areas as well. The geographical extent of adverse effects will be isolated to the PDA.

If the 28 desktop-identified areas of elevated archaeological potential are confirmed through field surveys, further shovel testing at these locations will be conducted prior to the start of construction. After incorporating the results of the field surveys, ARIA shovel testing (if and where required), and application of mitigation measures, the magnitude of effects on archaeological and heritage resources will be minor. This residual effect will be

immediate, but possibly irreversible. The potential for a significant effect on archaeological and heritage resources and knowledge can be mitigated through field investigations and development of a Discovery Plan for reporting revealed artifacts and features.

14.3.2.2 Indigenous Cultural Resources

Upon completion of the MEKS report, based on its findings, the implementation of its recommended mitigation measures will help minimize adverse effects on Indigenous cultural resources.

With these measures in place, the residual effects of the Project on the ability of the Mi'kmaq of Nova Scotia to continue traditional land-use activities are expected to be minor, localized to the PDA, and reversible. Ongoing monitoring of hydrology, sediments, and species will further support the early identification and management of any unforeseen impacts. The final determination of significance will be informed by the review of the MEKS by KMK and NSCCTH, and additional mitigations will be implemented if required to ensure that residual effects remain not significant.

14.4 Monitoring

The results of the field assessments of the areas of elevated archaeological potential will determine how many of these areas overlap with the PDA. Following the submission of the final ARIA report, consultation with NSCCTH will determine whether there are areas of elevated archaeological potential that warrant archaeological monitoring during construction activities. NSECC will be provided with the acceptance letter from NSCCTH prior to completion of any disturbance in newly proposed areas. Recommendations provided by KMK will be reviewed and considered, and monitoring requirements will be implemented where appropriate in consultation with regulators and Indigenous communities.

15 Consideration of Cumulative Effects

15.1 Overview

Cumulative environmental effects refer to the combined impact of multiple stressors on the environment over time. Rather than considering individual impacts in isolation, cumulative effects assessments look at the overall consequences of multiple overlapping human activities or undertakings on VECs.

The cumulative effects assessment identifies existing, planned, and reasonably foreseeable projects and activities among which environmental effects could overlap in time and space with those of the proposed Project. Where such overlap is recognized, the potential for cumulative effects and requirements for additional mitigation measures are discussed.

Cumulative effects assessment for this EA focuses on residual effects of Project activities that may interact with the residual effects of other projects and activities, including those that have shaped the existing environment of the LAA and RAA. While the existing environment for each VEC may itself be a result of cumulative effects that have occurred through historical activities, potential additive or synergistic effects of residual Project-related effects are considered.

15.1.1 Regulatory Context

Assessment of the potential for cumulative environmental effects considers relevant provincial and federal legislation and guidelines:

- Nova Scotia *Environment Act*
- Nova Scotia EA Regulations
- A Proponent's Guide to Environmental Assessment (NSECC, 2025)

15.1.2 Boundaries

As outlined in Chapter 4 (Assessment Methods and Initial Screening), an RAA boundary has been established for VECs where potential effects of this Project may interact with those of other activities, resulting in cumulative effects. The boundaries of the RAAs are illustrated

in Figure 15.1, Appendix A. While some residual effects have been identified, most are expected to be contained in the LAA of the respective VEC and considered to be short-term with low significance. The following RAAs have been defined:

- Atmospheric Environment
- Air Quality – Nova Scotia's northern air zone assessed in the AQMS by ECCC
- Ambient Light – 5 km
- Acoustic Environment - 2 km from PDA
- Geophysical – No RAA
- Aquatic – Secondary Watersheds: River Hebert, Diligent River, Ramshead River
- Flora – Contiguous natural habitat areas
- Wetlands – 1 km surrounding PDA
- Terrestrial Wildlife – Concentration area occupied by the Colchester/Cumberland Mainland Moose subgroup
- Bats – 5 km
- Birds – 5 km
- Population and Economy – Cumberland County
- Land Use and Value, Visual Landscape, and Recreation and Tourism – 5 km
- Electricity and Other Utilities – Cumberland County
- Human Health – No RAA
- Transportation – Cumberland County
- Heritage and Cultural Resources – No RAA
- Indigenous Cultural Resources – Mi'kma'ki districts Sipekne'katik and Siknikt

15.1.3 Assessment Methodology

The assessment of potential cumulative environmental effects generally follows the approach outlined in the *Policy Framework for Assessing Cumulative Effects under the Impact Assessment Act*, in the Practitioner's Guide to the *Impact Assessment Act* (Impact Assessment Agency of Canada (IAAC), 2023).

The cumulative effects assessment approach is similar to and builds upon the methods implemented in this EA to identify and evaluate the Project-specific environmental effects presented in Chapter 4 (Assessment Methods and Initial Screening).

The scope of the cumulative environmental effects assessment is based on the following:

- Identification of residual environmental effects of the Project that may occur even after implementation of avoidance and mitigation measures. Residual environmental effects of the Project that have potential to interact with effects of other projects or activities and result in a cumulative environmental effect.
- Identification of VECs that will be carried through the cumulative environmental effects assessment (i.e., those VECs that are likely to have residual environmental effects).
- Defining the spatial and temporal boundaries within which cumulative effects could potentially occur. Boundaries are primarily based on ecosystem-centred spatial and

temporal boundaries; where such boundaries are unclear or do not exist, activity-centred or administrative and technical boundaries are applied.
- Identification of other projects and activities that are considered in the cumulative environmental effects assessment. Past and existing projects and/or activities are identified based on evidence available from reliable resources, such as government databases or published reports. Future projects and activities are identified if they are registered or recently approved under the NSECC EA registry, identified in a publicly available development plan, or officially announced by a proponent.

Analysis of potential cumulative environmental effects follows a similar pathway of effects assessment that was used to evaluate the Project-specific environmental effects. Several resources were consulted to identify other activities and upcoming projects in the region whose environmental effects may interact with those of the Project:

- NSECC Environmental Assessment Project Data Viewer Gallery (NSECC, 2026)
- Canadian Impact Assessment Registry (IAAC, 2026)
- Common Project Search tool (https://common-project-search.canada.ca/)
- Mineral Resources Land Use Atlas (https://fletcher.novascotia.ca/DNRViewer/?viewer=MRLU)
- Public and Indigenous engagements
- Onsite field studies

The following definitions are used to describe the Project contribution to cumulative effects (Table 15.1).

- **Low**: The Project may contribute minimal change to cumulative effects when considered alongside the combined effects of other existing projects, undertakings, and activities in the RAA.
- **Moderate**: The Project may contribute noticeable change to cumulative effects when considered alongside the combined effects of other existing projects, undertakings, and activities in the RAA, but does not compromise overall system(s) integrity.
- **High**: The Project may contribute change to cumulative effects that degrades overall system function and/or sustainability when considered alongside the combined effects of other existing projects, undertakings, and activities in the RAA.

The following definitions were used when describing the degree of cumulative effects of all projects, undertakings, and activities.

- **Low**: Cumulative effects from projects, undertakings, and activities in the RAA on the VEC are limited in extent and intensity, reflecting relatively low overall disturbance. The VEC remains largely intact and functional in the RAA.
- **Moderate**: Cumulative effects from projects, undertakings, and activities in the RAA on the VEC are evident and measurable. While the VEC remains functional in the RAA, localized or partial reductions in condition are apparent.
- **High**: Cumulative effects from projects, undertakings, and activities in the RAA on the VEC are widespread and pronounced. The VEC is already near or past acceptable

thresholds, such that further decline will threaten long-term viability or sustainability of the VEC.

15.2 Projects and Activities

Compared with other counties in the province, Cumberland County appears to have had fewer projects subject to environmental assessments, as per the NSECC Environmental Assessment Projects Dashboard (NSECC, 2026). Coal mining was historically the region's principal industry; however, following mine closures, forestry and agriculture have become key economic drivers in the region (Municipality of Cumberland et al., 2021).

15.2.1 Wind Projects

Key wind power projects that have been developed or proposed in the vicinity of the PDA include:

- Springhill, two turbines, 2.1 MW, Cumberland County
- Amherst Wind, 15 turbines, 40 MW, Cumberland County
- Amherst Community Wind Farm, two turbines, 6 MW, Cumberland County
- Town of Amherst, one turbine, 0.05 MW, Cumberland County
- Weschester Wind Project, 12 turbines, 50 MW, Cumberland County
- Higgins 3.5 MW Wind Power Project (also called Stevens Wind), three turbines, 3.5 MW, Cumberland County
- Higgins Mountain Wind Farm, 17 turbines, 100 MW, Cumberland County
- Pugwash Wind Farm, 12 turbines, 33 MW, Cumberland County
- New Prospect Wind, unknown number of turbines, 150 MW, Cumberland County*
- Martock Ridge Community Wind Project, three turbines, 6 MW, Hants County
- Ellershouse Wind Farm Project, seven turbines, 16.1 MW, Hants County
- Ellershouse Wind Farm Expansion Project, seven turbines, 16.4 MW Hants County
- Ellershouse 3 Wind Farm Project, 12 turbines, 66 MW, Hants County
- Benjamins Mill Wind Project, 28 wind turbines, 150 MW, Hants County

*Proposed wind project

The closest wind energy projects to the PDA are the Springhill Wind Project, approximately 29 km to the northeast of the closest Project turbine (as shown on Figure 15.2, Appendix A), the three wind projects in Amherst, approximately 40 km to the north of the closest Project turbine, and the Weschester Wind Project, approximately 60 km to the northeast of the closest Project turbine.

15.2.2 Other Projects and Utilities

In addition to the wind projects in the region, another notable energy development that underwent an environmental assessment is the Tidal Energy Demonstration Project. The Tidal Energy Demonstration Project is a tidal energy project owned and operated by Fundy

Ocean Research Centre for Energy (FORCE). It is located close to Black Rock in the Minas Passage of the Bay of Fundy, approximately 10 km west of the community of Parrsboro. The Project was registered and approved in 2009. The proposed project involved constructing and operating a facility to test and demonstrate in-stream tidal devices to assess their potential to generate electricity. FORCE operates a visitor centre on West Bay Road with interpretive exhibits, interactive displays, a small community room, and a space for onsite meetings and research (FORCE, n.d.).

Another larger Project in the area is the Wasogonatl Transmission Line, i.e. the NS-NB Reliability Tie. The Wasogonatl Transmission line is a new 345 kV high-voltage alternating line that twins an existing line between the two provinces. At its closest point to the Project, it is approximately 50 km northeast, just above Oxford, NS. This Project is currently under construction and is expected to be completed late 2027 to 2028.

The transmission line that the Project will tie-into is the largest transmission line closest to the PDA. It is a 69/138 kV line that runs from Parrsboro into the Amherst area.

15.2.3 Past and Existing Land Use and Activities

Past and existing land use and activities are described in Chapter 13: Socio-economic Environment. The following sub-sections provide a brief synopsis of those that could result in cumulative environmental effects in combination with residual environmental effects of the Project.

15.2.3.1 Natural Resources Industry

As summarized in Chapter 13 (Socio-Economic Environment, Section 13.2.2), historical and current forest harvesting and quarrying activities occur in the Project RAA. The majority of the lands on which the Project is situated are owned and harvested by a local forestry company, C. Ernest Harrison & Sons Ltd. These activities have led to forest loss and fragmentation. As observed through the Global Nature Watch tree cover loss tool (Global Nature Watch, 2026), a substantial amount of forest has been harvested in the Project RAA. Forestry activities have influenced the present condition of the RAA, characterized as predominantly fragmented forests, harvested zones, and forestry roads that create edge environments. Figure 15.3 (Appendix A) illustrates the area of forest loss that has occurred between 2001 and 2025 in the area, as documented through satellite imagery and the Global Nature Watch's Tree Cover Loss data (Global Nature Watch, 2026).

The Project RAA overlaps areas that have undergone mineral exploration over the years, resulting in abandoned mine openings, particularly near Springhill, and active quarries (Figure 15.2, Appendix A). Coal mining was a critical industry for the region in decades past, and although the coal mines in the region have closed, quarrying still occurs in the region.

There is a quarry operated by C. Ernest Harrison & Sons located on their forestry lands that are participating with the Project, immediately adjacent to one of the proposed Project

access roads. The closest quarry with publicly available information is the OSCO Aggregates quarry, approximately 10 km northeast of the closest Project turbine. The closest quarry expansion project that has required an environmental assessment to the PDA is the Williamsdale Quarry Expansion Project, approximately 42 km from the closest Project turbine. The second closest quarry expansion that has required an environmental assessment to the PDA is the Westchester Quarry Expansion project, approximately 51 km from the closest Project turbine.

These natural resource extraction activities, particularly forestry, have resulted in a highly visible cumulative effect of land disturbance (Figure 15.3, Figure 15.2, Appendix A) over the past two decades. These industries will persist and potentially increase during the lifetime of the Project.

15.2.3.2 Transportation

The Project RAA contains multiple existing public roads that access the nearby community of Parrsboro, including Highway 2 and Highway 209 (Figure 13.1, Appendix A). Highway 209 is a highway that runs from the community of Parrsboro to the Advocate and Cape Chignecto area. Highway 2 connects the community of Parrsboro and much of Cumberland County to the Trans-Canada highway (Highway 104), and the rest of the province. Highway 2 will serve as the primary transportation route to access the respective collector roads for the projects in the RAA planned or under development (Figure 15.1, Appendix A).

15.2.3.3 Recreation and Tourism

An extensive network of all-season trails used for hiking, ATVs, and snowmobiles has been established in the RAA and will continue to be used during the lifespan of the Project (Figure 13.1, Appendix A). These trails facilitate access to the RAA for hunting, fishing, and other recreational activities, and there is heavy ATV and snowmobile presence in the RAA (see Chapter 15: Socio-Economic Environment).

15.3 Cumulative Effects Assessment

15.3.1 Potential Cumulative Effects and Mitigation

Table 15.1 presents the expected interactions that may lead to cumulative effects of the Project in combination with other projects and activities that are described in Section 15.2. The Project contribution to cumulative effects describes the individual contribution of the Project to cumulative effects in the RAA. The degree of cumulative effects of all projects and activities characterizes the combined effects of undertakings, projects, and activities across the RAA.

Table 15.1 Screening of Potential Cumulative Environmental Effects

VEC	Dominant Cumulative Effects Drivers	Dominant Spatial and Temporal Nature	Potential Cumulative Effects	Potential Interaction with Other Projects and Activities	Project Contribution to Cumulative Effects	Degree of Cumulative Effects of all Projects, Undertakings, and Activities	Mitigation
Acoustic Environment	Proximity of projects	2 km, long-term	Construction and turbine noise	Proposed neighbouring wind facility, recreational activities, natural resource harvesting, traffic	Low	Low, no threshold exceedances	Conventional project-specific
Ambient Light	Proximity of projects	5 km, long-term for turbine lights	Lighting from turbines	Proposed neighbouring facility	Low	Low, no threshold exceedances	Conventional project-specific
Flora	Connecting habitat	Contiguous natural habitat	Loss of habitat and introduction of invasive species	Forestry, recreational activities, proposed neighbouring wind facility	Low	Low	Conventional project-specific
Wetlands	Connecting hydrology	1 km	Loss of wetland habitat	Forestry, recreational activities, proposed neighbouring wind facility	Low	Low, wetland alteration permitting and restoration will be completed	Conventional project-specific
Terrestrial Wildlife	Connecting habitat	Colchester/Cumberland Mainland Moose subgroup	Behavioural disturbance and habitat loss	Forestry, recreational activities, off-highway vehicles (e.g., snowmobiles, all-	Low	Moderate to High, Mainland Moose are endangered in Nova Scotia, and the loss of one or	Mitigation and monitoring of the Project and the proposed neighbouring wind project

VEC	Dominant Cumulative Effects Drivers	Dominant Spatial and Temporal Nature	Potential Cumulative Effects	Potential Interaction with Other Projects and Activities	Project Contribution to Cumulative Effects	Degree of Cumulative Effects of all Projects, Undertakings, and Activities	Mitigation
		concentration area, long-term		terrain vehicles), proposed neighbouring wind facility.		more breeding individuals is significant on the declining population.	
Bats	Mobile ecology	5 km	Collision and habitat loss	Forestry, proposed neighbouring wind facility	Low	Low	Mitigation and monitoring of the Project and the proposed neighbouring wind project
Birds	Mobile ecology	5 km	Collision and habitat loss	Forestry, recreational activities, proposed neighbouring wind facility	Moderate	Low	Mitigation and monitoring of the Project and the proposed neighbouring wind project
Population and Economy	Multiple contributors	North Shore Region of Nova Scotia	Monetary benefits to residents and municipality	Forestry, proposed neighbouring wind facility	Moderate	Low	Positive effect; no mitigation required
Visual Landscape	Multiple receptors	5 km	Change in vista	Forestry, proposed neighbouring wind facility	Low	Moderate	Conventional project-specific
Electricity and Other Utilities	Multiple users	Cumberland County	Strengthened grid resource and protection	Proponent agreements with NSPI.	Low	Low	Positive effect; no mitigation required
Transportation	Multiple users	Cumberland County	Traffic disruption	Forestry, proposed neighbouring wind facility	Low	Low	Conventional project-specific

VEC	Dominant Cumulative Effects Drivers	Dominant Spatial and Temporal Nature	Potential Cumulative Effects	Potential Interaction with Other Projects and Activities	Project Contribution to Cumulative Effects	Degree of Cumulative Effects of all Projects, Undertakings, and Activities	Mitigation
Recreation and Tourism	Multiple users	5 km	Disruption and possible temporary trail detours	Forestry, proposed neighbouring wind facility	Low	Low	Conventional project-specific
Heritage and Cultural Resources	Combined areal span	Mi'kma'ki districts Sipekne'katik and Siknikt	Interruptions to access of hunting/ fishing areas	Forestry, proposed neighbouring wind facility	Low	Low	NSCCTH review of the ARIA will determine if mitigation measures are required for heritage resources. NSCCTH and KMKNO review of the MEKS will determine if mitigation measures are required for Indigenous cultural resources

15.3.1.1 Atmospheric Environment

The RAA for ambient light comprises an extent of 5 km around the PDA, the RAA for acoustic environment comprises an extent of 2 km around the PDA, and the RAA for air quality encompasses Nova Scotia's northern air zone. The RAA for air quality includes other wind projects within proximity to the Project.

Project construction will partially coincide with at least one other wind project in the vicinity of the Project, the New Prospect Wind project. Construction for this project is anticipated to begin in 2029 and 2030 (Elemental Energy, n.d.). Individual Project effects for non-GHG emissions of noise, light, and dust are not expected to be significant. Noise modelling (see Chapter 5 Atmospheric Environment) for the Project determined that noise will not exceed provincial guidelines at Project receptors (Appendix D). As such, the potential for cumulative effects on the acoustic environment from the Project with neighbouring wind power projects is negligible.

The Project will contribute to a reduction in GHG emissions for the province, supporting Nova Scotia's climate action targets. If selected, the Project will supply renewable energy to the provincial grid through the Green Choice Program (Government of Nova Scotia, 2025); the Project will then enable large-scale electricity customers to purchase up to 100% of their electricity from locally generated renewable sources. This initiative provides a direct pathway for organizations to decarbonize their operation and demonstrate environmental leadership, while also encouraging further investment in clean energy infrastructure across Nova Scotia. The Green Choice Program supports Nova Scotia's 2030 Clean Power Plan, which sets a goal for the province to generate 80% of its electricity from renewable sources by 2030.

By integrating the Project output into the provincial grid, Nova Scotia can reduce its reliance on fossil fuels, thereby lowering overall GHG emissions and contributing to improved air quality and public health. Additionally, the program is designed to enhance grid resilience, providing reliable access to clean power for participating customers. The cumulative effect of these renewable energy projects positions Nova Scotia as a leader in Canada's transition to a sustainable energy future, supporting both provincial and national climate commitments.

The net effects of the renewable energy projects in Cumberland County and surrounding areas will result in a positive cumulative effect to the atmospheric environment that needs no mitigation beyond that already outlined in Chapter 5: Atmospheric Environment.

15.3.1.2 Flora

The RAA for flora is the contiguous habitat where fragmentation could result in loss of rare species and flora habitat as well as facilitate the introduction and spread of invasive species. With careful detailed design and micrositing of Project infrastructure to avoid sensitive habitats and active habitat enhancement efforts, effects on terrestrial flora are

expected to be not significant. Vegetation around the turbine base and road edges will naturally regenerate, which will offset the long-term loss of vegetation following construction.

15.3.1.3 Wetlands

The Project is located in an active forest management area. Current and historic use of the 1 km RAA for forestry and recreational offroad vehicle use has visibly altered wetland habitat. Forestry activities have resulted in a loss of wetland habitat or altered wetland function through vegetation clearing and compaction by machinery. Several wetlands in the LAA that may be impacted by the Project have been harvested in other areas. Where required, Project-related loss of wetland habitat and function will be offset through wetland compensation. The residual impacts of the Project on wetland habitat will be confined to the PDA. Hydrology will be maintained, thereby minimizing the potential for long-term effects on wetland function or the contribution of the Project to cumulative impacts in the RAA.

15.3.1.4 Terrestrial Wildlife (Mainland Moose)

The Project RAA for terrestrial wildlife incorporates area occupied by the Colchester/Cumberland subgroup of Mainland Moose that is identified as Core Habitat in the Mainland Moose recovery plan (NSDNR, 2021). Forestry and other ongoing natural resource extraction, renewable energy projects, electrical infrastructure development, road building, and recreational activities like ATV and snowmobile use have all contributed to fragmentation and habitat loss of Mainland Moose Core Habitat. Forest clearing and road building affect wildlife movement, while also increasing wildlife mortality and injury (from collisions), and creating sensory disturbances from an increase in light and noise. Forest clearing reduces cover habitat for thermoregulation and shelter; however, it can also encourage foraging habitat through natural regeneration. Forest clearing and road construction can allow a larger number of White-tailed Deer to access moose habitat, which heightens the risk of disease transmission. Increased accessibility to the forested areas of the RAA could make illegal moose poaching more prevalent.

The provincial recovery plan for Mainland Moose states that the loss of any breeding individuals from a depressed population is significant (NSDNR, 2021). Therefore, cumulative effects across the area encompassing the Colchester/Cumberland subgroup of Mainland Moose that result in the loss of at least one breeding individual should be deemed as a high effect, before implementation of mitigation strategies.

It is not expected that the Project alone will result in the loss of an individual(s), particularly after planned mitigation strategies, as discussed in Chapter 10 (Terrestrial Wildlife). These mitigations include utilizing mainly existing roads/trails where possible. Areas of high-quality habitat for moose were avoided wherever possible, such as avoiding mature forest and wetlands. Additionally, buffers around wetlands and watercourses will be maintained to support habitat connectivity.

Although individually, the Project may not pose a significant threat to Mainland Moose, the cumulative effects from the Project, existing and historic forestry activities, mineral resource extraction activities, road and trail construction, and recreational activities are expected to be moderate to high. These projects, undertakings, and activities have resulted in changes in Mainland Moose habitat across the RAA. Additionally, although there is little recent evidence available to support this, with the known risks to Mainland Moose resulting from these projects, undertakings, and activities, it is likely that cumulative effects have resulted in the loss of individuals. The loss of Mainland Moose has been experienced on a regional scale, in the Colchester/Cumberland subgroup, and beyond, on a provincial scale.

Per EA Approval conditions, monitoring at wind farms in the RAA will be conducted for a minimum of two years once their respective turbines become operational and the monitoring approach must be approved by NSDNR and ECCC-CWS. Monitoring efforts conducted for the Project will provide information of the residual effects on Mainland Moose for the regulatory agencies.

15.3.1.5 Bats

The RAA for bats is an extent of 5 km around the PDA. Low levels of bat activity were detected in the LAA during baseline monitoring—the majority of which were identified as *Myotis* species. Provincial and federal recovery strategies recognize anthropogenic disruptions as being additive effects to the challenges of WNS. Ongoing natural resource industry activities, the development of renewable energy projects, and electrical infrastructure in the region could increase the risks of collisions with turbines and power lines as well as habitat loss and fragmentation.

After implementation of mitigation measures in the LAA during Project activities, effects are expected to be minor. Cumulative effects on bat populations of the RAA will be detected by monitoring plans to be approved by ECCC-CWS and NSDNR for the Project. Results of the post-construction monitoring program will be submitted to the appropriate regulatory agencies as required.

Additional surveys or mitigation measures may be identified in consultation with regulators following review of the results. Should post-construction monitoring indicate that further mitigation is needed, an Adaptive Management Plan will be prepared in consultation with NSDNR and ECCC-CWS.

15.3.1.6 Birds

The RAA for birds is an extent of 5 km around the PDA. Similar to the effects on other wildlife, clearing vegetation leads to a loss of habitat for some birds while simultaneously providing habitat for species favouring edge or open environments. While ongoing natural resource industry and the development of renewable energy projects and electrical infrastructure in the area will continue to change habitat and potentially alter avian

behaviour, some fragmentation is already evident, and the existing environment is a result of historic disturbance in the RAA.

A recent report states that wind power projects have a relatively small impact on bird populations compared to those of other human-related hazards and the use of fossil fuel sources (Murphy and Anderson, 2019). The Project layout is planned to avoid sensitive areas, make use of existing access roads, and place turbines mainly in habitats that are already disturbed whenever possible.

Through implementation of mitigation measures during Project activities, expected effects are expected to be minor to moderate. Cumulative effects on bird populations of the RAA will be detected by monitoring plans to be approved by NSDNR and ECCC-CWS for the Project and other nearby wind projects. Data sharing between the Proponent and other wind developers in the RAA, detailed above in 15.3.1.4 can help inform and plan post-construction monitoring programs. Should post-construction monitoring indicate that further mitigation is needed, an Adaptive Management Plan will be prepared in consultation with NSDNR and ECCC-CWS. Monitoring efforts across nearby wind development projects will provide a broader picture of effects on birds for regulators than that of a Project-specific program.

15.3.1.7 Socio-economic Environment

For some socio-economic components, the RAA spans 5 km around the PDA; for others, cumulative effects may occur at the county level.

The Project will be submitted to the Green Choice Program, which aims to contribute to greening the provincial grid by providing clean energy to Nova Scotia ratepayers. As described in Chapter 1, the Green Choice Program will allow 11 of the largest energy consumers in the province to procure up to 100% of their energy from renewable sources. This initiative will help to reach the province's green energy targets and reduction of GHG emissions (Government of Nova Scotia, 2025). These goals include generating 80 % of the provincial grid by renewables by 2030 and eventually leading into a net-zero emissions future by 2050 (NSDNR, 2023). On a local scale, the Project will also support the County of Cumberland in reducing their corporate and community GHG emissions and promoting local renewable energy initiatives. achieving its goal for a 35 % reduction in GHG emissions by buildings in the county by 2031 and their goal in supporting local renewable sources of energy (Efficiency Nova Scotia, 2021).

Project impacts to the local population and economy will be positive. During construction, local businesses may be stimulated from the influx of contractors. Additional economic contributions to the Municipality of the County of Cumberland from the Project will include the following (as outlined in 15.3.1):

- $39 million in municipal taxes during the 25-year life of the Project
- Annual landowner royalties

- A Community Benefits Fund with an annual allocation of $1,000/MW each year of operation
- Four $2,000 bursaries to fund scholarships for residents of the Municipality who would like to enter training or education programs that would be applied to the construction or operation of a wind energy facility
- Employment of approximately 200 to 250 workers during the construction phase and a staff of 3 to 8 (including part-time and full-time employees)

Cumulative effects to the visual landscape from the Project will be minor, as the region's topography makes Project turbines only visible from select viewpoints. Turbines from other existing Projects are not visible within the PDA. Furthermore, impacts to the vista are based on individual preference. Based on engagement sessions in the area, most residents did not express concern for the visual impact of the Project, in fact, turbines even invoked positive feelings for many.

Traffic interruptions resulting from the transportation of turbine components could be cumulative if construction at other sites coincides with that of this Project, particularly on Highway 2 which will serve as the major transportation route for the turbines. However, these potential effects, if they occur, will be isolated to the short-term construction phase.

The Project's construction could cause interruptions to access to the area temporarily, which could coincide with other temporary access interruptions due to the construction of the New Prospect Wind Farm. This could have short-term impacts on recreational activities in the region, but through appropriate Project planning and mitigations, impacts should be low.

Overall, the effects of this Project and other renewable energy projects in Cumberland County and the surrounding counties will result in a positive cumulative effect to the socio-economic environment of the province that needs no mitigation beyond that already outlined for the VEC's LAA.

15.3.2 Significance

The Project will result in some residual environmental effects similar to those of other historic and/or current activities already evident in the area. Cumulative effects for this Project are not expected to be significant after proper planning and mitigation measures are established for this and other projects under development in the RAA. Monitoring programs described for biological VECs such as moose, birds, and bats will facilitate early detection of adverse effects and inform further mitigation, should it be necessary.

16 Effects of the Environment on the Project

Natural hazards are defined herein as the effects of the environment on the Project and can arise from natural phenomena such as extreme weather events or natural disasters. These have the potential to affect the Project components, schedule, operation, maintenance, and/or costs. The Project has been designed to withstand existing environmental conditions and account for projected climate change. All phases of the Project, however, are subject to effects such as delays in construction and decommissioning as well as changes in power generation and requirements for infrastructure repairs during operation and maintenance.

The following sections outline natural hazards that could impact project infrastructure.

16.1 Storms and Extreme Winds

16.1.1 Hurricanes and Tropical Storms

Nova Scotia is in the path of storms that move up the Atlantic coast. Based on historical records (1981-2026) from the National Oceanic and Atmospheric Administration (NOAA), the area within a radius of 60 nautical miles of the PDA has been impacted by 18 tropical storms and hurricanes in the past. Notable examples include Hurricane Earl in 2010 (making landfall as a Category 1) and Hurricane Juan in 2003 (making landfall as a Category 2). Both events caused widespread damage to local infrastructure due to high winds and heavy rainfall.

Tropical storm systems, such as hurricanes, originate over warm tropical oceans and typically lose energy as they move into cooler waters or make landfall. As sea surface temperature continues to rise, hurricanes may become more intense due to increased energy to fuel storm development. Warmer ocean water could also enhance the atmosphere's ability to hold moisture, leading to heavier rainfall during the events (Knutson et al., 2019).

Therefore, hurricanes and tropical storms that bring high winds and torrential rains are expected to increase in intensity with climate change. In particular, there is a projected

increase in the frequency of Category 4 and 5 hurricanes in the Atlantic, and the latitude of maximum intensity may move northward (Knutson et al., 2019; ClimateData.ca, 2024a) (see Figure 16.1). However, uncertainty remains high, and confidence in projected changes varies among studies. As a result, future hurricane projections should be interpreted with caution.

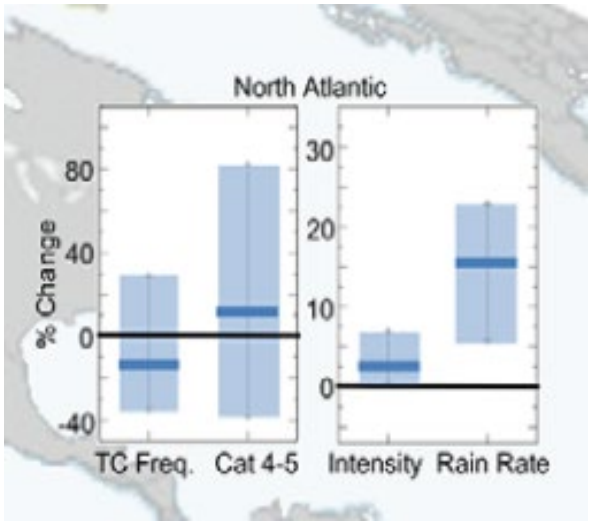


Figure 16.1: Projected changes in frequency and intensity of future tropical storms at 2°C Global Warming (Knutson et al., 2019).

16.1.2 Nor'easters

Winter storms, commonly referred to as nor'easters in Atlantic Canada, are characterized as strong winds and heavy snowfall and are typically most intense in Atlantic Canada between November and March (Plante et al., 2014). Historically, Nova Scotia has experienced high year-to-year variability in the frequency and intensity of winter storms. White Juan, an intense blizzard that occurred in 2004, remains as one of the most severe winter storms in recent history. Historical trend analyses indicate that the strongest nor'easters have become stronger, with both the maximum wind speeds and hourly precipitation rates increasing since the 1940s (Chen et al., 2025).

An upwards shift of average temperature and a corresponding shift in winter precipitation from snow to rain are expected to reduce overall snowfall in the region. However, extreme winter storms are still expected to occur in Atlantic Canada, owing to the potential northern shifting of storm tracks. Projections depict that intense high-impact snowfall events can be expected to continue to occur with warming surface temperatures; however, there is high uncertainty due to high year-to-year variability (McCray et al., 2023).

16.1.3 Extreme winds

Typically, extreme winds tend to occur during the storms described above or in other situations, such as other types of extratropical cyclones and thunderstorms. As storm intensity is projected to increase under climate change, wind speeds during these events

may also increase. Projections for extreme design wind pressures (1-in-50-year) could increase by up to 10% and 20% by the 2050s and 2080s, respectively (Cannon et al., 2020). However, there is considerable uncertainty in both historical trends and future projections of extreme wind events in North America.

Although turbines are built to withstand high winds, operation is typically paused at maximum wind speeds in the range of approximately 22 to 30 m/s (depending on the turbine model), which can be experienced during large storm events; this may negatively affect energy production and revenue. Rapid changes to wind direction caused by storm events could cause potential yaw system stress, stress to blades due to changes in loading, and structural stress due to dynamic loading (Kapoor et al., 2020).

High wind loads can also present stress to other project infrastructure such as the operation and maintenance building and exposed mechanical and electrical equipment such as overhead power lines. Pressures from high wind loads on main structural systems and secondary components of building (e.g., envelope) and exterior equipment (e.g., poles, lighting) can result in damages and potential impacts to operation such as loss of primary power. The most frequent weather-related power outages in Nova Scotia are caused by downed trees and branches from high winds contacting power lines (NSPI, 2024). However, more frequent and intense storm events resulting in extreme high winds may result in an increased risk to infrastructure.

16.2 Extreme Precipitation and Flooding

As described in Section 7.3.1, watercourses and waterbodies have been identified within or adjacent to the PDA. Potential flooding mechanisms affecting the PDA include extreme precipitation events and rapid snowmelt. Flooding may occur as fluvial flooding, which occurs within watercourses and their floodplains. Given the extensive network of watercourses across the site (approximately 81), the PDA may be directly exposed to fluvial flooding hazards. Flooding may also occur as pluvial flooding, which results from intense rainfall that exceeds the capacity of natural drainage systems and causes surface water accumulation.

16.2.1 Extreme Rainfall

Significant runoff resulting from extreme rainfall events can cause erosion of access roads and ditches, and increase scour around culverts and equipment pads. Flooding in the PDA can also affect operation and maintenance through impacts to site and infrastructure access, and damages to the operation and maintenance building or other site infrastructure that require repairs.

Rainfall behaviors are related to temperature, as a warmer atmosphere can hold more moisture. Therefore, increased temperature trends can translate into an increase in rainfall

duration and intensity. Additionally, rainfall dynamics are related to large-scale circulation and storm tracks, such as hurricanes and winter storms that can bring heavy precipitation, as described in the section above.

Precipitation intensity is projected using a 'temperature scaling' approach at a rate of approximately 7% with each degree of warming for temperatures below 12°C and 14% for temperatures above 12°C (Westra, et al., 2014). It is projected that the intensity of extreme rainfall will likely increase by approximately 20% and 45% by the 2050s and 2080s, respectively.

16.2.2 Snowmelt

Temperature fluctuations due to warmer winter temperatures could result in increased winter rain and rain-on-snow events. Potential impacts to snowpack conditions include the following:

- Increased flood conditions and pooling of water on trails
- Increased melting, thinner snowpack, and decreased snow retention
- Increased frequency of wet, slushy, or icy conditions

These conditions can introduce water into substations or around collector lines, potentially causing localized damage such as short-circuiting or corrosion on exposed components. Underground electrical equipment is typically designed to be waterproof under normal conditions; however, prolonged or excessive surface water accumulation near access points, vaults, or joints could lead to water ingress and localized equipment risk.

According to the recently published Canada's Changing Climate Report (CCCR) (ECCC, 2026), warmer temperatures are expected to lead to earlier occurrence of snowmelt, rain-on-snow events, and ice jam breakups, resulting in earlier streamflow-related spring floods. However, their future frequency remains uncertain because of the interactions among rising temperatures, reduced snow cover, and the complex dynamics of snowmelt-related floods.

16.3 Extreme Temperatures

During the period of 1991-2020, a maximum daily temperature of 31.4°C in 2016 and a minimum daily temperature of –31.5°C in 1993 were recorded at the Parrsboro Weather Station.

Climate change is expected to have the following effects on extreme temperatures in Atlantic Canada (Cohen et al., 2019):

- Extreme high temperatures will increase.
- Heatwaves will become more frequent, longer and more intense.
- Extreme low temperatures will become less severe.

According to ClimateData.ca (2026), the number of days with temperature below -25°C is projected to decline to zero beginning in the near-term. However, the annual number of days exceeding 30°C within the PDA is projected to increase from an average of 0.36 days per year during the 1991-2020 period to approximately 14 days per year by the 2050s and 44 days per year by the 2080s under a high-emission scenario (Climatedata.ca, 2026). As a result, extreme cold events are expected to become less frequent, while extreme heat events are projected to occur more often.

Extreme temperatures can affect the operation of wind turbines when conditions exceed operational design ranges of approximately -30°C to +40°C (Nordex, 2025). They can also create operation and maintenance hazards for personnel, increasing the risk of heat-related illnesses (e.g., heat stroke) or cold-related conditions (e.g., hypothermia). These conditions can also lead to higher operation and maintenance costs due to increased energy use for cooling buildings, with costs expected to rise as climate extremes intensify.

16.4 Average Wind

According to the CCCR (ECCC, 2026), trends in annual average surface wind speeds across Atlantic Canada are inconsistent, partly due to inconsistency between observational data products. However, a statistically significant decline in average summer wind speeds has been observed (ECCC, 2026).

In general, climate models project a decrease in average near-surface wind speeds across Canada (ECCC, 2026). However, agreement among climate models is relatively low, resulting in considerable uncertainty and limiting confidence in future wind projections.

A reduction in average wind speeds could lead to a corresponding decrease in wind energy generation potential, which should be considered in the assessment of long-term project performance and energy production.

16.5 Snow

Warming temperatures are expected to result in an overall decrease in snowfall, more precipitation falling as rain instead of snow, changes in snow density (i.e., wetter snow), and a shortening snow season caused by late snowfall and early snowmelt. Abnormal years with high snowfall are still expected to occur, as mentioned in Section 16.1.2.

16.5.1 Snowfall

The annual snowfall amount and annual number of days with snowfall have decreased in Nova Scotia due to the warming temperatures (ECCC, 2026). As climate change progresses, average and minimum winter temperatures as well as winter precipitation are projected to

increase over time. The warming climate continues to negatively impact snowpack, with more frequent seasonal snow melt events, later timing of onset of snow cover in fall/winter and earlier spring melt, and the formation, duration, depth, and quality of snowpacks over time. Potential impacts to snowpack conditions due to warming temperatures include the following:

- Increased pooling of water on trails and access roads
- Slushy or icy conditions on trails and access roads
- Thinner snowpacks
- More frequent melting episodes
- Decreased snowpack accumulation and retention
- Increased snowpack density

Impacts to snowpack conditions may lead to an increased frequency of inactive trails/ access roads, temporary closures, and maintenance requirements.

16.5.2 Snow Load

An increase in winter rainfall events, including rain-on-snow events, is expected in the Project region over time (NSECC, 2022).

The 1-in-50-year snow load, used to design infrastructure such as roofs to withstand snow loads, is expected to decrease by approximately 45% by the 2050s and 65% by the 2080s (see Figure 16.2).

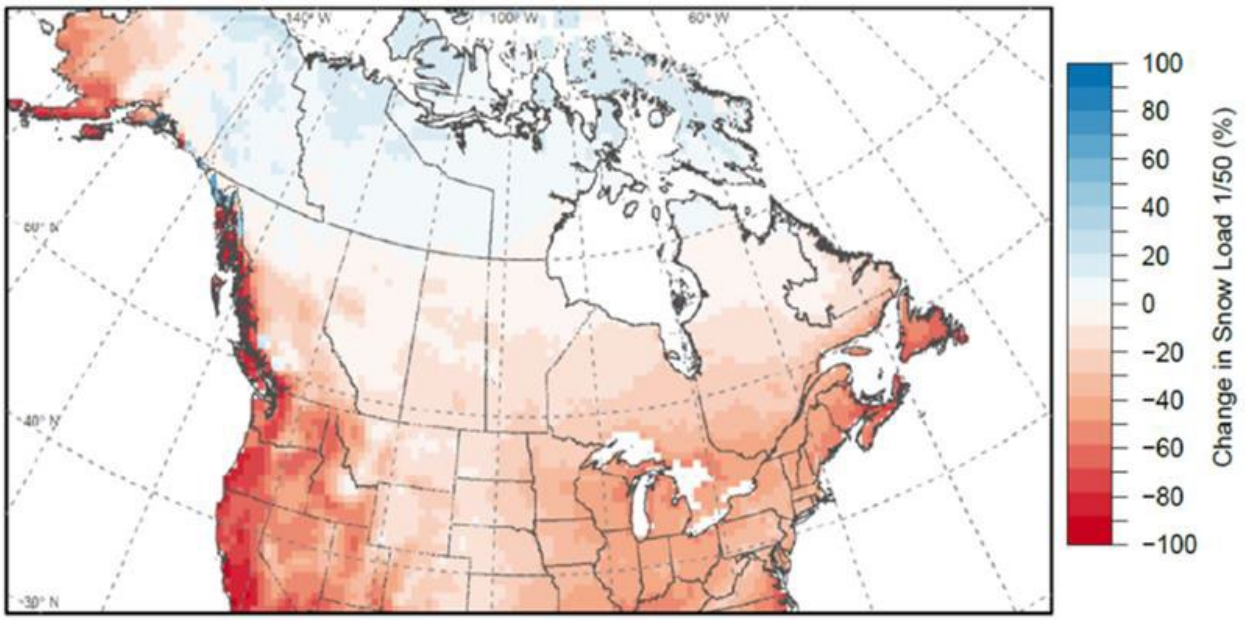


Figure 16.2: Projected changes (in %) for the 1-in-50-year snow load for +3°C global warming (Cannon et al., 2020).

A heavy snowfall event can reduce access to the site and result in high snow loads on the operation and maintenance building causing structural loading and falling snow and ice.

Snow can present risks to the turbine and substation and collector line operation when it leads to ice accretion (See Section 16.6). However, the projected decrease in snow loads may lead to a reduction of snow load related risks.

16.6 Freezing Rain and Icing

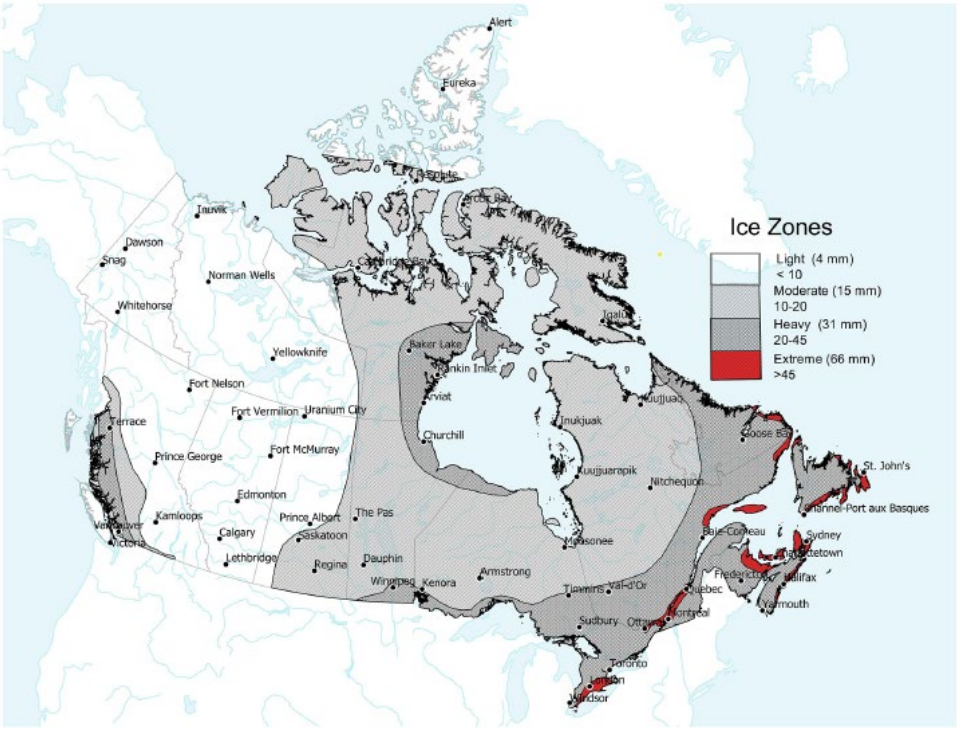
16.6.1 Icing

Atmospheric icing refers to any type of accumulation of ice or snow on a surface during a meteorological event. This type of icing is mainly caused by precipitation, such as freezing rain and wet snow, or passing clouds and fog. Ice formation on wind turbine blades is dependent upon air temperature, wind speed, surface shape, and liquid water content of the air (CanREA, 2020). Icing is most likely to occur between temperatures of -4°C and 2°C.

Atmospheric icing on structures, including wind turbines, generally occurs under two conditions: in-cloud icing (rime or glaze) and precipitation icing (freezing rain or wet snow). The following describes ice build-up on wind turbines.

- Rime ice is in-cloud icing where water droplets form a rime on the blades (see Extreme Temperatures 16.3 for temperature projections with climate change).
- Glaze ice is caused by freezing rain or wet in-cloud icing and forms a smooth layer of ice that is strongly adhered to the blades at temperatures between 0 and -6°C.
- Wet snow is partly melted snow crystals with high liquid water content that become sticky and are able to adhere to the surface of the turbine blade and occurs when the air temperature is between 0 and 3°C.

According to the Canadian Highway Bridge Design Code, the PDA is in a heavy ice zone, with an average nominal ice thickness of 31 mm (Figure 16.3). According to the International Energy Agency's (IEA's) five icing classes, where Class 1 has the lowest risk and Class 5 the highest, the Project is located in a Class 2 area, meaning meteorological icing is expected only about 0.5 to 3% of the year (approximately 2 to 10 days), based on the VTT Wind Power Icing Atlas (2024).



Note: *The nominal ice thickness and corresponding range (mm) is indicated for each zone*

Figure 16.3: **Ice Zone (CSA CHBDC, 2019).**

Rotor icing duration varies significantly between a wind turbine blade at standstill and one in operation, as increased airflow velocity and blade vibration during rotation reduce ice incubation time (IEA Wind, 2017). Therefore, ice is more likely to form on other Project infrastructure while the turbine is operational, such as above-ground power lines, roads, towers, nacelles, hubs and the MET tower.

Ice accretion on rotor blades reduces the aerodynamic performance of the turbine, which can result in production losses. Blade icing also increases vibrations and fatigue loads that can reduce turbine lifespan, leading to measurement and control errors that cause mechanical and/or electrical failures. Structural damage as a result of icing and other environmental conditions is discussed in Section 17.5. Ice accretion in the PDA is expected to decrease over time due to climate change, leading to a corresponding reduction in associated risks to Project components, although ice accretion events are still projected to occur over the Project life.

Heavy or prolonged precipitation during extreme events, occurring during colder months, can cause ice to accumulate on access roads, creating hazardous driving conditions. Using salt to melt ice may create pooled saltwater, which can infiltrate underground electrical infrastructure and potentially cause short circuits in components such as insulators (NSPI, 2024). Although underground equipment is generally sealed and rated to withstand moisture and short-duration flooding, prolonged exposure or high-salinity water can still compromise these systems. Salted roads can also cause arcing when wind-driven salt is

blown onto overhead wires, although this is unlikely. Both situations have the potential to result in power outages and disruptions to operation and maintenance of the Project.

Ice shedding is most likely to occur when there is ice accumulation on the blades that becomes subject to milder temperatures (usually at and above 0°C) that prompt melting (CanREA, 2020). The risks of ice throw to human health and safety may lead to temporary shutdowns of individual turbines. Ice throw and ice shed hazards are considered accidental events described in more detail in Chapter 17 (Accidents and Malfunctions).

16.6.2 Freezing Rain

Although projections of future icing are limited, several studies have examined climate change impacts on freezing rain, which can contribute to ice accretion and associated icing hazards.

Freezing rain projections for Canada have been developed using high-resolution convection-permitting climate models (Chartrand et al., 2022; Marinier et al., 2022; McCray et al., 2022) and regional climate models (Jeong et al., 2018, 2019). The convection-permitting results, presented through ClimateData.ca and Portraits Climatiques, generally project a decrease in freezing rain for Nova Scotia. Similarly, CCCR (ECCC, 2026), which synthesizes the Jeong studies, indicates a general decrease across the Maritimes. Together, these sources generally support a projected decrease as the most likely direction of change for Nova Scotia.

However, several aspects of the underlying studies complicate this interpretation. CanESM2, which was used in the Jeong studies, has a relatively strong warming response. Marinier et al. (2022) also projected increases in some months despite an overall decrease, greater variability in simulated vertical atmospheric profiles, suggesting that freezing rain may occur under a wider range of conditions, and higher wind speeds during long-duration events, which could contribute to greater ice accretion.

These projections should also be interpreted in the context of recognized modelling limitations. Freezing rain is “among the most difficult extreme events to detect and determine trends in,” partly because of its complex variability and the limited understanding of its physical causes (ECCC, 2026). Accordingly, Chapter 12 of the IPCC AR6 WGI (2021) and Cannon et al. (2020) expressed *low confidence* in projections of extreme freezing rain. Therefore, although available evidence generally supports a decrease for Nova Scotia, precautionary measures remain appropriate given the uncertainty in future freezing rain and associated icing.

16.7 Wildfires

Historically, the Maritime Provinces have generally experienced relatively low wildfire occurrences compared to other parts of Canada (e.g., western regions). Between 1950 and 2010, the mean annual area burned in Nova Scotia was approximately 1,900 ha, and both the total area burned and the number of fires generally declined between 1990 and 2021 (Taylor et al., 2025). The wildfire season in Nova Scotia extends from March 15 to October 15, during which fire restrictions are implemented to reduce wildfire risk. Wildfires in the province are primarily caused by human activity rather than lightning. According to NSDNR (2021), approximately 97% of wildfires are human-caused, including many incidents of arson, while only 3% are attributed to lightning. The combination of proactive fire management, public restrictions, and suppression efforts has likely contributed to the historically low wildfire occurrence in the region.

However, recent events have demonstrated that favourable historical conditions may not be indicative of future wildfire hazard under a changing climate. For instance, 2023 marked the most severe wildfire season in history in Nova Scotia, with fires burning over 25,100 ha and destroying 200 homes. The severity has been attributed to a combination of below-average winter snowpack, dry spring conditions, and high winds that facilitated rapid fire spread and hindered suppression efforts (Taylor et al., 2025). These events have raised concerns regarding future wildfire hazard under a changing climate. While the province is generally well equipped to respond to forest fires, the costs associated with firefighting infrastructure, equipment, and aircraft continue to rise, and resource limitations may present challenges, particularly in less populated areas.

As the climate changes, warmer temperatures, coupled with changes in precipitation patterns, enhance potential evapotranspiration and drier climate, which would lead to greater fuel availability, lengthened fire season, longer spread days, therefore, more extensive and frequent fires (Flannigan et al., 2013; Wang et al., 2015; Wotton et al., 2017). Overall, it is projected that the number and extent of wildfires may increase, and the proportion of days in fire season with the potential for unmanaged fires will increase.

Inherently, wildfires pose significant risks to human health and safety, can cause extreme damages and loss of project infrastructure, destruction or blockage of access roads and transportation routes. These risks are projected to increase over time as climate change drives higher wildfire frequency, greater fire intensity, and more severe burn conditions in the region, thereby elevating the overall likelihood and consequences of wildfire-related impacts. Refer to Section 17.6 for more information on Fires.

16.8 Lightning

Lightning has been known to strike turbines, causing fires and structural damage. The frequency and intensity of lightning and thunderstorms are affected by climate change in

terms of increases in convective available potential energy (CAPE) due to warming. A warmer troposphere and higher sea surface temperature will result in increased heat and moisture fluxes, causing high instability in air mass and, therefore, increased CAPE. As a result, more energy is available to drive severe weather, including thunderstorms and lightning (Climatedata.ca, 2024b). Lepore et al. (2021) found that with each degree Celsius increase in global temperature, the frequency of environments favourable for severe weather could rise by 5% to 20%. This increase is more pronounced in the Northern Hemisphere's higher latitudes, where it is primarily driven by a substantial rise in CAPE (Figure 16.4).

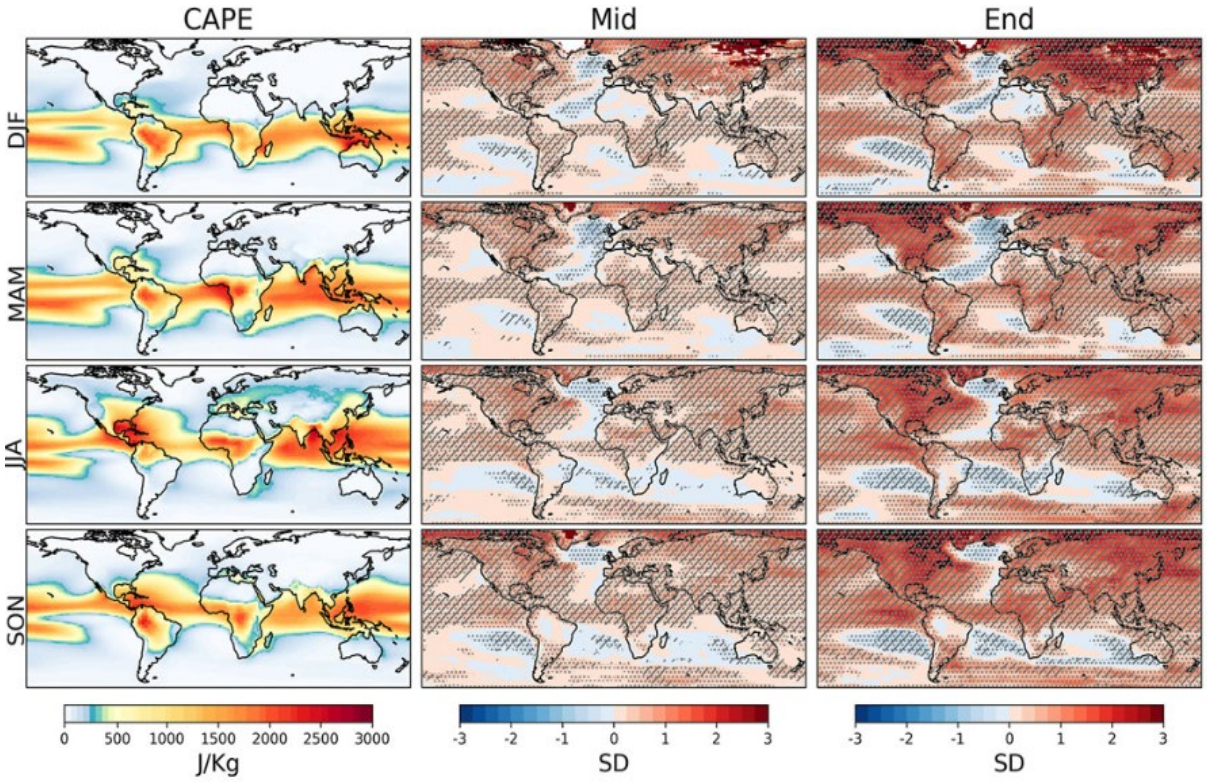


Figure 16.4: **Projected change in CAPE. Stippling indicates significance at the 0.05 level, hatching 100% sign agreement in the response across all models (Lepore et al., 2021).**

Lightning strikes pose a significant risk to project infrastructure due to the high elevation and the exposed nature of wind turbines. Direct lightning strikes can cause significant damage to impacted infrastructure such as the blades, and degrade or destroy Project electrical components such as converters, transformers, substations, and cables. Lightning strikes can also increase the likelihood of equipment failure, unplanned downtime, higher operation and maintenance costs, and fire risk. While grounding systems and surge protection substantially reduce these risks, even properly protected equipment can experience damage from high-energy strikes. Climate change is projected to increase the frequency and intensity of thunderstorms and associated lightning strike potential, which in turn increases lightning-related risks to the Project over time.

16.9 Seismic Activity

The Parrsboro Shore ecodistrict has three major faults, and a series of minor faults. The major faults in this ecodistrict generally run east and west (NSDNR, 2015b; NSDLF, 2019b). Faults in the PDA are associated with contacts between the Rapid Brook and Ragged Reef Formations, and the Greville River and Cranberry Lake / Humming Brook / Gilbert Hills Formations. The region is not located near the edges of tectonic plates and is outside of any seismic zones and is therefore considered low risk for major earthquakes (Natural Resources Canada (NRCan), 2019).

Nova Scotia is considered to have a relatively low risk for earthquakes that have the strength of magnitude (MN) 5 or more that is associated with causing damage to infrastructure (NRCan, 2021). There has not been an earthquake of 5 MN or more centred in Nova Scotia since 1855. There have, however, been reports of events felt in the region, such as the 2.6 MN event felt in Dartmouth in March 2020, a 3.0 MN near Yarmouth in 2016, and a 3.6 MN near Digby in 2015 (CBC News, 2020).

Climate change was not considered to have an impact on seismic activity, and it is not expected that seismic activity will impact the Project.

16.10 Sinkholes and Subsidence

Sinkholes can cause extensive damage to buildings, roads, and other infrastructure—the primary hazard being collapse of cavities in the bedrock created by the dissolution of soluble evaporite or carbonate rocks in karst topography. As discussed in Section 6.2.3, sinkholes are uncommon in the Parrsboro region. There is a single turbine to the south of the PDA under which the karst risk map is 'medium risk', associated with the Greville River Formation (alluvial conglomerate, wacke, sandstone, fluvial siltstone and argillite). The remainder of the PDA is underlain by areas of 'low risk'. Project operation and maintenance does not depend on the availability or use of natural resources such as groundwater or surface water, which can increase the risk of ground subsidence.

16.11 Management and Adaptation

The following section outlines management and adaptation strategies included in the Project to mitigate risks of the natural hazards outlined in Section 16.1 to 16.10. Project components and design have considered the existing environment and the need to adapt to climate change.

Specifically, the following mitigation measures will be implemented to address risks to the Project from hazards associated with climate change:

- Project infrastructure will be designed in accordance with applicable building, geotechnical, and electrical design standards, including consideration of regional seismic loading requirements where applicable.
- Geotechnical investigations will be completed to characterize subsurface conditions and identify any areas susceptible to instability or subsidence. Foundation designs will be developed based on site-specific geotechnical recommendations.
- Turbines, substations, and electrical infrastructure will be equipped with grounding systems and surge protection in accordance with applicable standards to reduce the likelihood of lightning-related damage.

Extreme weather events such as hurricanes, tropical storms and nor-easters could bring extreme winds and precipitation to the PDA. Such weather events are expected to intensify in future years due to climate change therefore, associated risks to project components are expected to increase. Wildfire, extreme temperatures, ice accretion, and snow load could also affect Project components. With climate change, extreme high temperatures, lightning activity, and wildfire hazards are expected to increase, resulting in greater Project risk over time. Conversely, extreme low temperatures, ice accretion, and snow accumulation are expected to decrease, reducing the associated Project risks.

To mitigate risks arising from these environmental events the following have been considered in the design or will be undertaken during operation and maintenance:

- The turbine model selected for this Project has been designed to withstand extreme weather conditions, including extreme winds and ice accretion without structural damage. Vibration sensors in the turbine detect conditions that could lead to damage of rotating blades, including ice accumulation or high winds, and can trigger an automatic turbine shutdown.
- The selected turbine models offer a Normal Climate Variant platform which have an operating temperature between –20°C and +40°C.The selected turbine model also offers a Cold Climate Variant package which can withstand temperatures from -30°C to +40°C without damage. Even with increasing extreme temperatures over time, according to projections, 40°C is not expected to occur at the site over the life of the Project.
- The Advanced Anti-Icing System (AAIS) will be installed on all turbines and operates when temperatures are within the range of -30°C to +3°C. The system uses meteorological ice sensors, power deviation warnings, and weather forecasts to heat blades in advance of potential icing, thereby mitigating the risk of imbalance, vibration, and structural stress caused by ice accumulation.
- To prevent damage to overhead power lines and power interruptions during extreme weather, the power corridor RoW will be kept clear of trees.
- The overhead electrical systems and operation and maintenance building are designed to comply with relevant Standards (NBCC Section 4.1.6 and Section 4.1.7 for building snow and wind load design and CSA C22.3 for overhead systems for wind pressure).

- Snow clearing and de-icing will be completed as part of normal operation and maintenance procedures to reduce snow and ice related risks on access roads across the site.

Extreme precipitation and rapid snowmelt can contribute to pluvial and/or fluvial flooding, potentially affecting Project components. As precipitation is projected to increase with climate change, flood-related risks to the Project are also expected to increase in future years. To mitigate risks arising from these events the following measures will be undertaken.

- Effective drainage infrastructure, such as culverts, will be installed during construction to prevent surface water pooling around foundations and access roads. A detailed hydrologic and hydraulic study with modelling will be completed to size culverts for the PDA to ensure effective surface water diversion. Standard extreme precipitation events will be modelled, which will incorporate climate projections into sizing.
- Surface water management measures may require upgrades and maintenance over time to accommodate increasingly severe precipitation events and will be considered during Project operation and site restoration at the time of decommissioning.
- An ESC Plan (See Section 17.2) and a Surface Water Management Plan will be developed for the site.
- An EPP with erosion control measures will be developed prior to the beginning of construction activities.

Wildfires could also impact project components and are expected to cause increased risk to the Project over time due to climate change. More information on fires is found in Chapter 17.6 under Accidents and Malfunctions. To mitigate risks arising from wildfire events the following measures will be undertaken.

- Project activities will be restricted and/or suspended during any phase of the Project should NSDNR mandates require.
- To reduce the potential for wildfire spread to Project components, defensible space will be maintained around structures throughout operation and maintenance through vegetation management, including the removal or control of scrub, low brush, long grass, and other combustible vegetation.
- Burning will be prohibited on site. Should a fire be observed by onsite staff, it will be reported immediately to the NSDNR hotline 1-800-565-2224 or 911 emergency services.
- Access and maintenance roads will be maintained to provide reliable ground access to Project components and facilitate access by emergency response vehicles and personnel.

17 Accidents and Malfunctions

Accidental events and malfunctions are unplanned events that have a low likelihood of occurrence but may result in adverse environmental effects, including effects on one or more of the VECs identified in Table 4.1 in Chapter 4 (Assessment Methods and Initial Screening). The following accidents and malfunctions were identified as having the potential to occur during construction, operation and maintenance, and/or decommissioning:

- Transportation-related accidents
- Erosion control malfunctions
- Hazardous materials spills
- Ice throw
- Structural damage
- Fires

West Bay Wind Inc. has established health, safety, and environmental management practices across its projects and operations, with a focus on hazard identification, risk mitigation, contractor compliance, incident management, emergency preparedness, and continuous improvement.

A Project-specific EPP will be developed prior to the commencement of Project activities; EPP components are outlined in Chapter 2 (Project Description). The EPP will include a Contingency Plan that will provide emergency response measures for accidental occurrences. NSECC has a generic guide for developing contingency plans (NSECC, 2021). Through the Project Contingency Plan, staff will be informed of the appropriate communication channels, including contact information that is readily accessible to field crews and site environmental monitors.

17.1 Transportation-related Accidents

Accidents and malfunctions of vehicles and heavy equipment have the potential to adversely affect the environment and pose human health and safety risks. Traffic accidents may cause injuries, damage to infrastructure, temporary activity shutdowns, and the need for emergency response services.

Mitigation measures to prevent transportation-related accidents are outlined below and will be applicable to both public roads and onsite access roads.

- Special weather statements and warnings issued by ECCC will be considered before driving.
- Speed limits will be established and enforced on access roads.
- Speed limits will be adhered to on public roads.
- Cell phone use while driving will be prohibited.
- Should the site be snow-covered, site personnel are to drive only on known terrain.
- Appropriate training for onsite personnel will be provided that includes site safety protocols and emergency response procedures.

17.2 Erosion Control Malfunctions

Malfunctions of drainage infrastructure may occur during any phase of the Project and could result in runoff or discharge to nearby waterbodies. Failure or overtopping of drainage systems may result in localized erosion, sediment transport, and sediment-laden runoff entering nearby watercourses and wetlands. Elevated concentrations of total suspended solids in runoff can adversely affect the aquatic environment, including fish and fish habitat.

Effective erosion and sediment control (ESC) measures are particularly important during spring freshet and periods of extreme or prolonged rainfall. Project drainage infrastructure will be designed and constructed to function under both typical and extreme weather conditions. The Proponent will develop and implement an ESC Plan and a Surface Water Management Plan. In addition, the EPP will include a Contingency Plan outlining emergency response procedures for drainage-related failures that could damage roads, cause water pooling around foundations, or result in sediment-laden runoff entering waterbodies. The onsite environmental monitor will identify and report damaged or poorly functioning drainage infrastructure to the Proponent during routine inspections and maintenance activities. Appropriate grading and drainage measures will also be incorporated during decommissioning to maintain site stability and manage runoff.

The Contingency Plan will be implemented in the event of an erosion control malfunction. Contingency measures recommended by the NSDPW's Generic EPP for the Construction of 100 Series Highways (NSDPW, 2007) are applicable to this Project:

- Conduct staff training (e.g., tailgate safety and environmental meetings to inform staff of potential problems and hazards).
- Plan and practice storm alertness measures, outlining conditions for work stoppages, pre-storm staff meetings, inspections, and preventative maintenance of ESC measures such as covering highly erodible surfaces, emptying of settlement ponds, and proactive measures to ensure critical ESC measures near watercourses will withstand storm runoff, seasonal impacts, and wind.

- Confirm availability of equipment and operators that can be mobilized on short notice to install/repair berms, dams, diversion ditches, catchment ponds, and turbidity curtains.
- Stockpile ESC materials, including quantities and locations for strategic placement
  - ESC blankets/matting and staples (or tarps/plastic sheeting)
  - Sandbags, clear stone
  - Water pumps and hoses
  - Turbidity curtains
- Implement typical approaches for temporary control of water flow and erosion until new ESC measures can be implemented, such as excavation of cross ditches to divert runoff away from surface water bodies and into catchment ponds or vegetated areas; excavation of temporary water storage areas; berm construction; bank stabilization, and deployment of backup turbidity curtains. Approaches will vary depending on season, and the contractor will indicate approaches for summer (typically lower-flow conditions), spring and fall (typically higher-flow conditions), and winter/frozen-ground conditions.
- Develop standard protocols for notification of failures to the Proponent, NSDPW, and NSECC/DFO inspectors.
- Develop standard protocols for incident and near miss reporting to the Proponent and NSECC to provide documentation of the failure (a Near Miss Report details failures that did not result in the loss/release of sediment), the intention being to identify the cause and help prevent future occurrences.

17.3 Hazardous Materials Spills

A hazardous material spill has the potential to cause significant adverse environmental effects depending on the size and location of the spill. Accidental discharges of POL or other hazardous materials can contaminate soil and potentially migrate through the unsaturated zone to groundwater. Spills can also travel via runoff to surface waters or wetlands. Volatile compounds can vaporize into the surrounding air. Through pathways such as these, wildlife habitat can be adversely affected and there could be effects to human health.

Since POL on site will primarily be those associated with the operation of vehicles and heavy equipment, as well as the turbine nacelles, there is a low probability of a major POL release and the magnitude will be limited to the volume of POL contained by the equipment. The Nordex platform chosen for the Project uses an electric motor drive for pitching the wind turbine blades, as opposed to a hydraulic ram pitch system. This engineering shift has eliminated the potential release of hydraulic fluid associated with blade pitch control systems.

Fuel and hazardous materials spill response will be included in a Contingency Plan to be developed as part of the Project-specific EPP. Spills will be reported immediately by onsite personnel to the NSECC using their 24-hour emergency response hotline: 1-800-565-1633.

As a reference, the NSDPW (2007) Generic EPP provides guidelines for waste management as well as the handling and storage of POL.

- Hazardous material containers will be properly labeled in compliance with the requirements of the Workplace Hazardous Materials Information System (WHMIS).
- Onsite personnel will have training in WHMIS, transportation of hazardous goods, spill response, and site-specific procedures.
- Safety Data Sheets (SDS) will be available for all hazardous materials in use or stored on site.
- The equipment used on site will be monitored to ensure that it is in good working condition.
- Hazardous materials will be handled only by site personnel who are trained and qualified in the handling of these materials, and only in accordance with manufacturer's instructions and government regulations.
- Waste hazardous materials will be separated, stored, transported, and handled in accordance with regulatory requirements and disposed of at an approved hazardous recycling or disposal facility.
- Equipment used will be mechanically sound with no oil or gas leaks. Equipment will be regularly checked for leaks and leaks will be repaired immediately.
- There will be no fuelling, storage, washing, or servicing of vehicles within 30 m of a watercourse, drainage ditch, areas with a high-water table, or exposed and shallow bedrock.
- There will be designated refuelling and POL storage areas, each located a minimum of 30 m from any waterbody or environmentally sensitive feature. Storage and refuelling procedures must meet the Nova Scotia Petroleum Management Regulations under Sections 25 and 84 of the *Environment Act*.
- Fuel storage areas will be clearly marked and/or barricaded to prevent damage from vehicles.
- Spill clean-up materials shall be accessible and maintained in the designated areas of fuel and chemical storage as well as heavy equipment vehicles.

17.4 Ice Throw / Shed

Wind turbines operating during specific meteorological conditions can introduce the hazard of ice throw or ice shed (fall) in areas surrounding turbines. The risk of an individual or vehicle being struck by ice is very low, but setback distances to non-participating property lines and roadways are key to minimize the potential for an incident. The potential risk to public safety is determined by the size of the ice fragments thrown, distance thrown, and probability that someone will be within the landing zone. The risk of wind turbine blade icing is discussed in Section 16.6 (Icing).

In recent years, there have been several peer-reviewed papers where field studies of ice throw in Nordic areas have demonstrated that most ice pieces of the size that could cause serious injury or fatality are thrown within the tip height of the turbine (Lunden, 2017; Bredesen et al., 2017). In 2017, Swedish researchers published the findings of their IceThrower study (Lunden, 2017). This involved icing wind turbine blades in the field and then determining the area where ice was thrown surrounding the turbine. This study found that 75% of the ice thrown was found within one rotor diameter distance from the turbine tower. Only 1% of very small fragments were identified beyond 1.5 times the rotor diameter distance (which was the same as the total height of the turbine). These studies indicate that most ice fragments are deposited within relatively short distances of the turbine when compared to the setback distances typically required by regulatory and planning frameworks. Therefore, a setback of 1.1 times the total height of a turbine to roads and non-participating property lines has become a standard setback across North American jurisdictions.

The Nordex wind turbines proposed to be used at the Project have a rotor diameter of 163 m, hub height of 125 m, and a total height of 206.5 m. Based on the IceThrower study, the majority of ice fragments would be expected to fall within approximately the tip height of the turbine. Only a small portion of ice fragments is likely to be observed beyond this distance and would be smaller than those observed closer to the turbine.

The Project turbines, in accordance with the Municipality of the County of Cumberland Municipal Planning Strategy Policy, are set back at least 1 km from dwellings external to the Project (at numbered civic addresses). Based on the Municipal Planning Strategy, turbines must be set back 1.25 x the height of the turbine from roads. As the Project turbines will be 206.5 m from the base to the tip of the blade, turbines should be set back at least 258 m from all roads. The Project layout has turbines at least 317 m from addressed roads. As such, ice throw should not reach dwellings or traffic on maintained public roads.

IEA recommends mitigation measures to reduce the risk of ice throw from wind turbines (IEA, 2022a). The Proponent has committed to follow the IEA recommendations below, as well as other key safety measures.

- During detected meteorological conditions that would be conducive to icing, wind turbines may be temporarily shut down, and safety protocols will be implemented.
- Ice build-up on turbine blades during operation causes them to vibrate. This vibration triggers automatic imbalance sensors in the turbines, and they are automatically shut down to avoid damage to the turbines and avoid throwing ice.
- Safety perimeters will be set up around turbines in the event of a detected rotor icing event.
- Signage will be placed on trails near turbines.
- The Project turbines will be equipped with the AAIS, which will significantly reduce the potential for ice formation on the rotor blades.

With these measures in place, the likelihood and duration of ice accumulation on turbine blades is reduced. Further, given the low passage rates on the forestry roads and recreational trails near the turbines, it is estimated that the likelihood of a safety incident with recreational users is negligible. It should be noted that the installed cumulative wind capacity at locations with icing conditions across Europe, North America and Asia was approximately 119 GW at the end of 2020 (IEA, 2022b), and published industry information indicates that reported incidents involving members of the public are exceedingly rare.

The primary risk to on-site personnel is ice shed, or the fall of ice from turbine blades to the base of the tower. CanREA's *Best Practices for Wind Farm Icing and Cold Climate Health & Safety* recommends mitigation measures for the safe initial approach of maintenance personnel investigating ice throw or blade damage, helping to reduce risks to worker safety (CanREA, 2020). In addition, a site-specific Health and Safety Plan will be developed and implemented for the Project, supported by worker training programs designed to minimize occupational health and safety risks.

- Before entering the ice throw zone of a turbine, use binoculars to determine if a turbine is iced or not.
- Remotely turn the nacelle to face opposite side of the access door.
- If necessary, shut down the turbine and those near the route to the destination.
- Park all vehicles outside ice throw zones.

The Project is not proposed to be gated; therefore, the public will be able to continue to use the area for recreational purposes. During winter months where icing conditions are likely, signs will be posted at turbine access road entrances to warn individuals that icing conditions can occur and they should avoid areas close to turbines. Additionally, information sessions with the local snowmobile clubs and recreational users may be held to communicate the risks of approaching turbines during icing conditions. The likelihood of ice falling onto public roads is very low; given the low traffic density on the public roads in the LAA, the likelihood of an incident occurring is extremely low.

Based on the distance turbines are set back from roads (at least 317 m), the automatic shutdown of turbines during icing conditions, and the planned signage to be installed, the probability of an individual being struck by ice thrown from a turbine is extremely low. Residual effects associated with ice throw or ice shed are predicted to be negligible and not significant.

17.5 Structural Damage

Extreme weather, manufacturing faults, and turbine blade wear can lead to fatigue loads that can reduce turbine lifespan. Additional blade fatigue can be caused by extremely cold weather, including nonuniformities on surfaces, and brittle material fractures (Algolfat et al., 2023). Most accidents are caused by natural causes such as lightning and high winds, although some may be attributable to manufacturing defects, such as air bubbles

(Bošnjaković et al., 2024). Effects related to climate and weather, including wind, lightning, and icing, are discussed further in Chapter 16 (Effects of the Environment on the Project).

If wind turbine blades are damaged, increased or irregular vibrations may occur (Algolfat et al., 2023). Damage to blades can cause them to break and could lead to parts flying off. This poses a threat to people, animals, and other infrastructure or objects in the vicinity, including other Project infrastructure. Studies indicate that blade components can travel several hundred metres from the turbine base (e.g., 700 m at rotational speeds of 70 m/s; Bošnjaković et al., 2024). To maintain durability, sustainability, and public safety, the selected turbine model is equipped with automatic protection systems designed to initiate shutdown under specified operating conditions, including high wind events.

The turbine model selected for this Project, the Nordex N163, contains vibration sensors that will detect these conditions and trigger auto-shutdown of the turbine. The turbines are equipped with certified safety systems that continuously monitor operational parameters and automatically stop the turbine and set it to a safe state when specified thresholds are exceeded (e.g., high wind conditions). The Project turbines use the Nordex OS™ SCADA EDGE platform, which supports remote monitoring and operational control of individual turbines and the overall wind farm by the operator.

Total turbine collapse or structure failure is rare. If a turbine tower fails, it falls within the tip height of the turbine. Rogers and Costello (2022) modelled the probability of blade failure and impact on roads:

> *Results for these example turbines show that the typical setback of 1:1 x tip height is generally sufficient at reducing risk to extremely low levels (between 1 impact in 1 million years and 1 impact in 10 million years) for roads in rural areas which tend to be lightly traveled.*

Given the setback distances between Project turbines and nearby residences at civic addresses and roads, it is highly unlikely that turbine or blade failure would result in adverse effects on public health or safety. The Proponent will implement regular monitoring, inspection, and maintenance programs consistent with manufacturer requirements. Any damaged or worn components identified during inspections will be repaired or replaced promptly, and turbines exhibiting abnormal operating conditions, including excessive vibration or blade damage, will be removed from service until corrective actions have been completed. During operation and maintenance of the Project, the Proponent will implement the following:

- Ensure replacement parts meet manufacturer specifications and applicable design requirements.
- Use POL appropriately rated for the expected operating conditions.
- Remove frost from high voltage circuits prior to energizing.
- Conduct routine inspection, maintenance, and calibration procedures.
- Monitor weather forecasts, warnings and special weather statements.

- Employ remote shutdown procedures during extreme weather events or when there are indications of equipment malfunction.
- Remove individual turbines from service when worn, damaged, or malfunctioning equipment is identified, until repairs have been completed.
- Develop and implement a Contingency Plan for equipment failures and emergency situations.

Additionally, the Project was designed to locate turbines at a minimum setback of 1 km from civic addresses, per the provincial guidelines and the land-use bylaw (minimum of 826 m), which mitigates risks to local infrastructure and public safety.

Given the low likelihood of turbine or blade failure, the implementation of turbine safety systems, and the setbacks incorporated into the Project design, residual effects associated with structural failure are predicted to be negligible and not significant.

17.6 Fires

Project construction, operation and maintenance, and decommissioning activities that may accidentally cause a fire include the following:

- Sparking equipment or hot vehicular exhaust
- Refuelling
- Vehicle accidents
- Other human activities

Fires can have serious adverse effects on the environment, including habitat loss, mortality of wildlife and vegetation, atmospheric emissions, and damage or loss of property. Fire suppression activities may also result in localized runoff of fire-fighting agents or disturbed sediments (NSDPW, 2007).

Fiberglass-reinforced polymers, foam insulation, wires, and POL used to lubricate mechanical components of the nacelle are all materials used in wind projects that can fuel fires.

To prevent such fires, the selected turbine model for this Project (the Nordex N163), has lightning/surge protection that is based on the electromagnetic compatibility compliant lightning protection zone concept, which comprises the implementation of internal and external lightning/surge protection measures under consideration of the International Electrotechnical Commission standard 61400-24. In addition, the nacelle components are equipped with an automatic lubrication system that prevents friction in the rotors and cools the gearbox.

Guidance for mitigation measures and contingency plans for fire prevention is available in the NSDPW generic EPP (NSDPW, 2007) and will be specifically addressed in the Project

EPP. Procedures to follow in the event of a fire will also be addressed in the Project Contingency Plan.

As outlined in Chapter 16 (Effects of the Environment on the Project), the Nova Scotia Fire Index is to be monitored during construction, operation and maintenance, and decommissioning activities. An area around each turbine base will be cleared and maintained to function as a firebreak around turbine foundations. Onsite personnel will have fast access to fire suppressant equipment and PPE. Flammable chemicals/POL will be stored at a designated fuelling and hazardous material storage site with secondary containment.

In the event of a fire on site, local and provincial emergency response services and procedures would be initiated, starting with a call to 911. Fires will also be reported immediately by the environmental monitor to the NSDNR using their 24-hour emergency response hotline: 1-800-565-2224.

Onsite staff would be advised to remove obstacles on access roads, such as vehicles that could impede emergency response crews, provided it is safe to do so. Given the height and specialized nature of wind turbine fires, responding fire departments would generally focus on establishing a safety perimeter, protecting surrounding vegetation and infrastructure, and managing public safety risks in accordance with site-specific emergency response procedures. Prior to Project operation, the Proponent will provide local fire departments information about site points of access and the Project, supplemented by a tour of the site. Further details on fire response will be outlined in the Project Contingency Plan.

Mitigation measures recommended by the Canadian Electricity Association (2020) will be implemented to prevent and control fires near electrical infrastructure applicable to this Project.

- Staff will be trained on how to use extinguishers safely and effectively.
- Onsite personnel will be trained on procedures for extinguishing small nacelle fires.
- The Proponent will replace wood components (e.g., power poles) that have deteriorated due to wear and/or pose a risk as an ignition source if they are subject to weather conditions that exceed their operating design standards.
- Power lines will be regularly inspected to identify lines that require rebuilds. Old lines will be replaced as needed to preserve safety and meet new operating standards and fire mitigation standards.
- RoWs will be regularly maintained through vegetation management to prevent vegetation or other material coming in contact with transmission and distribution lines, reducing ignition risk.
- Fuel hazards (e.g., tree trimmings, slash) will be removed from RoWs.
- RoWs and other open spaces will be gravel, mineral soil, frequently mowed grass, or maintained vegetation (e.g., ground-cover, shrubs) to act as firebreaks—an obstacle to the spread of a fire.

- Animal deterrents will be installed around the substation to reduce wildlife contact with equipment that can trigger fires.
- Hazardous materials in the substations will be protected by following WHMIS standards.
- A Contingency Plan will be developed and implemented.

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EMI Report



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