ENVIRONMENTAL ASSESSMENT REGISTRATION DOCUMENT & INITIAL PROJECT DESCRIPTION

Fast Acting Natural Gas Power Generation Facility – Marshdale

(IAAC Project Title: Marshdale Natural Gas Power Generation Facility)

Prepared for: IESO Nova Scotia

strum CONSULTING

December 2025

December 15, 2025

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Dear Jeremy Higgins and Madeline Clarke,

Re: Environmental Assessment Registration Document
Fast Acting Natural Gas Power Generation Facility – Marshdale

Initial Project Description
Marshdale Natural Gas Power Generation Facility Project
Projet de centrale électrique au gaz naturel Marshdale

Please find enclosed the Environmental Assessment Registration Document for the Fast Acting Natural Gas Power Generation Facility – Marshdale being submitted to Nova Scotia Environment & Climate Change, Environmental Assessment Branch. The document is concurrently being submitted as an Initial Project Description to the Impact Assessment Agency of Canada and is being referred to as the Marshdale Natural Gas Power Generation Facility / Projet de centrale électrique au gaz naturel Marshdale by IAAC.

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

Sincerely,

Johnny Johnston
President and Chief Executive Officer
IESO Nova Scotia

EXECUTIVE SUMMARY

The Independent Energy System Operator – Nova Scotia (IESO Nova Scotia) has initiated a request for expression of interest to select a company to complete the final design, construct, own, and operate an up to 300 megawatt fast acting natural gas power generation facility. IESO Nova Scotia has selected two potential project locations including Marshdale, which is located near the community of Marshdale in Municipality of Pictou County (MOPC), Nova Scotia. The second site, Salt Springs, is also located in MOPC; the Environmental Assessment Registration Document (EARD)/Initial Project Description (IPD) for the Salt Springs Project is being submitted under separate cover. The Project will consist of a simple cycle combustion turbine generating station, fueled primarily with natural gas and the ability to switch to light fuel oil as necessary and supporting infrastructure.

Under Nova Scotia's Clean Power Plan, the province must stop using coal fired electricity by 2030 and have 80% of electricity supplied from renewable sources. The facility would provide foundational, reliable power to Nova Scotia's electrical system and represents the most cost-effective path toward grid decarbonization.

The Project is a designated project under the *Impact Assessment Act* as it meets item 30 under the *Physical Activities Regulations*, S.O.R./2019-285. Therefore, this EARD/IPD has been prepared to meet the requirements of an IPD for submission to the Impact Assessment Agency of Canada (IAAC). The requirement for an Impact Assessment will then be determined by IAAC through their Screening Decision. The designated project is not a component of a larger project that is not listed in the *Physical Activities Regulations*.

The Project is considered a Class I Undertaking under Schedule A of the Nova Scotia Environmental Assessment Regulations, N.S. Reg. 93/2025, and therefore, requires the registration of an EARD. The EARD has been completed in accordance with the requirements outlined in A Proponent's Guide to Environmental Assessment (NSECCC, 2025), the Nova Scotia Class I Environmental Assessment Checklist (NSECC, 2025b), and the Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSECC, 2009a).

The following Valued Components (VCs) were identified based on the experience of the Project team and through engagement with regulators, the Mi'kmaq of Nova Scotia, and the public.

- Atmospheric Environment
    - Atmosphere and Air Quality
    - Greenhouse Gases
    - Sound
- Geophysical Environment
- Aquatic Environment
    - Surface Water, Fish and Fish Habitat
    - Wetlands

- Terrestrial Environment
    - Terrestrial Flora
    - Terrestrial Fauna
    - Avifauna
- Socioeconomic environment
    - Economy
    - Land use and Land Value
    - Archaeological and cultural resources
- Species at risk (considered in the appropriate VC chapter, as necessary)

The results of the assessment indicated that the Project, with the implementation of mitigation and monitoring measures, will not result in significant adverse residual effects. The Project plays a critical role in implementing the province's Clean Power Plan and provides the benefit of reliable and secure electricity to the grid to support the ongoing integration of new renewable power generation capacity, overall reduction of Nova Scotia's greenhouse gas emissions from electricity generation, and economic prosperity within Nova Scotia.

IESO Nova Scotia has engaged and collaborated (and will continue to do so) with local communities, the Mi'kmaq of Nova Scotia, and government representatives to ensure that any potential concerns identified in association with the Project are addressed and mitigated.

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LIST OF ACRONYMS

%	Percent
°	Degrees
°C	Degree Celsius
µm	Micrometres
AAQMS	Ambient Air Quality Monitoring Station
ACCDC	Atlantic Canada Conservation Data Centre
AMO	Abandoned mine openings
AQHI	Air Quality Health Index
AQM	Air Quality Management
ARD	Acid rock drainage
ARIA	Archaeological Resource Impact Assessment
ATV	All-Terrain Vehicle
BMP	Best management practice
BPIP	Building Profile Input Program
BPIP-PRIME	Building Profile Input Program - Plume Rise Model Enhancements
CAAQS	Canadian Ambient Air Quality Standards
CCME	Canadian Council of Ministers of the Environment
CCOHS	Canadian Centre for Occupational Health and Safety
CEA	Cumulative Effects Assessment
CEMS	Continuous Emissions Monitoring Systems
CEPA	Canadian Environmental Protection Act
CER	Clean Electricity Regulations
CH_4	Methane
CLC	Community Liaison Committee
cm	Centimetre
CMAR	Centre for Marine Applied Research
CNWI	Canadian Wetland Inventory
CO	Carbon monoxide
CO_2	Carbon dioxide
COSEWIC	Committee on the Status of Endangered Wildlife
CSA	Canadian Standards Association
dBA	A-weighted decibels
DBH	Diameter at breast height
DEM	Digital elevation model
DFO	Fisheries and Oceans Canada
EA	Environmental Assessment
EARD	Environmental Assessment Registration Document
ECCC	Environment and Climate Change Canada
ECCC-CWS	Environment and Climate Change Canada - Canadian Wildlife Service
EQS	Environmental Quality Standards
ERP	Emergency response plan
ESA	*Endangered Species Act*, S.N.S. 1998, c. 11

ESCP	Erosion and Sedimentation Control Plan
ESRI	Environmental Systems Research Institute
FAC	Facultative
FACU	Facultative upland
FACW	Facultative wetland
FEC	Forest Ecosystem Classification
FEED	Front-end engineering design
FHWA	Federal Highway Administration
FP	Floodplain
FWAL	Freshwater aquatic life
FWI	Fire Weather Index
GCDWQ	Guidelines for Canadian Drinking Water Quality
GIS	Geographic information system
GHG	Greenhouse gas
GHGRP	Greenhouse Gas Reporting Program
GLC	Ground level concentrations
GPS	Global positioning system
H_2O	Hydrogen dioxide
ha	hectares
HADD	Harmful Alteration, Disruption, or Destruction
Hz	Hertz
IAA	*Impact Assessment Act*, S.C. 2019, c. 28, s. 1
IAAC	Impact Assessment Agency of Canada
IBA	Important Bird Area
IESO	Independent Energy System Operator
IH	Intolerant Hardwood
IPD	Initial Project Description
km	Kilometre
km/hr	Kilometres per hour
KMK-ARD	Kwilmu'kw Maw-klusuaqn's Archaeological Research Division
KMKNO	Kwilmu'kw Maw-klusuaqn Negotiation Office
kV	Kilovolt
kWh/year	Kilowatt-hours per year
LAA	Local Assessment Area
m	Metre
M&NP	Maritimes & Northeast Pipeline
m/s	Metre per second
m^2/D	Square metre per diameter
m^3/hr	Cubic meter per hour
MAGS	Metre above ground level
MARI	Maritime Archaeological Resource Inventory
masl	Metres above sea level
MBBA	Maritimes Bird Breeding Atlas
MBCA	Migratory Bird Convention Act

MBS	Migratory Bird Sanctuaries
MEKS	Mi'kmaq Ecological Knowledge Study
mm	Millimetre
MMIF	Mesoscale Model Interface Program
MOPC	Municipality of Pictou County
MP	Member of Parliament
MW	Megawatt
MW	Mixedwood
N_2O	Nitrous oxide
NCNS	Native Council of Nova Scotia
NI	No indicator
NL	Not listed
NLM	Natural Landscapes of Maine
NO_2	Nitrogen dioxide
NO_X	Nitrogen oxide
NPRI	National Pollutant Release Inventory
NRCan	Natural Resources Canada
NS	Nova Scotia
NS AQR	Nova Scotia Air Quality Regulations
NSAAQS	Nova Scotia ambient air quality standards
NSCCTH	Nova Scotia Communities, Culture, Tourism, and Heritage
NSDGD	Nova Scotia Department of Growth and Development
NSDOE	Nova Scotia Department of Energy
NSEB	Nova Scotia Energy Board
NSECC	Nova Scotia Environment and Climate Change
NSNR	Nova Scotia Natural Resources
NSOLA	Nova Scotia Office of L'nu Affairs
NSPW	Nova Scotia Public Works
OBL	Obligate
O_3	Ozone
PA	Project Area
PC	Point Count
PCP	Pictou County Partnership
PF	Project Footprint
PID	Property Identification Numbers
PM	Particulate matter
$PM_{2.5}$	Particulate matter 2.5 micrometres or less in diameter
PPE	Personal protective equipment
RAA	Regional Assessment Area
REOI	Request for expression of interest
RfP	Request for proposal
SARA	Species at Risk Act
SAR	Species at risk
SDS	Safety Data Sheets

SGEM	Nova Scotia Silvicultural Guide for the Ecological Matrix
SH	Spruce hemlock
SMP	Special management practice
SO_2	Sulphur dioxide
SOCI	Species of conservation interest
t	Tonnes
tCO_2e	Tonnes of carbon dioxide equivalent
TH	Tolerant hardwood
TNM	Traffic Noise Model
TNS	Tourism Nova Scotia
TRS	Total reduced sulphur
TSP	Total suspended particulate
ULSD	Ultralow sulphur diesel
UPL	Upland
VC	Valued component
VOC	Volatile organic compounds
WAM	Wet area mapping
WC	Watercourse
WD	Wet deciduous
WESP-AC	Wetland Ecosystem Services Protocol – Atlantic Canada
WHMIS	Workplace Hazardous Material Information System
WL	Wetland Ecosystem Services Protocol – Atlantic Canada
WMA ltd.	Wskijnu’k Mtmo’taqnuow Agency Limited
WRF	Weather Research and Forecasting
WSS	Wetland of special significance

1.0 PROPONENT DESCRIPTION

The Independent Energy System Operator – Nova Scotia (IESO Nova Scotia or the "Proponent") is a new, independent, non-profit organization that will be responsible for the planning and reliable operation of Nova Scotia's bulk electricity system. Starting in 2025, IESO Nova Scotia is taking on the responsibilities of planning and managing the electricity grid in Nova Scotia in a phased approach. Their responsibilities include running the integrated resource planning processes, overseeing procurement of electricity resources and services, system operations, and the transition to clean energy in a fair and transparent way.

The Proponent retained Strum Consulting to support the development and submission of the Environmental Assessment (EA) Registration Document (EARD) under the *Environment Act,* S.N.S. 1994-95, c. 1. The Project is a designated project under the *Impact Assessment Act* as it meets item 30 under the Physical Activities Regulations, S.O.R./2019-285. As a result, this document is also being prepared to meet the requirements for an Initial Project Description (IPD) submission to the Impact Assessment Agency of Canada (IAAC). This document is herein referred to as an EARD/IPD. Strum is an independent multi-disciplinary team of consultants with extensive experience in undertaking EAs throughout Atlantic Canada. Contact information for the Proponent and their consultant is included in Table 1.1.

Table 1.1: Proponent and Consultant Contact Information

Proponent Information	
Project Name	Fast Acting Natural Gas Power Generation Facility – Marshdale IAAC is referring to this Project as: Marshdale Natural Gas Power Generation Facility
Proponent Name	Independent Energy System Operator – Nova Scotia
Executive Officer(s) / Principal(s)	Johnny Johnston – President and Chief Executive Officer
Mailing and Street Address	1791 Barrington Street, Suite 1010 Halifax, NS B3J 3K9
Website	https://ieso-ns.ca/
Proponent Contact Information for the EA Registration and IPD Review	Aaron Long Project Manager Community@ieso-ns.ca
Consultant Information	
Consultant Name	Strum Consulting
Mailing and Street Address	#210 – 211 Horseshoe Lake Drive Halifax, NS B3S 0B9
EA Contact	Melanie Juurlink

2.0 PROJECT INFORMATION

2.1 Project Introduction

The Proponent has initiated a request for expression of interest (REOI) to select a company to complete the final design, construct, own, and operate an up to 300 megawatt (MW) fast acting natural gas power generation facility. Under Nova Scotia's Clean Power Plan, the province must stop using coal fired electricity by 2030 and have 80% of electricity come from renewable sources. The facility would provide foundational, reliable power to Nova Scotia's electrical system and represents the most cost-effective path toward grid decarbonization.

The Proponent has selected two potential project locations including Marshdale (the "Project") located near the community of Marshdale in Municipality of Pictou County (MOPC), Nova Scotia. The second site, Salt Springs, is also located in MOPC; the EARD/IPD for the Salt Springs Project is being submitted under separate cover.

The Project will consist of a simple cycle combustion turbine generating station, fueled primarily with natural gas and the ability to switch to light fuel oil as necessary. The Project will consist of the following primary components:

- Dual fuel combustion turbine package (net nominal capacity up to 300 MW), consisting of a combustion turbine generator, air inlet filtration unit, exhaust stack, start-up system, and instrumentation and control system designed with synchronous condensing capabilities.
- Natural gas supply from the Maritimes & Northeast Pipeline (incidental to the Project; described in Section 2.6).
- Secondary light fuel oil capability including storage system, storage tanks, fuel forwarding equipment, and fuel unloading equipment.
- Electrical systems, including generator step up transformers, 138 kilovolt (kV) interconnection and protection, and auxiliary station services (transmission line is considered incidental to the Project; described in Section 2.6).
- Water processing facilities.
- Water supply, storage, and treatment.
- Balance of plant and operator facilities building.
- Septic tank or field.
- Access road.
- Laydown area.
- Security fence and gates.

The Project will be located on private land [Property Identification Number (PID) 00910307] in MOPC, approximately 12 km southwest of New Glasgow, near the communities of Marshdale, Concord, Lorne, and Glengarry Station (Drawing 2.1). As required by Part C, Section 13c of the IPD Guidance (IAAC, 2025), the Proponent has secured the land required for the Project through an option to purchase agreement. The Project location was selected based on several factors, including:

- Proximity to natural gas supply (i.e., Maritimes & Northeast Pipeline).
- Proximity to the Nova Scotia electricity grid.
- Adherence to setback requirements.
- Availability and accessibility of suitable land parcels.
- Avoidance of known protected areas, significant habitats, and wildlife sites, provincial parks, and reserves, and field identified archaeological, cultural, and heritage resources.
- Maximizing use of previously disturbed areas.

Construction activities are proposed to begin by December 31, 2027, and completion and commercial operation is planned for the fall of 2029. If the IAAC deems an Impact Assessment is required, Project timelines are anticipated to extend approximately three to five years beyond the dates described in Section 3.5. The Project is expected to be operational for a minimum of 30 years, with the possibility of refurbishment to extend its life.

2.2 Purpose and Need for the Project

The IPD Guidance (IAAC, 2025) Part B: Project Information Section 7 requires a discussion relating to the purpose, need, and benefits of the Project. Nova Scotia's electricity system is undergoing a major transformation - driven by population growth, more homes and vehicles using electricity instead of gas or oil, and the need to move away from Nova Scotia's current use of coal for electricity. Under Nova Scotia's Clean Power Plan, the province must stop using coal fired electricity by 2030 and have 80% of electricity come from renewable sources. Putting in place new cleaner sources of energy must be done in a way that's sustainable and beneficial for all Nova Scotians. Further, critical to reliability is ensuring foundational energy sources are available when renewable energy sources, like wind and solar, are not available or able to meet demand.

The Clean Power Plan identifies the need for at least 300 MW of new, fast acting, dispatchable, power generation by 2030, designed with the ability to use multiple sources of fuel to support grid reliability and resiliency. The Project is being designed to run as needed to meet peak demand, provide dispatchable generation and ancillary grid services required from the introduction of increased variable renewable power sources. As such, the Project plays a critical role in implementing the province's Clean Power Plan and provides the benefit of reliable and secure electricity to the grid to support the ongoing integration of new renewable power generation capacity and overall reduction of Nova Scotia's greenhouse gas (GHG) emissions from electricity generation.

The Proponent is committed to sharing economic opportunities with the local community throughout the Project's development and lifespan. This will be done by using local skills and labour where possible with on-the-job training. Engagement with local groups has been ongoing to support both community and Project development.

2.3 Regulatory Framework

2.3.1 Federal

The Project is a designated project under the *Impact Assessment Act* as it meets item 30 under the Physical Activities Regulations, S.O.R./2019-285: "The construction, operation, decommissioning, and abandonment of a new fossil fuel-fired power generating facility with a production capacity of 200 MW or more." Therefore, this EARD/IPD has been prepared to meet the requirements of an IPD for submission to IAAC. The requirement for an Impact Assessment will then be determined by IAAC through their Screening Decision. The designated project is not a component of a larger project that is not listed in the Physical Activities Regulations.

The Project will be subject to emissions limits under the *Clean Electricity Regulations*, S.O.R./2024-263 (CER) enacted under the *Canadian Environmental Protection Act* (1999) (CEPA) as it meets the following criteria, defined in subsection 5(1) of the CER:

- The Project has an electricity generation capacity of at least 25 MW.
- The Project generates electricity using fossil fuels.
- The Project is connected, directly or indirectly, to an electricity system.

Other potentially applicable federal regulatory requirements, including approvals, permits, notification, and compliance for the Project, along with the status of requirements current at the time of this EARD/IPD submission, are provided in Table 2.1.

Table 2.1: Federal Regulatory Requirements

Requirement/Application	Regulatory Body	Application/Permit Status and Comments
Impact Assessment	IAAC	The Proponent will submit an Initial Project Description (this EARD/IPD) and Plain Language Summary to IAAC as the Project is a listed activity in the *Physical Activities Regulations*, S.O.R./2019-285 under the *Impact Assessment Act:* *"The construction, operation, decommissioning and abandonment of a new fossil fuel-fired power generating facility with a production capacity of 200 MW or more."* The requirement for an Impact Assessment will be determined by IAAC through their Screening Decision.
Fisheries Act Authorization	Fisheries and Oceans Canada (DFO)	Compliance legislation. An authorization under the *Fisheries Act* is not anticipated at this time. If, during the detailed design phase potential effects to fish or fish habitat are identified that may require authorization under the

Requirement/Application	Regulatory Body	Application/Permit Status and Comments
		Fisheries Act, the Proponent will submit a Request for Review to DFO.
National Pollutant Release Inventory (NPRI) Reporting	ECCC	The Project may be subject to annual NPRI reporting requirements if operational pollutant thresholds are met or exceeded. Reporting to the NPRI is mandated by CEPA and administered by ECCC.
Migratory Bird Convention Act, 1994 (*MBCA*) Permit	ECCC	Compliance legislation. The requirement to obtain a permit under the MBCA is not anticipated at this time.
Species at Risk Act (SARA) Permit	ECCC, DFO	Compliance legislation. Species at Risk (SAR) impacts and subsequent permitting are not anticipated at this time. No SARA permits were acquired for environmental studies for the Project, as none were required.
Approval of Emergency Response Assistance Plan	Transport Canada	The Proponent will apply for approval of an Emergency Response Assistance Plan (as required) based on requirements under the Transportation of Dangerous Goods Regulations, S.O.R./2001-286.
Explosives Transportation Permit	Natural Resources Canada (NRCan)	Pursuant to Section 28 of the Explosives Regulations, S.O.R./2013-211, the Proponent must submit an application for authorization for the transport and use of an explosive. This permit will be acquired if explosives are required to be transported in the event of their use (blasting) to support the construction of the Facility.
Temporary Blaster's License or Blaster's Permit	NRCan	The *Explosives Act* requires anyone working with explosives to have a license, certificate or permit issued by the Minister of Natural Resources. This permit will be acquired if explosives are required for the construction of the Facility.

2.3.2 Provincial

The Project is subject to a Class I EA as determined by Nova Scotia and Climate Change (NSECC) and the Environmental Assessment Regulations, N.S. Reg. 93/2025 under the *Environment Act*, S.N.S. 1994-95, c 1. As such, the submission of this EARD/IPD has been prepared in accordance with:

- A Proponent's Guide to Environmental Assessment (NSECC, 2025a)
- The Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSECC, 2009a)
- Nova Scotia Class I Environmental Assessment Checklist (NSECC, 2025d)

Other regulatory requirements, including approvals, permits, notification, and compliance may apply to the Project (Table 2.2).

Table 2.2: Provincial Regulatory Requirements

Requirement/Application	Regulatory Body	Application Permit Status and Comments
Environmental Assessment Registration	NSECC	This approval application (this EARD/IPD) will be submitted to NSECC in accordance with the *Environment Act*, S.N.S. 1994-95, c 1.
Industrial Plant / Facilities Approval	NSECC	This approval application will be submitted to NSECC in accordance with the Activities Designation Regulations, N.S. Reg. 47/1995, following EA Approval and prior to Project construction/commissioning.
Dangerous Goods Transportation Regulation	NSPW	Compliance with provisions of the Dangerous Goods Transportation Regulations, N.S. Reg. 152/85 as required during construction, operations and decommissioning.
Dangerous Goods Approval	NSECC	This approval will be acquired prior to the storage of materials as set out in the Dangerous Goods Management Regulations, N.S. Reg. 56/95, Schedule A.
Filing of Approved Contingency Plan	NSECC	A contingency plan is to be filed with NSECC prior to the storage of dangerous goods onsite, in accordance with the Dangerous Goods Management Regulations, N.S. Reg. 56/95.
On-Site Sewage Disposal Approval	NSECC	This approval will be acquired prior to the installation of any on-site sewage disposal systems as set out in the On-site Sewage Disposal Systems Regulations, N.S. Reg. 317/2015.
Water Approval – Withdrawal and/or Storage	NSECC	Water approvals will be submitted to NSECC in accordance with the Activities Designation Regulations, N.S. Reg. 47/1995, following EA Approval.
Wetland and/or Watercourse Alteration Permit	NSECC	Wetland alteration applications will be submitted to NSECC in accordance with requirements under the *Environment Act*, S.N.S. 1994-95, c 1 following EA approval. Watercourse alteration applications are not expected to be required.
Boilers and Pressure Vessels: Equipment License	Nova Scotia Labour Skills and Immigration	All boilers and pressure vessels (if required) will be installed and inspected at regular intervals as prescribed by the Chief Inspector per the Boiler and Pressure Equipment Regulations, N.S. Reg. 10/2011.

Requirement/Application	Regulatory Body	Application Permit Status and Comments
Electrical Wiring Permit Communications Cabling Permit	Nova Scotia Labour Skills and Immigration Nova Scotia Power Inc (NS Power)	Permits to be applied for before installing/modifying of electrical or communication installations during construction.
Notification of Blasting	NSECC	Notification to be submitted prior to blasting activities, if required.
Overweight/Special Move Permit Access Permit Work within Highway Right-of-way	Nova Scotia Public Works (NSPW)	Permits to be applied for before mobilizing oversize vehicles on public roads. Permits to be applied for before constructing new driveways. Permit s to be applied for before commencing work within a highway right-of-way.
Endangered Species Act, S.N.S. 1998, c. 11 (ESA) Permit	Nova Scotia Natural Resources (NSNR)	Compliance legislation. Provincial SAR impacts and subsequent permitting are not anticipated.
Building Plan Approval	Office of the Fire Marshal	Prior to the start of construction, the Proponent will provide building plans for the construction of the Facility to the Fire Marshal.
Heritage Research Permit Archaeological Resource Impact Assessment (ARIA) Approval	Nova Scotia Communities, Culture, Tourism, and Heritage (NSCCTH)	NSCCTH Permit A2025NS176 obtained to complete the ARIA (Section 12), received September 19, 2025.
Nova Scotia Temporary Workplace Traffic Control Manual	NSPW	Compliance for the use of provincial roads during the construction, operation, and decommissioning phases of the Project.

2.3.3 Municipal

Municipal Planning Strategies and Land Use Bylaws in MOPC require approval and/or permits for industrial projects (Table 2.3). The Project is in the Rural General Zone (G1) which permits industrial use subject to the approval of a development permit (Municipality of Pictou County, 2025a, 2025b). Project components may also be subject to provisions under the *Municipal Government Act*, 1998, c. 18, s.1.

Table 2.3: Municipal Regulatory Requirements

Requirement/Application	Regulatory Body	Application Permit Status and Comments
Building and Development Permits	MOPC	Application will proceed following receipt of EA approval and prior to construction.

2.4 Project Alternatives

Prior to preparation of this EARD/IPD, the Proponent completed an alternatives assessment. In accordance with the IPD Part B: Project Information Section 12 requirements, the Proponent considered:

- Alternative means of completing the Project that are technically and economically feasible through the use of best available technologies
- Alternatives to the Project that are technically and economically feasible
- Alternative locations for the Project are discussed in further detail in Section 3.1.1

The Proponent has identified this Project as the most viable option to add fast-acting electricity supply, security, and reliability to the Nova Scotia electricity grid. Project alternatives that can be considered in parallel to this Project may include:

- Grid-Scale Battery Energy Storage
  - Batteries provide fast response with zero direct atmospheric emissions
  - Clean Power Plan has targets to deploy 300 MW of battery energy storage systems
- Additional wind power
  - Clean Power Plan has targets of 1,000 MW of new wind power supply by 2030
- Additional solar power
  - Clean Power Plan targets increasing the solar power production by 300 MW by 2030
- Increased extra-provincial electricity imports

While these alternatives each partially contribute to the overall functioning and decarbonizing of the Nova Scotia electricity grid, they do not provide the new capacity required to support the phase out of expensive and carbon-intense coal-fired facilities nor do they provide the quick-response required to support the significant build-out of variable production renewable resources. Project alternatives were thoroughly evaluated and modeled in recent Integrated Resource Plans filed with the Nova Scotia Energy Board, demonstrating the need for the Project, which is also specifically referenced in the 2030 Clean Power Plan.

The Proponent has considered alternative fuel sources for the Facility, ultimately deciding that a dual-fuel configuration is optimal, allowing the Facility to operate on natural gas and light fuel oil (diesel). Coal was not considered as the goal of the Project is to reduce reliance on high-GHG sources. Hydrogen fuel is considered as a future fuel source should it become available in the province. The combustion turbine design shall allow for operation on blended hydrogen and natural gas fuel based on blend ratios that have been fully tested and demonstrated for commercially available combustion turbine models and shall allow for a future transition to 100% hydrogen fuel with minimal retrofitting. The primary fuel for the combustion turbines is natural gas, supplemented by light fuel oil when necessary. Each unit shall be capable of starting on either natural gas or light fuel oil and performing online fuel transfer between natural gas and light fuel oil seamlessly. This flexibility ensures uninterrupted operation and enhances the plant's ability to respond to fuel supply variations.

Other potentially viable locations for a fast-acting natural gas power generation facility have been considered as part of the initial project planning by NS Power but, were not progressed due to environmental, social, cultural, site control, and/or electrical grid interconnection factors (see Section 3.1.1).

Alternative means of carrying out the Project have been considered by the Proponent. For the purpose of the EARD/IPD, General Electric's LM6000 combustion turbine generator model is being considered. This model is a flexible and synchronous condensing capable aeroderivative combustion turbine generator with a startup time and ramp rate well suited to the needs of the Project.

In summary, the Proponent has considered alternative sites, alternative means of completing the Project, and alternatives to the Project. Given the alternatives considered, the Project as proposed represents the most economically and technically feasible option for supplying Nova Scotians with safe and reliable electricity.

2.5 Incidental Activities Within the Scope of the Project

As required by IPD Guidance (IAAC, 2025) Part B: Project Information Section 9, activities that are incidental to the designated Project's construction and operation that will be overseen by the Proponent and are included in the scope of this EARD/IPD include:

1. Construction and operation of the power plant.
2. Construction and maintenance of the on-site electrical interconnection between the power plant and substation.
3. Construction and maintenance of the access road from the power plant to White Hill Road.
4. Water supply for the power plant (to be confirmed upon sourcing option selected).

2.6 Incidental Activities Outside the Scope of the Project

The IPD Guidance (IAAC, 2025) Part B: Project Information Section 9 also requires a discussion relating to incidental activities that will be undertaken by a third party. Interconnection to the natural gas pipeline and the installation of new electrical transmission lines are incidental activities required to operate the Facility but excluded from this EARD/IPD. Such scopes are typically implemented (permitting, design, construction, ownership and operation) in Nova Scotia by separate companies (Maritimes and Northeast for the natural gas interconnection and NS Power for the electrical interconnection from the on-site substation to the existing NS Power grid) because such entities have regulatory rights and obligations associated with such interconnection scopes. These interconnections will be designed and permitted as applicable separately from the natural gas power generation facility.

2.7 Relevant Studies, Strategic, and Regional Assessments Conducted

The IPD guidance (IAAC, 2025) Part A: General Information Section 5 requires a summary of relevant regional studies and strategic plans. Regional Assessments are conducted pursuant to Sections 92-94 and in accordance with Sections 96-103 of the *Impact Assessment Act.* As of the date of this document's publication, the Project is not taking place in an area with a previously completed Regional Assessment, according to the Canadian Impact Assessment Registry (NSECC, 2025).
(Government of Canada, 2025b)
The Strategic Assessment of Climate Change (Government of Canada, 2020), conducted under Section 95(2) of the *Impact Assessment Act,* is applicable as the Project is a designated activity under the *Physical Activities Regulations*, S.O.R./2019-285. The Strategic Assessment of Climate Change has been considered in Project development and design, including potential alternative means of carrying out the Project (Section 2.4) and preliminary estimates of greenhouse gas emissions associated with the Project (Section 7.2).

2.8 Project Funding

All project development costs to date have been funded directly by the Proponent, which was established as per the *More Access to Energy Act*, 2024, c.2, Sch.B, s.1. The Proponent intends to conduct a competitive procurement process in early 2026 to select the entity which will finance and implement the Project. Federal authorities are not providing financial support for this project (IPD Guidance Part D Federal, Provincial, Territorial, Indigenous, and Municipal Involvement and Effects Section 16).

3.0 DESCRIPTION OF THE UNDERTAKING

3.1 Geographical Location

The Project is located on private land within MOPC approximately 12 km southwest of New Glasgow, near the communities of Marshdale, Concord, Lorne, and Glengarry Station, Nova Scotia (Drawing 2.1). The Project is centered at approximately 45.4439°N, 62.7397°W.

A Project Area was established to inform field and technical surveys and to facilitate preliminary Project design. The Project Area includes the boundaries of the private land parcel (i.e., PID 00910307) on which the Project is proposed (Table 3.1, Drawing 2.1). A Project Footprint was subsequently established, which includes the physical areas where direct disturbance can be expected to occur in relation to the Project, associated with both temporary and permanent components (Table 3.1).

Table 3.1: Areas of Study

Area of Study	Area (ha)
Project Area	55.95
Project Footprint(1)	12.55

(1) Area (ha) is an estimate of the temporary and permanent footprint of the Project Area and is subject to change upon final engineering design. Following the final engineering design, the area will be refined.

3.1.1 Siting Considerations

As part of the Project planning process and alternatives assessment (Section 2.4), a constraints analysis was undertaken that considered potential effects to the environment, nearby residents, and sociocultural resources early in the EA process, prior to field studies being completed. A detailed assessment for four potential sites in Marshdale was completed, with computed normalized performance scores used to compare the attributes of the four sites. These performance scores included considerations of the following criteria:

- Environmental
- Social and Cultural
- Economic
- Technical

Project siting also considered the following factors:

- Proximity to natural gas supply (i.e., Maritimes & Northeast Pipeline).
- Proximity to the Nova Scotia electricity grid and strategic interconnection point for grid stability and reliability considerations.
- Availability and accessibility of suitable land parcels.
- Avoidance of known protected areas, significant habitats, and wildlife sites, provincial parks, and reserves, and field identified archaeological, cultural, and heritage resources.
- Maximizing use of previously disturbed areas to the greatest extent possible.
- Adherence to setbacks and separation distance requirements (Table 3.2).

Table 3.2: Summary of Setbacks and Separation Distances

Setback	Distance	Relevant Regulator
Watercourses	Recommended 30 m (from disturbance)	NSECC
Inland Watercourses	15.24 m (from the ordinary high-water mark)	MOPC
Wetlands	Recommended 30 m	NSECC
Wetlands of Special Significance	Recommended 30 m (to be determined in consultation with NSECC)	NSECC
Old-growth Forest Stands	100 m limited development buffer (buffer distance subject to NSNR consultation, applicable on Crown land)	NSNR
Rare Plants	Species-specific	NSNR

Setback	Distance	Relevant Regulator
Rare Lichens	100 m to 500 m (species-specific, may be only appliable on Crown land)	NSNR
Protected Areas & Public Resources	To be determined during consultation.	NSECC, NSNR, MOPC

Following this assessment, Strum completed a detailed constraints assessment to support potential environmental constraints, and to support IESO to select one site to move forward with through the EARD/IPD based on potential environmental constraints. Through this process, Strum also identified specific field work requirements to support the EARD/IPD. The site selected and presented herein was selected based on social and cultural, economic, technical, and environmental considerations as listed above.

3.2 Project Proximity to Other Areas

3.2.1 Federal Lands

The Project is not located on Federal Lands under administration and management by the Government of Canada. The nearest parcel of Federal Land is located in Pictou Landing First Nation, approximately 23.5 km north of the center of the Project Area (Drawing 2.1).

3.2.2 Towns or Cities

The Project is located approximately 12 km southwest of New Glasgow, near the communities of Marshdale, Concord, Lorne, and Glengarry Station, Nova Scotia (Drawing 3.1).

3.2.3 Mi’kmaq Communities

The nearest Mi’kmaq community is the Boat Harbour West Indian Reserve No. 37, which is part of the Pictou Landing First Nation. This is approximately 23.5 km from the center of the Project (Drawing 3.2). Refer to Section 5 and Section 13 for additional details on the Mi’kmaq of Nova Scotia.

3.2.4 Protected Watersheds and Water Areas

The Town of Stellarton Municipal Water Supply Area partially overlaps the Project Area (Drawing 3.3). This water supply area is not a designated Protected Water Supply Area as defined by NSECC. The MOPC Municipal Planning Strategy has included this water supply area, and states that it has a goal of protecting it (Municipality of Pictou County, 2025b). The Town of Stellarton uses a multi-stage Water Contingency Plan based on water levels in the East River. These are meant to conserve water enroute to the municipal supply system. Restrictions range from voluntary restrictions to a full ban on outdoor use (filling pools, washing vehicles, etc.). The Stellarton Source Water Protection rules do not specifically apply to groundwater withdrawal, which is managed through a permitting process administered by NSECC if daily withdrawal rates exceed 23,000 L/day. The Proponent will continue to engage with MOPC and the Town of Stellarton, and will implement all watershed protection stipulations contained in the Municipal Development Agreement (Section 2.3.3).

3.2.5 Parks and Protected Areas

The nearest protected area is the Hopewell Conservation Lands, located approximately 4.8 km north of the Project. The nearest Important Bird Area (IBA), Cobequid Bay (NS019), is 47 km west of the Project (Drawing 3.3).

3.2.6 Non-Participating Receptors

The Project's geographical location in relation to proximity to nearby non-participating receptors is detailed in Sections 7.1 and 7.3. The nearest non-participating receptor to the Project (MR02) is approximately 833 m from the Project Footprint (Drawing 3.4).

A selection of civic addresses was chosen to represent non-participating receptors nearest to the Project Footprint. These modelled receptors and civic address are shown on Drawing 3.4. This list, in some cases, identifies representative receptor groupings; while each individual receptor is not modelled individually, results for all receptors are shown graphically in the respective effects assessment sections (for air quality and noise).

Table 3.3: Summary of Modelled Receptors and associated Civic Addresses

Modelled Receptor Number	Associated Civic Addresses	Distance to Project Footprint (m)
MR01	2262 White Hill Road	894
MR02	2731 White Hill Road	833
MR03	416 Marshdale Road	1969
MR04	1646, 1648, 1651 Culloden Road	2340
MR05	42 Grant 2 Road	2489
MR06	342 Grant 2 Road	1402
MR07	359, 360, 361 Lorne Station Road	1316

3.3 Project Features

The operation of the Project will be accomplished using several technologies and approaches. The main production stages for the Project include:

- Detailed design of the natural gas power generation facility.
- Construction
  - Site preparation and construction of the natural gas power generation facility.
  - Development of the production well field necessary to provide water to the facility for processing.
  - Interconnection with the natural gas pipeline*.
  - Interconnection with the electrical transmission grid*.
- Operations.
- Decommissioning.

*As described earlier, interconnection to natural gas pipeline and the new electrical transmission lines are incidental activities required to operate the Facility but excluded from this EARD/IPD as they will be undertaken by a third party. These interconnections will be designed and permitted as applicable separately from the natural gas power generation Facility.

3.3.1 Project Components

A series of specific components will be finalized through the front-end engineering design (Pre-FEED) prior to commissioning. A list of Project components and the description associated with Project development are summarized in Table 3.4 and shown on Drawing 3.5.

Table 3.4: Project Components and Description

Project Component	Description
Access road	One driveway connected to inner Facility defined vehicular routes to allow for product loading, unloading, maintenance, and workforce access.
Natural gas-fired combustion turbine	Nominal net capacity up to 300 MW, consisting of a combustion turbine generator, air inlet filtration unit, exhaust stack, start-up system, and instrumentation and control system. Designed with synchronous condensing capabilities.
Liquid fuel storage system	Includes storage tanks, piping, fuel unloading equipment and secondary containment.
Electrical systems	Includes generator step up transformers, 138 kilovolt (kV) grid interconnection and protection, and auxiliary station services.
Water supply and storage	Drilled wells to supply raw water to the site. Raw water will be stored on the site.
Water treatment for emissions and cooling	Raw water will be demineralized through water treatment system. Demineralized water will be stored on the site.
Residual Process water treatment	Concentrated water with elevated mineral content will be residual to the water treatment process. The concentrated water will be neutralized, tested for quality, and stored in a settling pond for a controlled release.
Stormwater retention ponds	Site drainage water will be collected and tested prior to controlled release.
Administration building	Building for staff administration and comfort station.
Fire suppression	Install fire suppression systems. Installation of a firewater storage tank may be required.
Septic system	Install a septic system. Based on the final engineering design, a sanitary wastewater treatment plant may be required.
Temporary laydown and construction facilities	Temporary facilities needed to build/combine various Project components.

3.3.2 Production Inputs

The following sections describe the main inputs required for operation of the Project: natural gas, light fuel oil, and fresh water. The Facility is forecasted to be operational approximately 25% of the year based on electrical grid demand for electricity supply and grid support. The production inputs have been described conservatively at full capacity for a 24-hour day. The average daily consumption will be well below these quantities.

3.3.2.1 Natural Gas

Natural gas will be the primary fuel used to operate the power plant. Natural gas will be supplied through an underground pipeline connected to the existing transmission pipeline. The plant will require a compressor station to supply the natural gas to the combustion turbines at the required pressure.

The facility will use approximately 60,000 dth/day of natural gas when operating 24-hours at full capacity. This converts to 1.60 million cubic meters of natural gas per day.

3.3.2.2 Light Fuel Oil

Light fuel oil will be the secondary fuel source and is forecasted to be used for less than 20% of the annual operating hours. Light fuel oil will be delivered to the site via trucks and will be stored at the site. The Facility will use approximately 75,000 litres of fuel oil per hour when the Facility is generating at full capacity, and the power plant shall be capable of storing a 5-day supply of light fuel oil, which requires approximately 9 million litres of fuel storage. Storage tanks suitable for the total volume required for five days of full-load operation will be located within the Project Footprint in proximity to an existing natural gas pipeline as shown on Drawing 3.5. The fuel storage system will include a multi-tank arrangement with the total quantity and location of storage tanks to be determined during detailed engineering. Fuel storage tanks will include secondary spill containment, an oily water separator for processing rainwater collection, and a testing and monitoring system. Stormwater runoff will be managed as described in Section 9.1.

Fuel turnover should take place every 6 to 12 months and long-term fuel storage measures should include monitoring, testing, and fuel treatments for fuel stored longer than 12 months.

3.3.2.3 Freshwater

A sustainable groundwater supply will be required for power plant operation. Preliminary desktop investigations estimate a peak raw water consumption of 175 m^3/hr and average annual consumption of 23 to 31 m^3/hr based on the expected power plant operation. Reduced water consumption rates are estimated during colder seasonal conditions and natural gas operation. Raw water tanks are shown on Drawing 3.5.

Raw water is expected to be supplied by groundwater wells installed in or near the Project Area. Raw water will be used for the demineralized plant, potable water services, and the fire water system.

Eight hours of raw water will be stored on the site to be used as service water and supply to demineralized water production. Fire water will also be stored on the site, and a two-hour supply will be available. It is anticipated there will be two 1,500 m^3 raw water/fire water tanks that may be considered in combination with the four 750 m^3 tanks for demineralized water in the final design.

Based on expected average demand, the Project will require a range from 14-19 wells (based on predicted yield) supplemented by water storage to support the Project. Water storage will be required to meet the expected peak demand periods. Water recycling, alternate technologies, and alternate water supplies (rainwater harvest system) will also be considered to reduce overall water needs.

A hydrogeological study will be completed to inform the number, location, and design of groundwater production wells necessary to achieve a sustainable yield. Further information is provided in Section 8.

A demineralization plant will be required to supply demineralized water for plant use. Demineralized water will be stored in four 750 m^3 demineralized water tanks, which will supply the combustion turbines through a distribution system. Demineralized water is required for emissions control, specifically NO_x, and intermittent compressor washing.

The demineralization water system will include the following:

- Multimedia Inlet Filter
- Water Treatment System
- Polishing demineralizer
- Demineralized water storage tanks
- Demineralized water pumps

At peak operation, treated process water release from the demineralized water plant is expected to be 50 m^3/hr.

Wastewater and stormwater management systems will ensure water discharge and runoff from the site meet Canadian Council of Ministers of the Environment (CCME) Guidelines. These systems include:

- Oil/water separator system to process rainwater drainage from the fuel storage tank containment.
- Oil/water separator system to process drainage from other areas where oil and fuel products are handled and there is the potential for spillage to the drainage system.
- Neutralization system and wastewater property monitoring system for demineralized water treatment plant wastewater.
- Settling pond to receive stormwater and wastewater and manage release rates.

Water release rates must be controlled to ensure there are no adverse impacts to receiving points or watercourses such as erosion or effects on aquatic life.

3.3.2.4 Production Pathway

A fast-acting natural gas power generation facility is designed to provide rapid, flexible electricity supply to support grid stability during periods of high demand or fluctuations in renewable energy output. The Project involves simple-cycle gas turbines fuelled by natural gas supplied by the Maritimes & Northeast Pipeline (M&NP), or by light fuel oil trucked into the Project Area. When the grid operator indicates a need for the facility to operate, this Facility can rapidly respond with high ramp rates, meaning the facility can start, stop, or adjust power output in short order.

A summary of operations is provided below.

- Fuel Delivery: Natural gas is delivered to the power plant through underground pipelines or light fuel oil is available at on-site storage. The natural gas interconnection is ancillary infrastructure not assessed in the EARD/IPD.
- Combustion: The natural gas is burned in a combustion chamber, which produces hot gases. This process releases energy in the form of heat. Demineralized water is used to control flame temperatures during combustion.
- Turbine Operation: The hot gases rotate a turbine as they expand across the turbine blading, similar to how wind turns a windmill. This rotating motion is converted to electricity.
- Electric Generator: The turbine is connected to a generator. As the turbine spins, it turns the generator, which converts the mechanical energy into electrical energy.
- Cooling and Exhaust: After passing through the turbine section the exhaust gases are safely released through a stack.
- Electricity Transmission: The electricity produced is sent through power lines to homes, businesses, and industries. The electrical transmission is ancillary infrastructure not assessed in the EARD/IPD.
- Control and Monitoring: Operators monitor the entire process to ensure normal, safe, and efficient operation. Systems are in place to adjust operations based on the power demand and environmental conditions.

3.4 Project Phases

The Project will include three phases:

- Site preparation and construction
- Operations
- Decommissioning

Activities and requirements associated with each phase are discussed in the following sections.

3.4.1 Site Preparation and Construction

Construction activities will not occur until the necessary approvals, permits, and permissions are received. Site preparation activities include:

- Land surveys for detailed placement of infrastructure and associated works
- Geotechnical investigations

- Aquifer investigations
- Placement of erosion and sedimentation control measures
- Vegetation clearing, excavating, grading, and compacting for construction

All construction staging and laydown areas are anticipated to occur within the Project Footprint. General construction activities include:

- Erosion and sediment control and temporary sediment basins
- Installation of access road infrastructure (upgrading existing and new construction)
- Development of temporary storage and laydown areas
- Production wellfield development
- Materials preparation and storage
- Foundation excavation and construction
- Transportation of Facility components, equipment, and materials
- Installation and assembly of Facility infrastructure
- Construction of balance of plant and operator facilities building and other structures
- Piping and electrical work
- Site waste and dust management
- Utility connection
- Site traffic control measures
- Construction of perimeter security fence and gates
- Removal of temporary works and site restoration
- Commissioning

A review of environmental considerations, mitigations, and best management practices to be followed during Facility construction activities can be found under Section 16.0.

3.4.1.1 Site Preparation

Site preparation for the Project will include geotechnical surveys, clearing, grubbing, and grading.

A geotechnical investigation will determine soil and on-site fill competency. The geotechnical investigation will ensure the area is able to support the various infrastructure and roads to be developed. Following the geotechnical surveys, the Project Footprint will be cleared of vegetation (i.e., trees and shrubs) using tree clearing and harvesting equipment. During this phase, overburden (i.e., stumps, roots, downed timber, humus, and topsoil) will be removed (i.e., grubbed) to expose the compacted soil layer (i.e., hardpan) and/or underlying bedrock. Any material which may be used in successive phases will be retained on-site for re-use in landscaping and grading.

The required grading for the Facility construction will be determined as part of the detailed engineering design in conjunction with the geotechnical investigation findings. All grading will be designed following best engineering practices and will be conducted such that minimal additional surface water will be directed toward off-site environmental features. Compaction will be incorporated in the grading phase and will be in accordance with geotechnical specifications.

In the case of exposed bedrock, blasting may be required to accommodate infrastructure and foundation installation. A blasting management plan (if/as required) will be developed and implemented to minimize the potential for blasting to impact surrounding infrastructure or the environment. Explosives will be transported to the required location on the day of the scheduled blast and will not be stored on the site. Blast monitoring will be carried out, as required.

Access to the Project will be via a new access road from the adjacent White Hill Road. The access road will be equipped with security gates (Drawing 3.5). The Proponent will implement a Traffic Management Plan in consultation with provincial and municipal authorities to schedule construction deliveries, minimize heavy truck use during peak hours, and ensure safe road access. Any road wear will be monitored, and repairs will be coordinated with the municipality if needed.

3.4.1.2 Construction

Once the site preparation has been completed, the Facility construction will begin. This will include the general construction activities listed above. Prior to commencing the construction of the Facility and its associated works, construction laydowns and storage areas will be established for temporary placement of equipment and construction materials. Once the storage and laydown areas are developed, the remaining Facility components will be constructed as equipment and building materials are delivered, following the sequence determined during the Project's development and design phase. Various contractors will be responsible for installing footings and foundations, erecting (framing) building walls, roofs, storage tanks, and enclosures. Specialist contractors will support the various component installs.

The development of the Facility is anticipated to require the following equipment:

- Backhoes
- Bulldozers
- Compactors
- Compressors
- Cranes
- Crusher
- Dump Trucks
- Excavators
- Loaders
- Manlifts
- Mixer Trucks
- Pickup/Light Trucks
- Pile Boring Machines
- Pile Driving Machines
- Forklifts
- Feller Buncher
- Generators
- Graders
- Ground Heaters
- Heavy Haulers
- Hydroseeder
- Hydrovac
- Tractors/Trailers
- Tree Clearing and Harvesting Equipment
- Trenchers
- Vacuum Trucks
- Welding Machines

Laydown Areas, Concrete Batch Plants, and Ancillary Infrastructure

Civil construction activities for the Facility will be completed effectively by locating concrete batch plants at site during the pouring of the foundations and pads.

The laydown area will be immediately adjacent to the Facility final footprint and within the Project Footprint. It will be levelled during site preparation and then available during construction and reused during operations as required.

Workforce Housing

Local personnel will use existing housing. Construction resources will make use of nearby hotels, campgrounds and short-term rental availability.

Surface Water Management

During construction, temporary fencing will be installed to secure the site, and surface water management systems will be developed, including diversion and collection ditches, roadside drainage channels, vegetated swales, and a settling pond. Areas of the Project Footprint associated with the Facility will likely be unpaved, and smaller areas may be paved or vegetated.

Prior to the development of the Project, the production well field will be required. This will involve clearing and drilling the well field, which is expected to be contained within the Project Area. Groundwater yield is based on desktop methods, which predict that between 14 and 19 wells may be required, supplemented with up to 3,000 m^3 of water storage. Desktop reviews for groundwater yield will be validated in the field using pump tests to confirm yield.

3.4.1.3 Commissioning

The Facility and all ancillary infrastructure will undergo a series of pre-commissioning tests for mechanical, electrical, and control functions prior to initializing commissioning and startup. Once commissioning and startup has been initiated, another series of performance checks for safety systems will be completed. Commissioning will be complete after the Facility has cleared all tests.

3.4.2 Operations and Maintenance

3.4.2.1 Operating Hours and Staffing

Operations staff at the Facility may be required 24 hours/day, 7 days/week, with the exception of scheduled shutdowns and unscheduled outages. During all operational periods, the Facility will be staffed. It is expected that the Facility will operate 25% of the time annually. The lifespan of the Facility is estimated to be a minimum of 30 years.

3.4.2.2 Emissions Controls

The power plant shall be equipped with advanced emissions control technologies to minimize environmental impact and comply with regulatory standards. Key features of the emissions control system are detailed in the following sections.

Low NOx Combustion Technology

The combustion turbines shall use advanced low NOx (nitrogen oxides) combustion technology. This technology reduces the formation of NOx during the combustion process, significantly lowering emissions levels. The low NOx burners are designed to maintain optimal combustion temperatures and fuel-air mixtures, ensuring efficient and clean combustion and compliance with the emissions performance requirements.

Continuous Emissions Monitoring Systems

The power plant may include a Continuous Emissions Monitoring System (CEMS) to continuously monitor and record concentrations of key pollutants. A CEMS is capable of providing real-time data on emissions levels. This data ensures compliance with environmental regulations and helps optimize the operation of emissions control systems. CEMS include automatic calibrations with the required calibration gas cylinders.

Environmental Compliance and Reporting

The Facility's emissions control strategy includes regular environmental compliance audits and reporting to relevant regulatory bodies. This ensures that the plant operates within the required environmental standards and continuously seeks opportunities for emissions reduction.

3.4.2.3 Freshwater Supply and Treatment

The Project will require the extraction of groundwater through production wells to supply process water needs. A hydrogeological field study will be conducted at the permitting stage to support a provincial application for groundwater withdrawal. The application will incorporate key protective hydrogeological study elements such as sustainable yield, and a groundwater-surface water interaction assessment will be included as required to ensure groundwater withdrawal does not negatively impact water quantity (and quality) of nearby aquatic features and groundwater well users. Based on well yields and plant configuration, groundwater modelling may be required. Further detail is provided in Section 3.3.2.3.

The Facility will be equipped with stormwater and wastewater management systems to protect the surrounding environment and community and ensure any water discharge or run off from the Facility meets local environmental regulations.

Treated process water discharge will be treated as necessary to meet CCME Water Quality Guidelines for the Protection of Freshwater Aquatic Life (FWAL) prior to being released. Typical treatment system designs include neutralization systems to ensure process water is safe to discharge. All discharged water will be tested to ensure CCME FWAL guidelines and NS Tier I Environmental Quality Standards (EQS) are met before being released from the settling pond at a controlled rate.

3.4.2.4 Process Water Treatment

Demineralized water will be required for combustion turbine systems and emissions control. Water will be demineralized through a water treatment process, which includes the following components:

- Multimedia Inlet Filter
- Primary Demineralizer
- Polishing demineralizer
- Demineralized water storage tanks
- Demineralized water pumps

The demineralized water tank will be stainless steel and will be provided with insulation and immersion heaters to prevent freezing. The plant demineralized water pumps and service water pumps will be housed indoors.

Wastewater discharge will be produced during operations. Based on the power plant configurations with a high range of water consumption (i.e., reasonable conservative estimates for water consumption), peak water demand for operation of the demineralized water plant is 175 m^3/hr. At peak operation, effluent release from the demineralized water plant is expected to be 50 m^3/hr. A neutralization system and wastewater quality monitoring system will ensure wastewater is safe to discharge, then, wastewater will be directed to a settling pond and is planned to be discharged at a controlled rate after being tested and treated to meet CCME FWAL guidelines and NS Tier I EQS for water.

3.4.2.5 Surface Water Management

During operations, stormwater will be managed by directed runoff into a settling pond through diversion and collection ditches, roadside drainage channels, and/or vegetated swales. Wastewater will also be released into the settling pond after going through a neutralization system. Stormwater will be treated to ensure CCME FWAL guidelines and NS Tier I EQS are met, then released at a controlled rate.

3.4.2.6 Fuel Supply and Storage

Natural gas will be the primary fuel used to operate the power plant and liquid fuels, such as diesel, renewable diesel, or biodiesel, will be used as a secondary fuel. On-site storage will be required for the liquid fuel options, whereas natural gas will be supplied by a pipeline connection.

The plant will include two tanks for liquid fuel storage suitable for five days of full load operation and will be located adjacent to a natural gas pipeline. Fuel storage considerations are outlined in Section 3.3.2.2.

3.4.2.7 Alternative Energy Sources

As cleaner (lower carbon emission) fuels become more readily available, the Facility will be able to be retrofitted to include alternatives fuels such as hydrogen or renewable diesel.

3.4.2.8 Auxiliary Administrative Buildings

Administrative buildings will provide a location for the daily administrative operations of the Facility, including offices, washrooms, and staff spaces. Potable water will be sourced from a drilled well, and gray water will be treated through an on-site septic system or holding tank. Parking will be provided with a lot adjacent to the administrative buildings.

3.4.2.9 Site Security and Firefighting

The Facility will be surrounded by chain-link fencing with an access-controlled gate at the boundary of the Project Footprint (Drawing 3.5). Firefighting systems (including firewater system) will be installed and designed with up-to-date codes and standards. It is expected that firefighting systems will be a combination of risers located throughout the Facility, with sprinkler systems in buildings. Access will not be restricted within the broader Project Area surrounding the Facility.

3.4.2.10 Access Roads

During operations, access roads will be used for the Facility workforce and will be maintained. During the winter months, all roads will be plowed, sanded, and/or salted, as required for driving safety and to ensure access to all site locations in the event of an emergency.

3.4.2.11 Vegetation Maintenance

Vegetation management will be completed around the Facility. Timing of vegetation management will depend on site-specific conditions.

3.4.2.12 Facility Maintenance

Maintenance activities will apply to the Project access road and site infrastructure. Maintenance activities will conform to manufacturer's equipment specifications, industry best management practices (BMPs), and standard operating procedures. Maintenance work will be carried out on a proactive, periodic, and as needed basis.

Ongoing equipment maintenance will include routine inspections of the production wells, equipment, piping, storage tanks, operating facilities, drainage ditches, settling pond, and other associated site infrastructure to maintain proper operations. If equipment or site infrastructure is found to be faulty or inoperable, site personnel will be responsible for identifying the issue and arranging for the repair and/or replacement of components or equipment as required.

3.4.3 Decommissioning or Refurbishment

The Project is anticipated to have an operational life of at least 30 years, with the possibility of refurbishment to extend this lifespan. Decommissioning plans will be provided to NSECC for review prior to Project decommissioning.

Generally, the decommissioning phase will follow the same steps as the construction phase (in the reverse order) but will also include:

- Removal, recycling (where possible), and disposal of Facility infrastructure and equipment, as required.
- Reinstatement and stabilization of land, where necessary.
- Removal of access road or remain in place, per landowner lease agreements.

3.5 Project Schedule

Table 3.5 presents the proposed Project schedule from EA registration to Project decommissioning. If the IAAC deems an Impact Assessment is required for the Project, Project timelines are anticipated to extend approximately 3 to 5 years beyond the dates provided in Table 3.5.

Table 3.5: Proposed Project Schedule

Project Activity	Timeline(1)	Duration
EARD/IPD Registration	2025	
Detailed Engineering Design	2026 to 2028	2 years
Site Preparation and Construction	2027 to 2029	2 years
Commissioning	2029	
Operation	2030 to 2060 (may extend up to 2075)	30 years (up to 45)
Decommissioning or Refurbishment	At conclusion of Operation – 1 to 2 years	2 years

(1) The Project schedule is based on professional estimates current at the time of the EA and are subject to change as activities progress. The Proponent will keep NSECC and IAAC informed on revisions to the schedule.

4.0 PROJECT SCOPE AND ASSESSMENT METHODOLOGY

As a Class 1 provincial EA, this Registration Document and supporting studies have been developed to meet all requirements under Section 9(1A) of the NS *Environment Act*, SNS 1994-95, c 1. As such, this submission has been prepared in accordance with ‘A Proponent’s Guide to Environmental Assessment’ (NSECC, 2025a) and associated guidance provided by the province through the EA Modernization process.

In addition, as a designated project under the *Impact Assessment Act*, an IPD is required to be submitted to IAAC in accordance with the Guide to Preparing an Initial Project Description Government of Canada (IAAC, 2025).

Through consultation with NSECC and IAAC (Personal communication, C. Benjamin, July 2025), the Proponent has prepared one document, to fulfill the requirements of both processes. This document is referred to as the EARD/IPD. While the structure of this document follows requirements for the provincial EARD, language and considerations outlined in Schedule 1 of the Information and Management of Time Limits Regulations SOR/2019-283 (IAAC, 2024) have been carried throughout this EARD/IPD. Furthermore, the Proponent has developed a concordance table, outlining all requirements of the IPD to ensure all requirements have been addressed and to clearly demonstrate where each IPD requirement is located within the document. This concordance table will be provided to IAAC and NSECC at the time of submission of the EARD/IPD. This approach was discussed with both IAAC and NSECC prior to submission of the document to ensure that both levels of government were satisfied that a combined document would meet both regulatory pathways for review.

The Project Team engaged the following regulatory bodies to provide input and advice on the EA scope and planning:

- NSECC
- IAAC
- Nova Scotia Office of L'nu Affairs (OLA)
- NSNR
- DFO
- Environment and Climate Change Canada – Canadian Wildlife Service (ECCC-CWS)
- NS Department of Growth and Development (NSDGD)
- NS Department of Energy (NSDOE)

4.1 Assessment Scope and Approach

EA is a planning tool used to predict the environmental effects of a proposed project, identify measures to mitigate non-negligible adverse environmental effects, and predict the significance of any residual effects after applying mitigation measures.

The EA focuses on Valued Components (VCs). VCs are specific components of the biophysical and human environments that, if altered by the Project, may be of concern to regulators, the Mi'kmaq of Nova Scotia, stakeholders, and/or the general public. The EA scope for this Project includes:

- Identify VCs that the Project may interact with (by activity and phase) within established spatial and temporal boundaries.
- Establish the existing conditions for VCs.
- Identify potential interactions between the Project and the VCs.
- Assess the potential effects that could occur from the interactions.
- Identify mitigation measures to reduce or eliminate those effects.
- Evaluate the significance of the residual environmental effects using VC-specific criteria.
- Identify monitoring or follow-up programs to verify predictions and/or evaluate the need to implement adaptive management, if required.

The effects assessment completed herein has been developed to meet the requirements of the EARD, and Schedule 1 of the Information and Management of Time Limits Regulations SOR/2019-283 (IAAC, 2024).

4.2 Identification of Valued Components

The following VCs were identified based on the experience of the Project team and through engagement with regulators, the Mi'kmaq of Nova Scotia, and the public.

- Atmospheric Environment:
  - Atmosphere and Air Quality
  - Greenhouse Gases
  - Sound

- Geophysical Environment
- Aquatic Environment
    - Surface Water, Fish and Fish Habitat
    - Wetlands
- Terrestrial Environment
    - Terrestrial Flora
    - Terrestrial Fauna
    - Avifauna
- Socioeconomic environment
    - Economy
    - Land use and Land Value
    - Archaeological and cultural resources
- Species at risk (considered in the appropriate VC chapter, as necessary)

Further to the evaluation of VCs listed above, a summary of effects in federal jurisdiction is summarized in Section 18. This section will address items required under Schedule 1 of the Information and Management of Time Limits Regulations SOR/2019-283 (IAAC, 2024). This includes listing any changes to the environment that occur on federal lands, lands outside of Nova Scotia, or outside of Canada. Specifically, this section will outline summaries of effects to:

- Fish and fish habitat as defined in subsection 2(1) of the *Fisheries Act*.
- Aquatic species, as defined in subsection 2(1) of the *Species at Risk Act* (marine plants).
- Migratory birds, as defined in subsection 2(1) of the *Migratory Birds Convention Act*, 1994.

The Mi’kmaq people are the only First Nation/Indigenous Peoples present within Nova Scotia. As outlined in Schedule 1 of the Information and Management of Time Limits Regulations SOR/2019-283, Section (Mi’kmaq of Nova Scotia) outlines the following effects:

- Physical and cultural heritage
- Current use of lands and resources for traditional purposes
- Structures, sites, or things of historical, archaeological, paleontological or architectural significance
- Impacts to health, social, or economic conditions of the Indigenous Peoples of Canada

This grouping of VCs and other chapters form the requirements for both the provincial EARD and the federal IPD.

4.3 Spatial and Temporal Boundaries

Spatial Boundaries

Spatial boundaries are considered separately for each VC and are typically based on natural system boundaries or administrative/political boundaries, as appropriate. The following spatial boundaries have been established for the effects assessment (see individual chapter drawings):

- Project Area (PA): The total area bounded by the Project (Drawing 2.1).
- Local Assessment Area (LAA): The area which represents the maximum extent of predicted or measurable direct and/or indirect effects of the Project. The LAA is VC-specific and defined in each VC chapter.
- Regional Assessment Area (RAA): The area encompasses Project-related effects including diffuse or long-range effects. This area is larger than direct and indirect effects and will be used to support the assessment of cumulative effects, and accidents and malfunctions.

In addition to the Project Area, the Project has a defined Project Footprint (Drawing 2.1), which represents the direct physical disturbance area, where Project Infrastructure is proposed.

Temporal Boundaries

The temporal boundaries in Table 4.1 apply to all VCs unless otherwise stated.

Table 4.1: Temporal Boundaries

Project Phase	Temporal Boundary
Site Preparation and Construction	2 years
Operation and Maintenance	30 years (up to 45)
Decommissioning or Refurbishment	2 years following Operation and Maintenance

4.4 Potential Project-Valued Component Interactions

The potential interactions between the Project and the VCs, by phase, are presented in the individual VC chapters (Sections 7 to 12), following a description of existing conditions. Where an adverse effect on a VC is identified, strategies for mitigation, avoidance, or compensation are proposed. Where possible, mitigation measures are incorporated into the Project design to eliminate or reduce potential adverse effects.

4.4.1 Residual Effects Assessment Criteria

The significance of the effects after mitigation is determined using defined criteria. Most criteria will be the same for all VCs (Table 4.2); however, the magnitude criteria are VC-specific and are provided in the individual chapters.

Table 4.2: Effects Assessment Criteria

Rating Criteria	Rating
Magnitude The amount of change in measurable parameters or the VC relative to existing conditions.	VC-specific as outlined in individual chapters. All non-negligible changes are those categorized as either Low, Moderate, or High.
Geographic Extent * The geographic area in which a residual effect occurs.	Project Area: Residual effects are restricted to the Project Area. Local Assessment Area: Residual effects extend into the local assessment area. Regional Assessment Area: Residual effects interact with those of projects in the regional assessment area.
Duration The time required until the measurable parameter or VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived.	Short-term: Residual effect is restricted to no more than the duration of the construction phase. Medium-term: Residual effect extends through the operation and maintenance phase. Long-term: Residual effect extends beyond the decommissioning phase.
Frequency Identifies how often the residual effect occurs and how often in a specific phase.	Single event: Occurs once. Intermittent: Occurs occasionally or intermittently during one or more phases of the Project. Continuous: Occurs continuously.
Reversibility Describes whether a measurable parameter or the VC can return to its existing condition after the activity ceases.	Reversible: The residual effect is likely to be reversed after the activity is completed. Irreversible: The residual effect is unlikely to be reversed. Partially reversible: The residual effect will be partially reversed after the activity is completed.
Likelihood* Considers the probability of the residual effect occurring	Unlikely: The residual effect is unlikely to occur. Possible: It is possible that the residual effect will occur. Likely: It is likely that the residual effect will occur. Almost Certain: It is almost certain that the residual effect will occur.

* Criteria used for describing context of the effect; however these criteria do not factor directly into the significance definition.

Table 4.3 outlines the approach to determine the significance of effects from the Project on VCs.

Table 4.3: Definition of Significant Residual Environmental Effect

Magnitude	Duration	Frequency	Reversibility	Significance
Negligible	All	All	All	Not significant
Low	All	All	All	Not significant
Moderate	All	Once Sporadic	All	Not Significant
	Long Term	**Regular** **Continuous**	**Irreversible**	**Significant**
High	Short term Medium Term	Once Sporadic	Reversible Partially Reversible	Not significant
	Medium Term **Long term**	**All**	**Irreversible**	**Significant**

An evaluation has been completed to determine the significance of residual effects (based upon significance criteria) for each VC resulting in the interaction from Project activities once appropriate mitigation has been implemented. Potential effects, mitigation, monitoring, and residual effect for each VC are provided in Sections 7 to 12.

5.0 MI’KMAQ OF NOVA SCOTIA

The Mi’kmaq are the founding people of Nova Scotia and currently, the Mi’kmaq live throughout the province in 13 Mi’kmaq communities as well as off-reserve (OLA, 2015). The Project is located within the Mi’kmaq territory called Epekwitk aq Piktuk (Parks Canada, 2025).

The Mi’kmaq in the provinces of Nova Scotia, New Brunswick, and Prince Edward Island, and the Gaspé Peninsula in Quebec, are founded on land historically occupied by the ancestors of the Mi’kmaq. The earliest evidence of the Mi’kmaq of Nova Scotia in the Maritimes Region indicates that the ancestors of the Mi’kmaq have existed on the land for more than 11,000 years (MDCC, 2025).

The Mi’kmaq of Nova Scotia have established Aboriginal and Treaty rights, including the right to fish for a “moderate livelihood” which flows from the Peace and Friendship Treaties, and Aboriginal rights to hunt, fish, and gather for food, social, and ceremonial purposes, more broadly referred to as “traditional” purposes. Mi’kmaq rights are communal rights and therefore shared amongst all members of the Mi’kmaq Nation in Nova Scotia.

The Crown has a duty to consult with the Mi’kmaq of Nova Scotia, which is achieved in accordance with the Mi’kmaq-Canada-Nova Scotia Consultation Terms of Reference. As per Supreme Court of Canada instruction and subsequent guidance from governments, such as the Updated Guidelines for Federal Officials to Fulfill the Duty to Consult (INAC, 2011) and the Proponents' Guide: The Role of Proponents in Crown Consultation With the Mi'kmaq of Nova Scotia (OLA, 2012), the Crown may delegate procedural aspects of consultation to proponents.

However, the duty to consult, and ultimate decision-making authority, remains with the Crown. The results of the Proponent's Mi'kmaq of Nova Scotia engagement program and EA development is expected to be considered by the provincial government in the EA decision-making process.

For the purposes of consultation, 11 of the 13 Mi'kmaq communities are represented in consultation by Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO), which reports to the Assembly of Nova Scotia Mi'kmaq Chiefs. At this time, Millbrook First Nation, and Sipekne'katik First Nation represent their own communities in consultation through their elected Chiefs and Councils.

The nearest Mi'kmaq community to the Project is the Pictou Landing First Nation, with approximately 2,014 acres of reserve lands including the reserves of Boat Harbour West 37, Fisher's Grant 24, Fisher's Grant 24G, Franklin Manor 22 and Merigomish Harbour 31 (*Government of Canada*, 2025c; *Pictou Landing First Nation*, 2025). Pictou Landing First Nation is located north of Trenton on the south shore of the Northumberland Strait in Nova Scotia and is approximately 23.5 km from the Project centre (Drawing 3.2).

Pictou Landing First Nation has a total registered population of 699 with around 500 residing on Reserve (Government of Canada, 2025a). The Band Council consists of the elected Chief and six Councillors, serving two-year terms. The most recent election was held on November 27, 2025 (*Pictou Landing First Nation*, 2025).

5.1 Engagement

As an integral component of any project development activity in Nova Scotia, the Proponent engaged with various Nova Scotia Mi'kmaq communities and organizations, starting in September 2025.

The Proponent has notified the Mi'kmaq of Nova Scotia, provided current Project information, extended offers to meet, and will continue to provide opportunities to engage on the Project. The Proponent has notified the following Mi'kmaq communities, regulatory bodies and groups regarding the Project - the OLA, KMKNO, Native Council of Nova Scotia (NCNS), Pictou Landing First Nation, Millbrook First Nation, Paq'tnkek Mi'kmaw Nation, Membertou First Nation, and Sipek'nekatik First Nation - and has documented the engagement process (Table 5.1) per the Proponents' Guide: The Role of Proponents in Crown Consultation with the Mi'kmaq of Nova Scotia (OLA, 2012).

Given proximity to the Project Area, the Proponent prioritized direct engagement with the communities of Pictou Landing, Millbrook, and Paq'tnkek. Engagement with Sipekne'katik was also sought in recognition of its independent consultation process. Membertou was initially contacted under the assumption that it was outside of the KMKNO consultation framework; it has since been clarified that Membertou participates within that process.

Table 5.1: Engagement with the Mi'kmaq of Nova Scotia

First Nation / Organization	Representative(s)	Contact Details	Identified Concerns
Organizations			
Kwilmu'kw Maw-klusuaqn Office - KMKNO	Twila Gaudet (Director of Consultation) Patrick Butler (Senior Energy & Mines Advisor) Tracy Menge (Benefits Officer) Greg Hart (Engagement Coordinator)	September 15, 2025 - The Proponent sent a letter to Ms. Gaudet via email with introduction to IESO Nova Scotia and meeting request. September 16 – October 7, 2025 - The Proponent communicated with KMKNO staff regarding meeting planning. October 16, 2025 - The Proponent met virtually with Patrick Butler, Tracy Menge, and Greg Hart to share Project information, engagement completed, and answer questions. October 31, 2025 - The Proponent emailed a Project information package. November 17, 2025 - The Proponent requested a follow up meeting to provide a Project update and requested assistance with coordinating a meeting with Mi'kmaw communities.	KMKNO expressed interest in shaping language in the Request for Proposals (RFP) outlining Mi'kmaw benefits. KMKNO asked about ARIA and MEKS completed for the Project.
OLA	Beata Dera (Director of Consultation) Melissa Slauenwhite (Consultation Advisor)	September 10, 2025 - The Proponent emailed OLA to introduce IESO Nova Scotia and request meeting. October 3, 2025 - The Proponent met with OLA virtually and provided an introduction to IESO Nova Scotia, Project overview, and update on Mi'kmaw engagement.	No concerns identified.
NCNS	Chief Lorraine Augustine	September 15, 2025 - The Proponent sent a letter to Chief Augustine via email with introduction to IESO Nova Scotia and meeting request.	No concerns identified. Interest in employment and economic development

First Nation / Organization	Representative(s)	Contact Details	Identified Concerns
		October 29, 2025 - The Proponent met with NCNS in person and provided an introduction to IESO Nova Scotia, Project overview, and Mi'kmaw engagement and benefits. A discussion was held on the Mi'kmaq Ecological Knowledge Study, the Archeological Resource Impact Assessment, and Project open house.	opportunities related to the Project and IESO Nova Scotia's future procurements.
First Nations			
Pictou Landing First Nation	Chief Tamara Young Linda Ritcey (Director of Communications)	September 15, 2025 - The Proponent sent a letter to Chief Young via email with introduction to IESO Nova Scotia and meeting request. September 17 – November 5, 2025 - The Proponent communicated with Chief and staff regarding meeting planning. November 10, 2025 - The Proponent presented to Chief and Council at an in-person council meeting. The presentation included an introduction to IESO Nova Scotia, Project overview, as well as Mi'kmaw engagement and benefits.	Questions from Pictou Landing First Nation Chief and Council included: • Type of fuels used on the site and source of natural gas. • EA timelines • Consultation trigger • Financial aspects of the Project • Environmental impacts – air, sound, water (supply and treatment) • Nature of electricity market being served – local vs. province-wide • Status of land ownership • Effect of added infrastructure on consumer price • Collaboration with neighbouring provinces

First Nation / Organization	Representative(s)	Contact Details	Identified Concerns
			• Facility relationship with other renewable projects • Request to share EA studies and MEKS
Millbrook First Nation	Chief Bob Gloade	September 15, 2025 - The Proponent sent a letter to Chief Gloade via email with an introduction to IESO Nova Scotia and meeting request. September 17, 24; October 15, 2025 The Proponent left voicemails with Chief Gloade's assistant regarding meeting request. October 29, 2025 - The Proponent sent email to Chief Gloade regarding meeting request.	N/A
Paq'tnkek Mi'kmaw Nation	Chief Cory Julian Krista Thompson (CAO)	September 15, 2025 - The Proponent sent a letter to Chief Julian via email with an introduction to IESO Nova Scotia and meeting request. September 17 and 24, 2025 - The Proponent left voicemails for Chief Julian regarding meeting request. October 15, 2025 - The Proponent left voicemail with CAO Krista Thompson regarding meeting request. October 21, 2025 - The Proponent sent email to Chief Julian regarding meeting request.	N/A
Membertou First Nation	Chief Terry Paul	September 15, 2025 - The Proponent sent a letter to Chief Paul via email with an introduction to IESO Nova Scotia and meeting request.	N/A

First Nation / Organization	Representative(s)	Contact Details	Identified Concerns
		September 17 and 26, 2025 - The Proponent spoke with Chief Paul's assistant regarding meeting request. September 29, 2025 - Chief Paul's assistant emailed to schedule meeting for October. October 15 and 21, 2025 - The Proponent sent follow up email to Chief Paul's assistant regarding meeting request.	
Sipekne'katik First Nation	Chief Michelle Glasgow Dr. Roger Lewis (Director of Consultation)	September 15, 2025 - The Proponent sent a letter to Chief Glasgow via email with an introduction to IESO Nova Scotia and meeting request. September 17, 2025 - The Proponent left voicemail with Chief Glasgow's assistant regarding meeting request. An email was also sent to Dr. Roger Lewis with Project information and meeting request. September 26 and October 15, 2025 The Proponent left voicemails for Dr. Roger Lewis regarding meeting request. October 29, 2025 - The Proponent sent email to Dr. Roger Lewis regarding meeting request.	N/A

In addition to engaging with local communities, the OLA, KMKNO, and the NCNS as outlined in Table 5.1, the Proponent has also met with Wskijnu'k Mtmo'taqnuow Agency Limited (WMA Ltd.), the investment and economic development entity owned by the 13 First Nations of Nova Scotia, to explore potential economic opportunities related to the Project. During these discussions, the Proponent provided WMA Ltd. with Project information, including regulatory requirements, timelines, and supporting materials such as a background presentation and open house poster boards. These resources outlined key aspects of the Project at a conceptual level, including the need for Environmental Assessment studies, engagement plans, and anticipated benefits, reinforcing the Proponent's commitment to transparency and collaboration.

This engagement reflects a broader priority: advancing economic reconciliation. The Mi’kmaq of Nova Scotia are already significant participants in the energy sector and are expected to continue playing a vital role as the sector expands. Investments by Mi’kmaw organizations contribute positively to the energy transition and represent an important component of reconciliation in Nova Scotia – an approach IESO Nova Scotia seeks to advance, in addition to encouraging proponents to maximize Mi'kmaw benefits through employment, contracting and procurement.

5.1.1 Review of Key Issues Raised

Key issues raised and areas of interest identified through engagement were related to the following:

- Economic benefits
- Request to receive Environmental Assessment
- Request to receive MEKS

The Proponent will ensure collaboration with the Mi’kmaq on key areas of interest and any additional matters that arise throughout the life of the Project. The EARD/IPD and Mi’kmaq Ecological Knowledge Study (MEKS) (once finalized) will be shared with all groups that have requested them. In addition, the Proponent will work closely with Mi’kmaq communities to ensure economic benefits can be maximized through follow-up engagement and meetings focused on opportunities related to the Project.

5.1.2 On-going Engagement

The Proponent is committed to sustained, meaningful engagement and economic reconciliation with the Mi’kmaq of Nova Scotia throughout all phases of the Project. Engagement will be structured as an ongoing, two-way process that includes regular updates and opportunities for feedback to ensure transparency and responsiveness.

The Proponent will collaborate with Mi’kmaw organizations and communities to identify opportunities for participation by Mi’kmaw businesses and skilled labour. Guidance will be sought from each community and organization regarding preferred methods of engagement to ensure approaches are respectful, culturally appropriate, and community driven.

In addition, the Proponent remains committed to minimizing potential impacts on Mi’kmaq rights and interests while generating positive economic and environmental benefits. This commitment includes the development of a Mi’kmaq Communication Plan to support consistent engagement and partnership throughout the life of the Project.

A plan for future engagement will include follow-up meetings with the following groups during the first quarter of 2026 to share additional Project details and to discuss benefits to the Mi’kmaq of Nova Scotia:

- KMKNO
- Native Council of Nova Scotia
- Pictou Landing First Nation
- WMA

Furthermore, the Proponent will continue to attempt to meet with the following groups during the first quarter of 2026 to discuss the Project and benefits to the Mi'kmaq of Nova Scotia:

- Paq'tnkek Mi'kmaw Nation
- Millbrook First Nation
- Sipeknekatik First Nation
- Confederacy of Mainland Mi'kmaq
- Union of Nova Scotia Mi'kmaq

5.2 Mi'kmaq Ecological Knowledge Study

A MEKS presents a thorough and accurate understanding of the Mi'kmaq of Nova Scotia's use of the land and resources within an area. It is a report of gathered, identified, and documented ecological knowledge which is held by individual Mi'kmaq people. In addition, the MEKS report provides information on proposed Project activities that may impact the traditional land and resources of the Mi'kmaq.

The MEKS for this Project will be developed by Membertou Geomatics Solutions and will be geographically scoped to include an evaluation of the Project Area along with a 5 km buffer surrounding the Project Area (referred to as the "Study Area" in the MEKS report).

MEKS considers the land and water areas in which the proposed Project is located to identify what Mi'kmaq traditional use activities have occurred or are currently occurring within the "Study Area"; and what Mi'kmaq ecological knowledge presently exists with respect to the area. This process will be completed in accordance with the Mi'kmaq Ecological Knowledge Protocol, 2nd Edition ("Protocol"), which was established by the Assembly of Nova Scotia Mi'kmaq Chiefs and speaks to the process, procedures, and results that are expected of a MEKS. Per the Protocol, a copy of the MEKS will be provided to KMKNO for review. All MEKS' must be reviewed by KMKNO on behalf of the Assembly to ensure consistency with the Protocol. KMKNO will review the MEKS and advise if the requirements have been met, or if the MEKS must be amended. When this review is completed by KMKNO, a copy of the MEKS will be provided directly to the required reviewers under separate cover.

The MEKS consists of two major components:

- Mi'kmaq Traditional Land and Resource Use Activities
    - Considers both past and present uses of the area.
    - Uses interviews as the key source of information regarding Mi'kmaq use.

- A Mi'kmaq Significance Species Analysis
  - Identifies species in the area and considers resources that are important to Mi'kmaq use (food/sustenance resources, medicinal/ceremonial plant resources, and art/tools resources).
  - Considers resource availability/abundance in the area (along with adjacent areas or in other areas outside), their use, and their importance, with regards to the Mi'kmaq.

Membertou Geomatics Solutions is undertaking a MEKS for the Project, with completion expected in early 2026.

6.0 ENGAGEMENT

IESO Nova Scotia is committed to transparent, meaningful, and ongoing engagement with government, the public, stakeholders, and the Mi'kmaq of Nova Scotia. IESO Nova Scotia has aimed to involve communities at-large, elected officials, and key stakeholder groups early in their planning process to strengthen acceptance and foster local engagement.

6.1 Engagement with Government Departments, Agencies, & Regulators

The Project Team has been in contact with government entities and officials representing federal, provincial, and municipal jurisdictions (Table 6.1) to open lines of communication about the Project and ensure all regulatory requirements are met.

Table 6.1: Government Meetings and Events

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
Federal Government		
Member of Parliament (MP)	Sean Fraser, MP, Central Nova	September 15, 2025 - The Proponent sent an introductory letter via email including an introduction to IESO Nova Scotia and meeting request. October 6, 2025 - The Proponent followed up via email and voicemail with a request to meet. October 20, 2025 - MP Fraser sent a letter via email outlining the importance of proper engagement and potential follow up for a meeting when schedule allows. No date has been set for a meeting.
IAAC	IAAC - Cheryl Benjamin	July 18, 2025 - Discussion with Cheryl Benjamin focused on the proposed submission framework, which would integrate the provincial EARD structure with the Federal Information and Management of Time Limits Regulations SOR/2019-283. Ms. Benjamin indicated that she had spoken with Ms. Tutty (NSECC) about this topic prior to the conversation with Strum. This approach is intended to ensure that a single consolidated document satisfies the requirements of both provincial and federal review processes. See October 14, 2025, joint meeting below with NSECC See November 21, 2025, joint meeting below with NSECC
Provincial Government		
NSDOE	David Miller – Executive Lead: Electricity Projects	July – November 2025 - Ongoing communication with David Miller (Executive Lead: Electricity Projects) regarding Project updates and confirmation of the Project's pivotal role in the least-cost pathway for ratepayers, as outlined in the 2030 Clean Power Plan.
NSDGD	David Mitchell	July 16, 2025 - Introductory meeting to discuss permitting requirements for the proposed facility. A detailed Project description was sent following the meeting. September 24, 2025 - Project update given and discussion of proposed list of required permits.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
		October 6, 2025 - Follow up on permitting list and approach. November 17, 2025 - Follow up meeting on permitting Environmental Assessment and Industrial Approval permitting applications.
NSECC IAAC	NSECC –Bridget Tutty IAAC – Cheryl Benjamin	July ,18 2025 see conversation with Cheryl Benjamin (IAAC), above.
NSECC NSNR	NSECC - Paula Francis, Bridget Tutty, Megan Rafferty NSNR - Mark McGarrigle	July 2, 2025 - A joint meeting was held to discuss the project permitting. September 10, 2025 - A joint update was given regarding field findings and discussion of facility siting.
NSECC	Paula Francis Bridget Tutty Malcolm MacNeil	September 24, 2025 - Follow up discussion regarding project parameters. October 21, 2025 - Request made via email to NSECC for a follow up meeting on EA progress. October 30, 2025 - Follow up discussion regarding project permitting requirements. November 21, 2025 Follow up discussion regarding project permitting requirements. November 25, 2025 - Follow up discussion regarding project permitting requirements.
IAAC NSECC	IAAC - Cheryl Benjamin, Jill Adams NSECC - Paula Francis, Bridget Tutty, Malcolm MacNeil	October 14, 2025 - Joint meeting to discuss parallel environmental assessment processes.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
IAAC NSECC	IAAC – Anjala Puvananathan, Cheryl Benjamin, Jill Adams, Mike Atkinson, Marc Leger NSECC - Paula Francis, Bridget Tutty, Malcolm MacNeil	November 21, 2025 - Joint meeting to discuss parallel environmental assessment processes.
NSECC DFO/MPO ECCC	NSECC - Paula Francis, Malcolm MacNeil, Jeremy Higgins DFO/MPO - Sean Wilson, Marley Aikens ECCC - Stephen Zwicker, Tania Morais	November 24, 2025 - Joint meeting to introduce the project and upcoming environmental assessment submission. Ongoing project requirements for protection of aquatic environment was discussed.
OLA	Beata Dera Melissa Slauenwhite	September 10, 2025 - The Proponent sent an introductory email to meet and discuss the Project. October 3, 2025 - Meeting held to introduce the Project and Mi’kmaw engagement plan. OLA provided information on the Crown consultation process and guidance on engagement with the Mi’kmaq.
Member of the Legislative Assembly (MLA)	Marco MacLeod, MLA Pictou West	September 15, 2025 - The Proponent sent an introductory letter via email including an introduction to IESO Nova Scotia and meeting request. October 9, 2025 - MLA MacLeod met with members of the Project Team and received an update on the Project and upcoming engagement activities. October 23, 2025 - Project Team member spoke with MLA MacLeod about upcoming engagement and reviewed a community concern.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
		October 27, 2025 - MLA MacLeod attended MOPC Committee of the Whole meeting and viewed Proponent's presentation.
Municipal Government		
MOPC	Robert Parker, Warden Wayne Murray, Deputy Warden Donnie Parker, Councillor Chester Dewar, Councillor Brian Cullen, CAO	September 15, 2025 - The Proponent sent an introductory letter via email including an introduction to IESO Nova Scotia and meeting request. .
MOPC	Wayne Murray, Deputy Warden Donnie Parker, Councillor Brian Cullen, CAO	October 2, 2025 - The Proponent met with MOPC councillors and CAO to discuss the proposed facility, project timelines, permitting needs, and community engagement. Attendees asked questions related to project size, emissions, water use and discharge, noise, setbacks, job creation, taxation, and fuel storage. Potential community concerns were identified as well as opportunities to advertise upcoming open houses.
MOPC	Robert Parker, Warden Wayne Murray, Deputy Warden Donnie Parker, Councillor Brian Cullen, CAO	October 9, 2025 - The Proponent met with MOPC warden, councillors and CAO to provide overview of the Project and planned open houses. Community engagement recommendations and Project questions were shared by MOPC.
MOPC	Chester Dewar, Councillor	October 16, 2025 - The Proponent met with Councillor Chester Dewar, representing Marshdale, to share Project details, update on engagement, and answer questions. Potential community concerns were shared. November 13, 2025 - Councillor Dewar attended community open house.
MOPC	Robert Parker, Warden	October – November 2025 - Ongoing communication with Warden Robert Parker regarding community questions and engagement. November 12, 2025 - Warden Parker attended community open house.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
MOPC	Logan McDowall, Development Officer	October 23, 2025 - The Proponent left voicemail for Logan McDowell to discuss proposed Project and Municipal permitting. October 27, 2025 - The Proponent spoke with Logan McDowell on the phone to introduce the Project and upcoming development and building permit application. Further, the Proponent spoke with Logan McDowell at the MOPC Committee of the Whole meeting and agreed to schedule virtual meetings to discuss municipal permit requirements. October 31, 2025 - The Proponent met with Logan McDowell virtually to discuss municipal permit requirements. Evan Hale, Director of Emergency Services, also attended. November 13, 2025 - Logan McDowell attended community open house. November 21, 2025 - The Proponent met with Logan McDowell virtually to discuss municipal permit requirements. John Baanbil, Development Officer, also attended.
MOPC	Peter Boyles, Councillor	October 24, 2025 - The Proponent met with Councillor Peter Boyles to provide an overview of the Project and answer questions.
Town of Stellarton	Water/Engineering Department members - Blaine Murray, Roland Burek, Andy Hartery	October 24, 2025 - The Proponent met with the Town of Stellarton staff to discuss proposed site development within Town of Stellarton Watershed Protection Area. Staff identified no barriers to construction and recommended a presentation to Stellarton Council.
MOPC	Entire Council	October 27, 2025 - The Proponent delivered a presentation at an MOPC Committee of the Whole meeting. The presentation shared an overview of IESO Nova Scotia, Project location and details, progress and timelines, community engagement and benefits, as well as anticipated community concerns.
MOPC	Frank MacFarlane, Business Development Officer	October 31, 2025 - The Proponent spoke with Frank MacFarlane to discuss project siting and economic/employment opportunities in Pictou County.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
Town of Stellarton	Entire Council	December 8, 2025 - The Proponent provided a presentation slide deck to Town of Stellarton Council to provide a Project update and discuss proposed site development within the Town of Stellarton Watershed Protection Area. Note: in-person presentation was deferred due to inclement weather cancellation of the meeting.

6.1.1 Review of Government Concerns

Discussions with federal and provincial regulators primarily focused on:

- Project scope
- Project and EARD/IPD timeline
- Scope of environmental surveys
- Public engagement
- Mi'kmaq engagement

Questions from municipal government mainly pertained to:

- Community concerns and questions (e.g. water usage, impacts to local water, discharge of water, sound, air quality)
- Community benefits
- Public engagement
- Project scope

Engagement with government officials will continue throughout the development, including construction and operational phases of the Project.

6.2 Public & Stakeholder Engagement

The Proponent has been involved in formal engagement activities with the public and stakeholders to ensure the community was made aware of the Project and given ample opportunity to receive information, ask questions, provide feedback, and share local knowledge.

In addition to sharing project information, the Proponent has expressed a commitment to ensuring that the communities in close proximity to the Project benefit from local hiring and potential training for operations roles at the facility. The Proponent is focused on providing residents and businesses in the local region preferential attention and access to business and employment opportunities. It is the Proponent's intent to maximize economic benefits for local communities and the Mi'kmaq of Nova Scotia by promoting long-term commercial growth through access to goods and service contracts, capacity training, and employment. As such, the Proponent will continue to work with economic development organizations and local businesses to create a "local business directory" to ensure major contractors are aware of local business/individuals that can be hired.

Engagement with the public and stakeholders will continue through the development, construction, and operational phases of the Project. Table 6.2 summarizes engagement with stakeholders.

Table 6.2: Stakeholder Meetings and Events

Community/Stakeholder Organization	Engagement
Port Hawkesbury Paper Michelin Canada Northland Power Scotian Wind DP Energy (Nova East Wind) Eastward Energy Maritimes and Northeast Pipeline Efficiency Nova Scotia Energy Storage Canada Electricity Canada InnovEvo BioCarb Siemens Canada	Meetings held with Industry from September-November 2025 to introduce IESO Nova Scotia and share organizational plans.
Net Zero Atlantic CanREA Irving Scotia Investments Oxford Frozen Foods Natural Forces	Meetings requested.
Ecology Action Centre (EAC)	November 18, 2025 - The Proponent sent an introductory email to the EAC with an introduction to IESO Nova Scotia, the Project, and meeting request. November 25, 2025 - The Proponent met with EAC staff to discuss the role and responsibilities of IESO Nova Scotia as well as provide an overview of the proposed fast-acting natural gas power generation facility.
Clean Foundation	November 19, 2025 - The Proponent sent an introductory email to the Clean Foundation with an introduction to IESO Nova Scotia, the Project, and meeting request. December 5, 2025 - The Proponent met with Clean Foundation staff to discuss the role and responsibilities of IESO Nova Scotia as well as provide an overview of the proposed fast-acting natural gas power generation facility.
Pictou County Rivers Association	November 10, 2025 - Phone call from Proponent to share project details and invite to open house. November 21, 2025 - The Proponent sent an email follow up and request for one-on-one meeting.
Friends of Redtail Society	November 10, 2025 - Email introduction, invitation to open house and/or to one-on-one meeting.

Community/Stakeholder Organization	Engagement
Pictou County Chamber of Commerce	November 6, 2025 - Email introduction, invitation to open house and/or to one-on-one meeting. November 18, 2025 - The Proponent met virtually with Executive Director Layla Rahmeh to discuss economic benefits, points of collaboration, and outreach to local business.
Pictou County Partnership (PCP)	November 6, 2025 - Email introduction, invitation to open house and/or to one-on-one meeting. November 13, 2025 - Staff from PCP attended the open house and discussed points of interest and collaboration.
Eureka Fire Department, Fire Chief Roger Caddell	November 10, 2025 - Sent invitation to open house. The Proponent plans to engage with the Fire Chief to share project details and discuss emergency response measures.
Hopewell Links Golf Course	November 10, 2025 - Sent invitation to open house.
Pictou Mountain Bike Trail Builders	November 10, 2025 - Sent invitation to open house.
Pictou County All-terrain Vehicle (ATV) Club	November 10, 2025 - Sent invitation to open house.
Pictou County Sno-Riders Snowmobile Club	November 10, 2025 - Proponent had phone conversation to share project details and invite to open house.

6.2.1 Digital Communications

The Proponent has maintained a Project website - www.ieso-ns.ca - since September 2025. This publicly accessible website continues to be updated regularly. It includes information about the Project and IESO Nova Scotia including:

- Introduction to the Project
- About IESO Nova Scotia
- Community benefits
- Questions and answers
- Project documents and articles
- Project contact information

6.2.2 Newsletter

The Proponent publishes a Project update newsletter to their website, e-mail list, mailing lists, and via the Municipality of Pictou County's newsletter. Sign-up for this newsletter is available on the Project website, as well as at public events such as the open house. The first newsletter for the Project was issued in December 2025.

6.2.3 Media

A news release on the Project was issued to all Nova Scotia media outlets on October 16, 2025. Interviews have been conducted and/or follow media statements have been provided to CBC, New Glasgow News, and Pictou Advocate.

6.2.4 Public Open House

One public open house took place prior to EA Registration. Proponent and Strum Consulting representatives were present to provide information on the Project and answer any questions or concerns brought forward by community members. Posters from the open house and a sample comment form are in Appendix A.

The open house was held on Thursday, November 13, 2025, from 4:00 pm to 8:00 pm at the Eureka Fire Hall (5222 Stellarton Trafalgar Road, Eureka). The venue was fully accessible, ensuring that residents of all mobility levels could comfortably attend and participate.

This event was advertised on the Municipality of Pictou County's October e-newsletter (posted October 16, 2025) as well as the MOPC Facebook page (October 16, October 28, November 13, 2025), New Glasgow News (October 23, October 30, November 6, 2025), The Advocate (October 22, October 29, November 5, November 12, 2025), 94.1 The Breeze (October 22 – November 12, 2025), 989 XFM (October 22 – November 12, 2025), IESO Nova Scotia website, community Facebook pages, as well as posters posted at the Eureka Fire Hall (October 22, 2025 onwards) and Hopewell Post Office (October 22, 2025 onwards), and postcard invitations dropped off at residences near the Project site (October 16, 2025 onwards).

The objective of this open house was to introduce the Proponent and the Project to the community, show a site location and rendering of the facility, EA study findings especially related to Facility emissions, noise and water usage, community engagement, benefits as well as gather community feedback.

The Project Team presented 15 posters, answered questions, and took feedback about concerns and interests from the local community and various stakeholders (Figure 6.1 and 6.2). Sign-in sheets were available for participants to provide their contact information and enable follow-up via email list signup. A total of 75 attendees were recorded on the sign-in sheets.

Figure 6.1: Community Project Open House, November 13, 2025

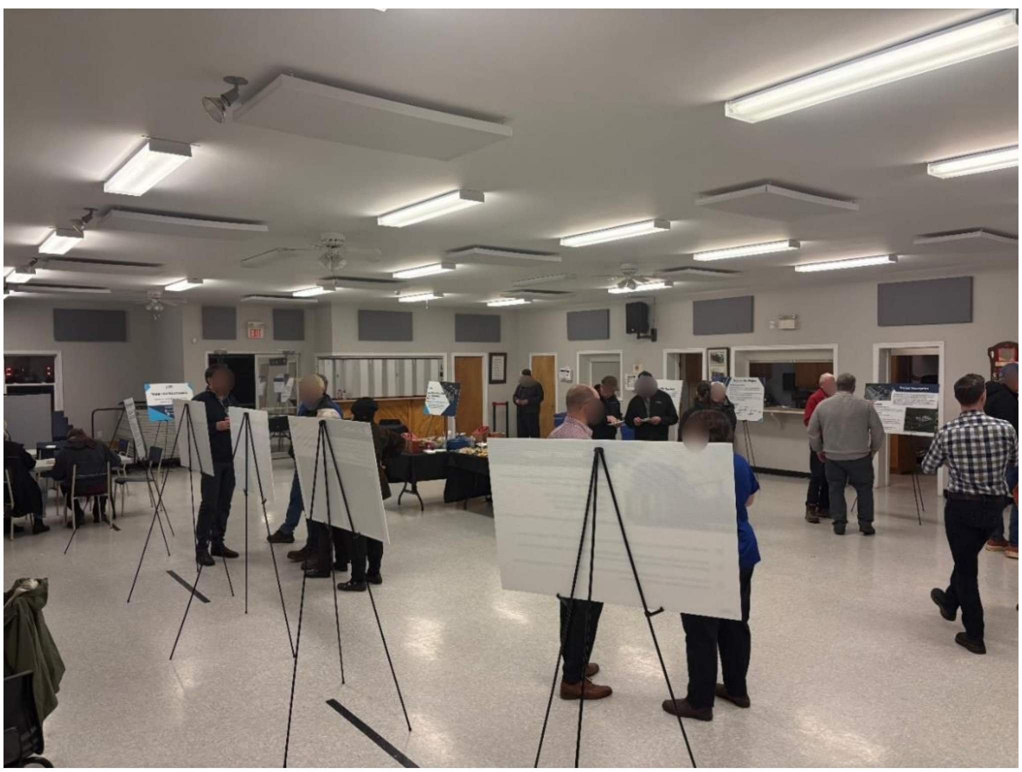

Figure 6.2: Community Project Open House, November 13, 2025

6.2.5 Individual Meetings with Members of the Public

The Proponent also met with individual members of the public within the local community on an as requested basis to foster dialogue, listen to and acknowledge concerns, and respond to questions related to the Project.

6.2.6 Community Liaison Committee

A Community Liaison Committee (CLC) will be established for the Project and will serve as a valuable platform for ongoing dialogue between the Project team and the local community. The CLC will help build trust, ensure transparency, and allow community members to share concerns, ask questions, and provide input throughout the life of the Project. The goal of the CLC will be to support knowledge-sharing, improve local understanding of Project activities, and identify opportunities for enhanced community engagement and benefits.

Interest in joining the CLC was solicited at the community open house held on November 13, 2025 with nearly 10 community members interested in taking part in the committee. The first CLC meeting will take place in early 2026.

6.2.7 Review of Concerns

Issues and concerns raised by the public as expressed in individual meetings and from in-person and written feedback received at the open house can be grouped into broader categories, which have been assessed throughout the EA (Table 6.3). The summary of key issues raised presented herein is reflective and inclusive of key issues raised in consultation to date with the Mi'kmaq of Nova Scotia.

Table 6.3: Comments Received from the Public

Key Issues	Proponent Response	Section of EA
Socio Economic Impacts		
How will the Facility affect my property values? What guarantees can be provided to residents?	The Facility site has been carefully selected to align with existing land uses and minimize potential impacts on nearby properties. The Proponent has focused on locations appropriately zoned and set back from residential areas where possible. Modern design standards, environmental safeguards, compliance with environmental constraints, and mitigation measures — such as noise and visual buffers — will help ensure the facility operates safely and unobtrusively, as well as minimize impacts on nearby property values. While these measures act as strong safeguards, it is important to note that individual property values are influenced by many market factors beyond the control of the Project. Environmental modelling and	Section 11

Key Issues	Proponent Response	Section of EA
	site characteristics have been chosen to reduce potential impacts as much as possible.	
How much will the Municipality earn in tax revenues each year from the Facility?	Municipal tax revenues have not yet been determined and will be based on Facility size, road upgrades, commercial rate, and comparable local and provincial facilities.	Section 11
How will the Proponent provide benefit to the community through support to local community groups?	The successful operator, with input from the community, will be required to implement a community benefit program, which may include sponsorship of local events, grants for community groups, and investment in community infrastructure. Details of this benefits program will be shared with the community once available.	Section 11
Interest in business opportunities for local organizations.	The Proponent is currently compiling a local business directory which will be shared with the facility owner/operator to ensure that the use of local resources is maximized.	Section 11
How many jobs will be created?	Construction is expected to generate 100-125 short-term employment opportunities, and operations will create 10-15 longer-term positions.	Section 11
How will the community continue to be engaged?	Engagement will be broad and diverse, with a variety of opportunities to receive information and provide feedback, including open houses, written communication, online, and through the CLC. A community log is being maintained by the Proponent of written communications received.	Section 6
How can residents share ideas and complaints?	Residents can share ideas, ask questions, or raise concerns by emailing community@ieso-ns.ca or booking a meeting with the project team. Additional opportunities include open houses and participation in the CLC. A formal complaint resolution plan will be developed before construction begins and will be posted on the Project website and shared within the community.	Section 6
Environmental Impacts		
What will the Facility sound like? Will it be noisy?	The facility has been designed to reduce sound levels with features such as landscaping, noise barriers, and natural vegetation buffers. A sound assessment was conducted as part of the EA to model cumulative noise effects generated by the Project on nearby receptors, including residences. The results indicate that noise levels will be below	Section 7.3

Key Issues	Proponent Response	Section of EA
	the permissible sound levels. For example, the permissible overnight sound level for a rural area of 40dBA is equivalent to the sound of a quiet library. Facility sound will be monitored to ensure continued compliance and construction activities may also be limited to specific hours to further minimize disruption. The Project will implement a Complaint Response Plan to address concerns raised related to noise by the local residences as needed. Should any concerns arise, they will be promptly reviewed, and appropriate solutions will be implemented in collaboration with the community.	
What emissions (GHGs) are associated with the natural gas power Facility and will they be lower than coal-burning facilities?	Although there are some direct greenhouse gas (GHG) emissions, the Project is expected to offset the current use of coal to meet grid requirements and facilitate the ongoing expansion of renewables leading to an overall decrease in the GHG emissions intensity of Nova Scotia's electrical grid. The Project is expected to emit approximately 326 kt/annually of CO equivalent (COe) of GHG, equal to 2.4% of Nova Scotia's emissions and 0.05% of Canada's emissions. The Project will have approximately 55% less GHG emissions intensity per unit of electricity generated than coal fired power plants. Unlike coal-fired plants, this facility will not run continuously, further resulting in significantly lower overall GHG emissions. The submission of annual GHG reports to the provincial and federal regulators will be required during operations and are subject to provincial and federal emissions thresholds.	Section 7.2
What will be the impact on air quality in the area? How will this be monitored?	Air quality modelling was completed as part of the EA and results of that modelling found no exceedances of regulated limits for NO_2, CO, or $PM_{2.5}$ expected at ground level and as such, no exceedances of regulated limits are expected at nearby residences.	Section 7.1

Key Issues	Proponent Response	Section of EA
	The Project uses advanced emissions control (low NOx Combustion, Continuous Emissions Monitoring System, Water/Steam Injection) and ongoing monitoring and regulatory reporting will be required during operations to ensure compliance.	
Are there health impacts associated with this type of Facility?	Given the results of the sound and air quality modelling, health impacts are expected to be minimal and mitigated through stringent design and monitoring. Ultimately, the Project will comply with conditions and constraints outlined by NSECC and any required reporting to this effect.	Section 7
How will the Facility impact my water well and how will you ensure it doesn't run dry?	Prior to construction, local wells will be tested for water quantity and quality to gather baseline data. This data will inform facility design and help ensure that impacts to the local aquifer and wells are minimized. A groundwater withdrawal permit will be required from NSECC. As part of permitting requirements, the Proponent will undertake ongoing and comprehensive monitoring of water resources and usage to detect any changes. If needed, additional mitigation measures will be put in place. In support of design and permitting, an aquifer test well and pump test will be completed in December 2025.	Section 8
Concern about amount of water needed in facility operations.	Water will be used at the facility for controlling air emissions, boosting power output when needed, and cleaning equipment. Water usage will be reduced to the extent possible, and a groundwater withdrawal permit will be required from NSECC. The permit will include ongoing and comprehensive monitoring of the water resources and usage. Most of the water used during operations turns into steam and is released safely through the turbine exhaust. The process of boosting power output — called power augmentation — involves spraying a fine mist of water into the air that feeds the turbines. This cools the air, making the turbines run more efficiently and produce more electricity.	Section 8

Key Issues	Proponent Response	Section of EA
	Boosting power output will mainly occur on very hot days or when electricity demand is high. Boosting power output is optional, which provides flexibility to best manage the Facility's overall water use. Overall, a 300-megawatt Facility uses about the same amount of water each year as 750 average rural homes.	
How will water be discharged from the Facility and will the water be treated before being released to the local environment?	All process water will be treated, neutralized, and tested before controlled release to existing surface water sources, ensuring compliance with government regulations. No hazardous effluent will be discharged and adaptive management will be applied.	Section 3
What happens if the water treatment system breaks? What mitigation measures are in place to ensure the water is not contaminated?	The facility will include treatment systems, continuous monitoring, and alarms to detect system failures. Immediate shut-off and repair protocols will be in place, along with contingency plans for operations during repair.	Section 9
Will the Facility be brightly lit during night-time hours?	Artificial lighting may be used during the construction and decommissioning phases of the Project. During the operations phase, artificial lighting will be present long term at the Facility and along the associated access roads.	Section 10
Will the lighting be bird-safe/friendly?	During the operational phase, the lighting on-site will be minimized and localized to the Facility and access road. Mitigation measures are recommended to be implemented to reduce the impacts of lights on birds in the Project Area (e.g., motion-activated lighting, lasers, shielding, LEDs, shades of light, etc.).	Section 10
Concern that environmental disturbances are being measured against environmental regulations. Would like to see thresholds to exceed current regulations.	The EA process includes setting mitigation thresholds based on best-available science and provincial standards.	Section 2
Concern regarding wetland impacts.	Eight wetlands were identified during the EA field assessment, with three to be altered totalling 1.75 ha. During the detailed design phase, further efforts will be made to microsite Facility infrastructure away	Section 9

Key Issues	Proponent Response	Section of EA
	from wetlands. Provincial wetland permitting will be completed and necessary compensation for lost wetland habitat will be implemented. A 30 m buffer prohibiting activities like refueling and vegetation removal will be maintained on watercourses and wetlands where possible. Post-construction wetland monitoring with adaptive management will be conducted for potential indirect impacts and an Erosion and Sediment Control Plan will be implemented to mitigate potential impacts to wetlands and watercourses. A Surface Water Monitoring and Management Plan will also be implemented to ensure discharged water meets regulatory water quality requirements.	
Concern regarding impacts to black ash and the Mi'kmaq.	Four black ash trees identified within the Project Area will be avoided. The Mi'kmaq will continue to be engaged on the Project to ensure rights and title are protected and Mi'kmaq feedback is received. A MEKS is currently underway and will be finalized in early 2026.	Section 10 Section 5
Interest in installation of nest boxes within the Project Area.	If appropriate, the Proponent may consider installing nest boxes within the Project Area.	Section 10
Recommendation to avoid rat poison for on-site pest control given secondary poisoning and biomagnification.	The Facility will implement an Integrated Pest Management approach prioritizing non-chemical methods. If chemicals are needed, only low-risk options that do not threaten wildlife will be used, and no second-generation rodenticides.	Section 2
Who conducted the Environmental Assessment?	The Proponent retained Strum Consulting to support the development and submission of the EARD and IPD.	Section 1
Safety, Construction and Operations		
How will fuel be safely stored on-site?	Fuel storage will follow industry best practices with secondary containment, spill control systems, leak detection, and certified tanks. Design will comply with Nova Scotia Petroleum Storage Site Licensing requirements.	Section 3
How will the Proponent respond to leaks, spills or	Natural gas facilities have been operating safely across North America for many years. The	Section 15

Key Issues	Proponent Response	Section of EA
other incidents and will local first responders receive training related to fire or other incidents on the site?	proposed Facility will follow these same proven safety practices. It will have detailed emergency and environmental plans in place to protect people and the surrounding land and water. Although the risk of spills or accidents is very low, the facility will include advanced monitoring and automatic shut-off systems to quickly detect and contain any issues. Staff will also work closely with local emergency responders and take part in regular training exercises. In the unlikely event of an incident, clear steps are in place to keep people safe, limit environmental impacts, and restore the area as quickly as possible.	
Concern regarding increased vehicle traffic on Marshdale Road during construction which would add to quarry and logging traffic and increase safety risk, dust, and wear and tear on the road.	A Traffic Management Plan will be developed with local authorities to schedule construction deliveries, minimize heavy truck use during peak hours, and ensure safe road access. Any road wear will be monitored, and repairs will be coordinated with the municipality if needed.	Section 3
What are the operating hours of the Facility?	During the construction phase, work is anticipated to take place between 7:00 am – 9:00 pm. When operational, the nature of a 'fast-acting' Facility means that it will operate only during electricity demand gaps. Typical generation will be infrequent and largely during the day and during peak electrical demand in the winter. The Facility will have personnel on-site 24/7.	Section 3.4
What is the Facility lifespan?	The lifespan of the Facility is anticipated to be 30 years and may be extended if required.	Section 3.4
Energy Transition / Electrical Grid		
Which other energy projects require the natural gas Facility to be approved before they are approved?	The natural gas power generation facility is foundational to integrating new renewables like wind and solar onto the Nova Scotia electricity grid. It provides system reliability needed before hosting additional large-scale wind or solar installations as well as future battery storage and alternative-fuel power projects.	Section 16

Key Issues	Proponent Response	Section of EA
Is this Project replacing the Trenton coal power plant?	The Project will play a role in phasing out coal power plants such as the one in Trenton, helping with the implementation of Nova Scotia's Clean Power Plan by 2030.	Section 2
Interest in grid-scale batteries or hydrogen-based power instead of a natural gas power plant.	IESO Nova Scotia will be undertaking an Integrated Resource Planning (IRP) exercise in 2026. It is anticipated that future procurement of grid-scale batteries, hydrogen-based power and other alternative fuels will be discussed in the IRP and may become part of future rounds of IESO Nova Scotia's energy procurement. There is broad support for an accelerated implementation of fast-acting generation from regulatory and planning stakeholders in Nova Scotia, which justifies the development of the Project at this time.	Section 2
Expressed support for the Project and its ability to help Nova Scotia transition off coal, support renewables, and add economic opportunities locally.	Nova Scotia's electricity system is undergoing a major transformation — driven by population growth, more homes and vehicles are using electricity instead of gas or oil, and the need to move away from Nova Scotia's current use of coal for electricity. Under Nova Scotia's Clean Power Plan, the province must stop using coal fired electricity by 2030 and have 80% of electricity come from renewable sources. Putting in place new cleaner sources of energy must be done in a way that's sustainable. Critical to reliability is ensuring foundational energy sources, such as fast acting natural gas power generation, are available when renewable energy sources, like wind and solar, aren't available or able to meet demand.	Section 2
General		
Why was this location chosen for the Project?	The site was chosen based primarily on proximity to existing electrical transmission lines and pipelines, minimizing the need for new energy infrastructure. In addition, environmental, landownership, and community-based factors have played a key role in site selection.	Section 3.1
Who will own the Project property as well as build and own the facility itself?	Ownership of the Project land has not yet been determined. Either IESO Nova Scotia may exercise its option to own the land, or, following a rigorous public procurement process with careful consideration and due diligence, the successful	Section 3.1.1

Key Issues	Proponent Response	Section of EA
	proponent selected to design, build, own, and operate the facility may assume land ownership. A RFP will be launched in January 2026, and the competitive process will result in a proponent being selected by summer 2026.	
What is the Project timeline?	Community and Mi'kmaq engagement: ongoing through life of the Project EA submission – December 2025 RFP – Launch early 2026, successful proponent announced summer 2026 Facility design – late 2026 Construction is anticipated to start in – 2027 with anticipated operation by 2029 Should the Project be screened into the federal process by IAA, the Project Timeline will adjust to accommodate the IAA process.	Section 3.5
What approvals does the Project require?	This project requires several municipal, provincial, and federal approvals. Please see section 2 for more detail.	Section 2.3
Where are the closest similar facilities?	Tufts Cove Generating Station (500 MW) in Halifax, NS, commissioned in 1965, originally running on oil, started using natural gas in 2000 and has similar combustion turbines to the Project. The equipment for this Project differs from Tufts Cove in that it will have a smaller footprint and shorter stacks.	Section 3.2
What is the source of the natural gas to be used in the Facility? Is fracking involved?	The Project will make use of a reliable supply of natural gas from the North American grid through the existing Maritimes and Northeast Pipeline that already runs through Pictou County. There are no current plans to procure fuel for the facility by hydraulic fracturing.	Section 2.1
Expressed preference for Canadian / local source of natural gas and fuel oil.	The nearby Martimes & Northeast Pipeline will deliver natural gas to the Facility. At this time, there are currently no domestic supplies of natural gas (onshore or offshore), therefore the facility will purchase natural gas supplies from the market. Light fuel oil (diesel) will be used as a secondary fuel.	Section 2.1

Key Issues	Proponent Response	Section of EA
	The Facility may use domestic supplies of natural gas if such supplies become available in the future. The supply of hydrogen, renewable natural gas and other sustainable fuels will be reviewed for blending potential as those domestic supplies mature.	
What is the Project's total annual carbon tax liability at peak rates and how does that affect electricity rates?	The Project is an essential addition to the grid, enabling the Province to achieve a portfolio emissions rate below 1 megatonne of GHGs annually, as outlined in the 2030 Clean Power Plan. This represents a 90% reduction from 2005 levels and aligns with the latest Integrated Resource Plan, which prioritizes reliable electricity supply at the lowest overall cost — including carbon tax considerations.	Section 2
What is the risk of this Facility becoming a stranded asset and who bears that financial risk?	The Project is a critical element of the 2030 Clean Power Plan and aligns with the latest Integrated Resource Plan recommendations. This fast-response generation facility is consistently identified as a preferred option across multiple planning scenarios, which account for varying electricity demand growth and advancements in alternative technologies. Because the Project frequently appears in least-cost system planning analyses, the likelihood of it becoming a stranded asset — and thus posing financial risk to ratepayers — is very low.	Section 2
Is there a decommissioning fund setup for the Facility and who is responsible for this?	The proponent will fund and manage decommissioning, secured via financial surety or trustee-held fund, to ensure facility closure without burden on ratepayers.	Section 3.4.3

6.2.8 Ongoing Engagement

Engagement activities are ongoing and will continue following the submission of the Environmental Assessment – this includes future open houses, regular CLC meetings, meetings with residents as requested, and Project updates shared via website, newsletter, and email. The Project Team will continue to review and address any concerns raised by government representatives, stakeholders, members of the public, and the Mi'kmaq of Nova Scotia throughout the duration of the Project.

7.0 ATMOSPHERIC ENVIRONMENT

7.1 Atmosphere and Air Quality

7.1.1 Overview

The assessment of the atmospheric environment will incorporate weather and climate, as well as ambient air quality considerations. Weather and climate baseline conditions have been obtained from regionally available meteorological data. Air quality baseline data has been collected from the local ambient air quality monitoring station.

From this ambient air quality baseline, anticipated Project-related impacts were assessed to determine the potential effects that the Project may have and compared to relevant regulatory limits.

7.1.2 Regulatory Context

Relevant legislation includes:

- *Environment Act*, S.N.S. 1994-95, c.1
- Air Quality Regulations, N.S. Reg. 8/2020

Note that this Project may be subject to the National Pollutant Release Inventory program as set out by ECCC, under the authority of the CEPA (Canada, 1999). This will be determined based on the final detailed engineering design.

7.1.3 Effects Assessment

Project-Atmospheric Interactions

Project activities have the potential to interact with the atmospheric environment through fugitive dust, exhaust, and process emissions during the following construction and operational activities (Table 7.1).

Table 7.1: Potential Project-Atmospheric Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Site Preparation	X
Placement of Sedimentation and Erosion Control Measures	X
Clearing and Grubbing	X
Civil Site Construction	X
Equipment Installation	-
Interconnections for Services	-
Removal of Temporary Works and Site Restoration	X
Commissioning	-

Project Phase	Potential for Interaction
Operations and Maintenance	
Facility Operation and Maintenance	X
Site Management	-
Decommissioning and Rehabilitation	
Infrastructure Removal	X
Site Reclamation	X

Assessment Boundaries

The LAA for the atmospheric environment is a 10 km × 10 km area centred on the Project Footprint respective source (Drawing 7.1). The RAA is not applicable.

Assessment Criteria

The VC-specific definition for magnitude is as follows:

- Negligible: No detectable change from ambient air quality levels expected as a result of Project construction or operation.
- Low: Air quality is expected to remain less than 50% of the maximum permissible ground-level concentrations as defined by the NS AQR.
- Moderate: Air quality is expected to remain below, but more than 50% of the maximum permissible ground-level concentrations as defined by the NS AQR.
- High: Air quality is expected to exceed the maximum permissible ground-level concentrations as defined by the NS AQR.

Assessment Methodology

The assessment was completed through a review of the following resources:

- Ecological Land Classification for Nova Scotia (Neily et al., 2017)
- ECCC Canadian Climate Normals (ECCC, 2025b)
- NSECC Ambient Air Quality Data (NSECC, n.d.-a)

Process Emissions Modelling

To understand the Project-related impacts on air quality from process emissions, Hatch Ltd. (Hatch) completed an Air Quality and GHG Assessment report in 2025 (Hatch Ltd., 2025b) (Appendix B), which was based on information provided by the Proponent, or parties acting on behalf of the Proponent.

The air quality assessment was performed using the United States Environmental Protection Agency (U.S. EPA) air dispersion modelling software AERMOD (version 24142). AERMOD is a steady-state plume model that incorporates air dispersion based on atmospheric turbulence, surface characteristics, building downwash, and terrain complexity. AERMOD was used to model estimated emissions and determine whether the predicted maximum off-property concentrations were below the Schedule A; Maximum Permissible Ground Level Concentrations specified in the Air Quality Regulations, N.S. Reg. 8/2020.

AERMOD was used to model ground-level concentrations of substantive air contaminants [carbon monoxide (CO), nitrous oxides (NOx), and particulate matter (PM) smaller than 2.5 microns (µm) ($PM_{2.5}$)] expected to be released from six 50 MW combustion turbines (300 MW total capacity). Modelling methodology, assumptions, and parameters are detailed below.

- Stack Emissions:
  - Natural gas-fired combustion turbines, equipped with emission-controlled burner equipment, exhausting to individual 30 m stacks.
  - Six 50 MW combustion turbines (300 MW total capacity).
  - Dual fuel capacity [natural gas, or light fuel oil (diesel)].
  - Modelled conservative using the worst-case (i.e., highest emitting) fuel type (light fuel oil), whereas the Facility is being designed to use cleaner-burning natural gas as the primary fuel source.
  - Modelled conservative assuming a continuous emission release.
    - Note that the Facility is not forecasted to run continuously.

- Emission Data:
  - Modelled air contaminants were CO, NO_x, and $PM_{2.5}$
  - Emission rates and model inputs are summarized in Tables 3-4 & 3-5 of the Air Quality and GHG Assessment report (Hatch Ltd., 2025b) (Appendix B).
  - Detailed source and emission data in Appendix A of the Air Quality and GHG Assessment report (Hatch Ltd., 2025b) (Appendix B).

- Meteorological Data:
  - Meteorological data obtained from Lakes Environmental Data Service (Lakes).
    - Lakes uses the Weather Research and Forecasting (WRF) model to generate precise windfields worldwide. This software then uses the Mesoscale Model Interface Program (MMIF) to convert WRF into meteorological data for use in AERMOD.
    - Meteorological data were centred at 45.5031037 N, 62.8040129 W, and were extracted from the WRF model with a grid resolution of 4 km.

- Baseline Air Quality:
  - Modelled background air quality was determined based on data from the Pictou ambient air quality monitoring station (AAQMS) (26.2 km), from 2021 to 2023.
  - CO was measured from the Halifax AAQMS, as it was not available from the nearest station in Pictou (109.6 km), from 2021 to 2023.

- Modelled Domain:
  - Study Area: 10 km × 10 km area centred on the Facility.
    - Long-range transport was not assessed as emissions are expected to travel less than 50 km.
  - Terrain Consideration: Terrain obtained from a Digital Elevation Model (DEM).
    - The DEM was processed with AERMOD Terrain Preprocessor (AERMAP).

- Building Downwash: Performed using the U.S. EPA Building Profile Input Program (BPIP) for the Plume Rise Model Enhancements (BPIP-PRIME) and incorporated into AERMOD.
- Modelling Grid:
  - Receptor grid centred on the source.
  - Grid resolution (receptor) spacing:
    - 50 m up to 500 m from the source
    - 100 m up to 1,000 m
    - 250 m up to 2,000 m
    - 500 m up to 5,000 m
    - 1,000 beyond 5,000 m
    - 20 m along the Facility property boundary.

The assumptions and limitations made for the screening model were as follows:

- CO, NO_x, and $PM_{2.5}$ are the only substantial sources of air contaminants generated by the combustion turbine stacks. Other Facility air emissions sources are considered negligible.
- Releases of SO_2 were not modelled as the project will utilize natural gas and ultralow sulphur diesel (ULSD) as primary and secondary fuels. Both fuels contain low concentrations of sulphur (<15ppm for ULSD and between 3-6 mg/m^3 for natural gas) and therefore releases of SO_2 are expected to be negligible.
- Stack dimensions and exhaust gas characteristics are based on preliminary design information and vendor data for similar combustion turbines.
- Virtual building dimensions are based on preliminary data.
- NO_x converted to NO_2 based on baseline O_3 concentrations.
  - Hourly O_3 concentrations from the Pictou AAQMS from 2023 were used to determine onsite baseline O_3 concentrations.
- Particulate matter emissions from natural gas and fuel oil combustion in the gas turbines are expected to consist completely of size fractions ≤ 2.5 μm; therefore, total suspended particulate (TSP) is considered equivalent to $PM_{2.5}$ for comparison with Air Quality Regulations, N.S. Reg. 8/2020.
- As the Facility's start-up time is expected to be less than 10 minutes, the emissions from start-up are expected to be negligible in the modelled scenario.

It is essential to note that the emission rate calculations are based on preliminary design data and may require updates once detailed engineering is completed and definitive equipment specifications, operating modes, and control efficiencies are confirmed.
For a detailed account of the technical approach, including modelling methodology, assumptions, and boundary conditions, refer to the Hatch Report (Appendix B).

Hatch completed a desktop review of potential receptors, including sensitive receptors, through available imagery. The identified sensitive receptors nearest to the Project were then field-verified (Drawing 3.4).

Assessment Results

Weather and Climate

Nova Scotia's climate is quite varied and is largely governed by coastal influences and elevation (Davis & Browne, 1996). The Project is located within the MOPC, the Central Uplands (830) Ecodistrict and the Nova Scotia Uplands Ecoregion (Drawing 7.1). The Nova Scotia Uplands Ecoregion is characterized by more severe winters and more precipitation than the surrounding lowlands due to its higher elevation (Neily et al., 2017).

To assess the local climate, the nearest available meteorological station, located in Upper Stewiacke (Climate IDs 8206200 and 8204193), with 30 years of climate data (1995 to 2024), was obtained (Table 7.2). This weather station is 33.4 km from the Project Area. It should be noted that although the meteorological station is located near the Project, the data may not accurately reflect the conditions within the Project Area.

Table 7.2: Climate Data from the Upper Stewiacke Meteorological Station (1995-2024)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Temperature (°C)													
Daily Avg.	-5.6	-5.4	-1.4	4.0	9.5	14.7	18.7	18.3	14.2	8.5	3.4	-1.7	6.4
Daily Max.	-0.4	0.1	3.9	9.6	16.1	21.2	25.3	25.0	21.0	14.5	8.2	2.9	12.3
Daily Min.	-10.8	-11.0	-6.7	-1.7	2.9	8.1	12.1	11.5	7.5	2.6	-1.4	-6.4	0.6
Extreme Max.	16.5	15.2	25.7	28.8	30.8	33.4	33.2	35.6	33.1	26.6	23.4	17.1	26.6
Extreme Min.	-29.6	-34.0	-29.5	-20.0	-6.5	-4.4	1.0	1.1	-5.1	-9.5	-15.8	-25.5	-14.8
Precipitation (mm)													
Precipitation	108.1	92.1	98.9	91.6	85.9	102.5	92.6	96.3	103.6	114.6	123.0	125.6	1,234.8

Source: (ECCC, 2025b)

Between 1995 and 2024, the mean daily temperature was 6.4°C for all months, with a mean daily maximum of 12.3°C and a mean daily minimum of 0.6°C. January and February were the coldest months (mean daily average of -5.6°C and -5.4°C, respectively), while the warmest months were July and August (mean daily average of 18.7°C and 18.3°C, respectively). The mean annual precipitation was 1,234.8 mm. November and December had the highest precipitation (123.0 mm and 125.6 mm) (ECCC, 2025b).

Wind speed and direction data were obtained from the Upper Stewiacke meteorological station (Table 7.3) for the past five years (2020 to 2024). Note that wind was not recorded consistently for the entirety of the 30-year climate period from 1995 to 2024. As such, only weather data from the past five years was analyzed.

Table 7.3: Wind Data from the Upper Stewiacke Meteorological Station (2020 to 2024)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maximum Hourly Speed (km/h)	99	86	112	79	65	65	68	56	125	61	92	98
Most Frequent Direction	SW	SW	SW	SW	SW	SW	SW	NW	NW	SW	NW	SW

The maximum hourly wind speed recorded from the Upper Stewiacke meteorological station between 2020 and 2024 ranged from 56 km per hour (km/h) in August to 125 km/h in September. The most prevalent wind direction observed from the climate data recorded at the meteorological station is from the southwest. It should be noted that wind directions may occur in all directions; however, wind direction is not recorded during calm wind flows at the meteorological station (ECCC, 2025b).

Hatch generated a windrose plot of the annual wind speed and direction near the Project Area, as determined by the WRF data from Lakes (Meteorological Data, n.d.) (Figure 7.1). Wind speeds above 11 meter per second (m/s) (i.e., 36 km/h) were predominant in the southwest (Appendix B).

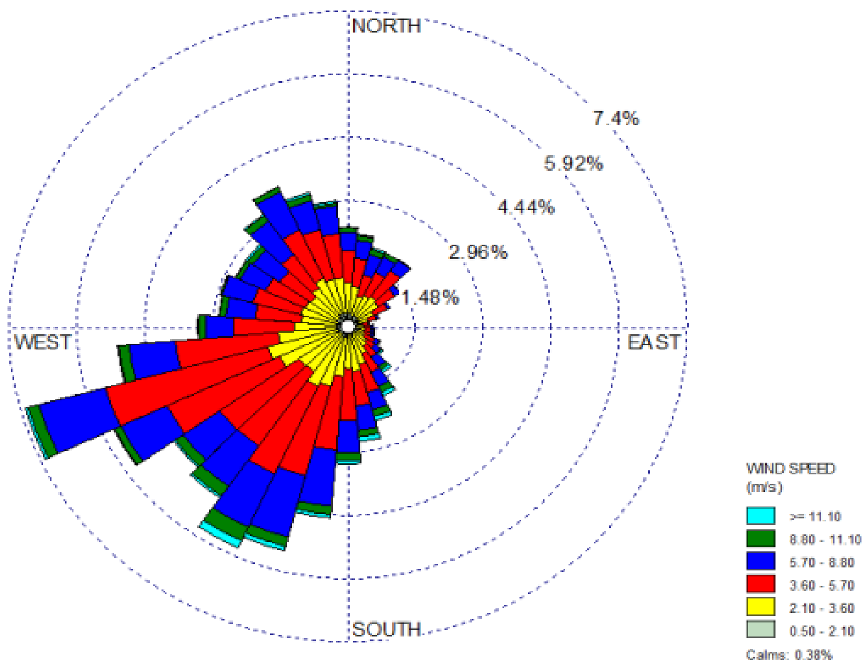

Figure 7.1: Windrose Plot – Annual Wind Speed and Direction 2020 to 2024 (Appendix B).

Ambient Air Quality

Nova Scotia has legislated Air Quality Regulations (NS AQR), N.S. Reg. 8/2020, under the *Environment Act*, S.N.S. 1994-95, c. 1 (Table 7.4).

The Nova Scotia ambient air quality standards (NSAAQS) published in Schedule A of the NS AQR set the maximum permissible ground-level concentration limits. Note that the NSAAQS does not specify the areas of compliance for threshold limits, but they are intended to be applied at and beyond a facility's property boundary, as noted in the Air Assessment Guidance Document published by NSECC (2023b). Therefore, compliance is assessed at and beyond the Project's proposed fenceline, as detailed in Drawing 7.2.

Table 7.4: NS Ambient Air Quality Maximum Permissible Ground Level Concentrations

Contaminant	Averaging Period	Regulatory Threshold (µg/m^3)(1)
		NSAAQS
Carbon Monoxide (CO)	1-hour	34,600
	8-hour	12,700
Nitrogen Dioxide (NO_2)	1-hour	400
	24-hour	-
	Annual	100
Ozone (O3)	1-hour	160

Contaminant	Averaging Period	Regulatory Threshold (µg/m³)[1]
		NSAAQS
Hydrogen Sulphide (H_2S)	1-hour	42
	24-hour	8
Sulphur Dioxide (SO_2)	1-hour	900
	24-hour	300
	Annual	60
Total Suspended Particulate (TSP)	24-hour	120
	Annual	70[2]

(Air Quality Regulations, N.S. Reg. 8/2020)
(1) Micrograms per cubic metre
(2) Geometric mean

Nova Scotia AAQS includes a limit on TSP, which comprises all airborne particles with a diameter less than 100 micrometres (µm). The Facility is anticipated to generate only $PM_{2.5}$; furthermore, Nova Scotia does not monitor TSP, so an accurate baseline for TSP could not be determined. Therefore, for this assessment, all particulate matter was assumed to be $PM_{2.5}$. Modelled $PM_{2.5}$ values were compared to relevant Nova Scotia AQR TSP limits and the more stringent $PM_{2.5}$ Canadian Ambient Air Quality Standards (CAAQS) published by the Canadian Council of Ministers of the Environment (CCME, n.d.). It is noteworthy that CAAQS are intended to manage regional airsheds and may not be directly applicable to maximum ground-level air contaminant concentrations.

Nova Scotia monitors air quality at eight ambient air quality monitoring stations (AAQMS) located throughout the province (NSECC, n.d.-a). Measured parameters at these locations may include the following:

- CO
- O_3
- NO_x
- $PM_{2.5}$
- Sulphur dioxide (SO_2)
- Total reduced sulphur (TRS)

The NO_2, O_3, and $PM_{2.5}$ values from seven of the eight AAQMS are used to calculate a score on the Air Quality Health Index (AQHI) (ECCC, 2025a; NSECC, n.d.-a). The AQHI is a scale ranging from 1 to 10+, where scores correspond to the following health risk categories: Low (1 to 3), Moderate (4 to 6), High (7 to 10), and Very High (10+) (ECCC, 2025a).

The closest AAQMS to the Project with available data is the Pictou station, 26.2 km north of the Project Area.

Table 7.5 summarizes the ambient air quality conditions observed at the Pictou AAQMS from January 2020 to December 2023, as calculated by Hatch (Appendix B). As noted previously, the Pictou AAQMS does not monitor CO, and therefore, CO ambient levels were based on values measured at the Halifax AAQMS (109.6 km from the Project Area). The identified parameters are calculated only for those anticipated to be released in substantive quantities from the Facility during operation (CO, NO_2, and $PM_{2.5}$).

Table 7.5: Ambient Air Quality Conditions at Pictou or Halifax (2021 to 2023)

Parameter	Averaging Period	Ambient Levels (µg/m³)	NSAAQS Limits (µg/m³)	Percent of Limit (%)
CO	1-hour	(252)[(1)]	34,600	0.7
	8-hour	(240)[(1)]	12,700	1.9
NO_2	1-hour	3.8	400	1.0
	Annual	1.8	100	1.8
$PM_{2.5}$	24-hours	11.1	27.0[(2)]	41.1
	Annual	5.0	8.8[(2)]	56.8
TSP[(3)]	24-hours	11.1	120	9.3
	Annual	5.0	70	7.1

(Hatch Ltd., 2025, Appendix B)
(1) Values in () represent Halifax AAQMS (2021 to 2023).
(2) CCME CAAQS.
(3) Assumes all TSP is released as $PM_{2.5}$.

As shown in Table 7.5, the existing air quality conditions (i.e., ambient levels) indicate that the measured contaminants are below their respective NSAAQS limits as detailed in Schedule A of the NS AQR, or applicable CAAQS limits. The reported AQHI typically scores 'low' at all times of the year (ECCC, 2025a).

Based on ambient air quality and modelling results, anticipated Project-related impacts were assessed to determine the potential effects the Project may have on air quality during construction and operations; Project-related process emissions, fugitive dust, and exhaust emissions are considered.

Fugitive Dust

Fugitive dust emissions and PM may be generated from open-air activities such as soil disturbance, wind erosion, and increased traffic. Fugitive dust emissions comprise soil minerals but may include salt, pollen, spores, and rubber tire particles. PM is measured as TSP and is defined and regulated in Nova Scotia as the mass of airborne particles having a diameter of less than 100 µm (NSECC, 2009b).

When fugitive dust enters the atmosphere, it can affect lung and heart function. PM has been linked to premature death (people with lung and heart disease), non-fatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms such as irritation of the airways, coughing, or difficulty breathing. People with underlying lung and heart disease, children, and the elderly are the most susceptible to particulate pollution exposure (US EPA, 2024b)

Fugitive dust may also impair visibility and cause environmental damage. Fine particles are the leading cause of reduced visibility in many cities, national parks, and wilderness areas. In addition, fugitive dust particles can be carried over long distances (via wind), deposited in other locations, and within surface water features. Some of the potential effects of particulate deposition may include the following (US EPA, 2024b):

- Increasing lake and stream acidity.
- Altering the nutrient balance in large river basins.
- Depleting the nutrients in the soil.
- Damaging sensitive forests and farm crops.
- Affecting the diversity of ecosystems.
- Reducing quality of wild food sources
- Contributing to acid rain effects.

Anticipated sources of fugitive dust emissions from the Project will be associated with the construction of the Facility and may include the following activities:

- Soil disturbance during site preparation (e.g. excavation).
- Wind erosion from soil or rock stockpiles during grading.
- Increase in traffic on roadways from travel by Project personnel (to/from the site).
- Management of on-site materials transfers (i.e., loading/unloading).

The interaction with local receptors was assessed to determine the environmental impacts of fugitive dust emissions on ambient air quality. The closest non-participating receptor (MR02) is 833 m from the Project Footprint (Drawing 3.4). The effect of fugitive dust sources on air pollution depends on the composition and quantity of the dust produced, as well as on how the particles behave once released into the atmosphere. Larger particles tend to settle quickly near their source, while smaller particles disperse substantially farther.

The distance particles can travel is influenced by factors such as the height at which they are released, their deposition velocity, wind speed, and the degree of atmospheric turbulence. For instance, theoretical calculations indicate that at an average wind speed of 4.4 m/s, particles larger than 100 µm typically settle within 10 m of their emission point (Holsen et al., 2011). However, particles 30 µm to 100 µm in diameter will likely deposit within 100 m from the emission source (road, construction area). Other finer particles have a slower settling velocity and may travel further before they settle (US EPA, 1995). Although particles under 30 µm may travel farther before settling, they are expected to disperse with respect to distance.

The site preparation and construction phase is expected to be two years and include activities detailed in Table 7.6. The closest non-participating receptors are located beyond the extent to which most fugitive dust emissions are expected to travel. Furthermore, the Project Area is surrounded by a forested buffer that is expected to trap and reduce particles before they reach nearby receptors. As a result, impacts during the construction phase are considered short-term, intermittent, and within the LAA.

Additionally, while fugitive dust emissions will occur during Facility operation as $PM_{2.5}$. these emissions are anticipated to be negligible and were not assessed by Hatch (Appendix B). As a result, impacts during the operation phase are considered medium-term, intermittent, low magnitude and within the LAA.

Tailpipe/Exhaust Emissions

Construction of the Facility is expected to take two years and result in increased combustion residuals and/or tailpipe exhaust emissions from vehicles (i.e., travel by Project personnel and transport/delivery activities) and heavy equipment, primarily PM, NOx, SO_2, and CO. The US EPA (2014) determined that for major roadways, traffic emissions influence air quality within the first 183 m from the emission source, and air quality improves with respect to distance from the source. Similar vehicle and heavy equipment tailpipe emissions are expected to be generated from the Project, and the nearest non-participating receptor (MR02) is located 833 m from the Project Footprint. Furthermore, the forested buffer, which separates the Project from the closest non-participating receptor, is anticipated to reduce the impacts of tailpipe exhaust (US EPA, 2014). Overall, exhaust emissions are considered short-term, intermittent, and within the LAA.

During the Project's operations phase, emissions may result from additional sources, including on-site vehicles, transportation and delivery services, and heavy equipment. When the Facility is operating by light fuel oil, fuel delivery is expected to require up to 52 trucks per day. These sources are anticipated to be negligible compared to the Facility’s stack emissions and disperse readily with respect to distance, as with construction exhaust emissions. Furthermore, deliveries of light fuel oil are anticipated only when the Facility is not using natural gas and is therefore expected to be required infrequently (i.e. less than 20 days per year). Therefore, these tailpipe emissions are anticipated to be medium-term within the LAA and intermittent.

Process Emissions

The identified sources of emissions from the Facility are the combustion turbine stacks. Maximum operational emission rates from the Facility were determined by Hatch (2025b) and are presented in the Air Quality and GHG Assessment report (Appendix B).

The model was used to predict concentrations within a 10 km by 10 km grid extending beyond the Project boundary (Appendix B). Results are summarized in Table 7.6 and are compared with the limits set in the NSAAQS limits or CAAQS.

Table 7.6: Modelled Emission Concentrations Summary

Contaminant	Averaging Period	Ambient Levels (µg/m³)	Maximum Facility Produced GLC (µg/m³)	Maximum Cumulative GLC (µg/m³)	Relevant Concentration Limits (µg/m³)	Percent of Limit (%)
CO	1 hour	(252)(1)	80.8	332.8	34,600	1.0
	8 hours	(240)(1)	57.2	297.2	12,700	2.3
NO_2	1 hour	3.8	88.0	91.8	400	23.0
	Annual	1.8	2.0	3.8	100	3.8
$PM_{2.5}$	24 hours	11.1	1.4	12.5	27.0(2)	46.3
	Annual	5.0	0.2	5.2	8.8(2)	59.1
TSP(3)	24 hours	11.1(3)	1.4	12.5	120	10.4
	Annual	5.0(3)	0.2	5.2	70	7.4

Adapted from (Hatch Ltd., 2025, Appendix B)
Some rounding errors may occur when values are translated between different table formats.
(1) Values in () represent Halifax AAQMS (2021 – 2023).
(2) CCME CAAQS.
(3) Assumes all TSP is released as $PM_{2.5}$.

Of the parameters modelled, 1-hour NO_2 at 23.0% (Drawing 7.2) had the highest fraction of the NSAAQS; the $PM_{2.5}$ 24-hour at 46.3% (Drawing 7.3) and the annual at 59.1% (Drawing 7.4) had the highest fraction of the CAAQS, but were 10.4% and 7.4% of the NSAAQS limits for TSP. The Facility is not anticipated to generate substantial amounts of other contaminants.

The maximum cumulative ground level concentrations (GLC) are the maximum modelled emission levels produced from the Facility including ambient (baseline) emissions, at ground level anywhere in the modelled domain. Therefore, these maximum cumulative GLCs do not necessarily reflect the emission concentrations at non-participating receptor locations, because maximum GLCs occur closer to the facility than receptors are located. The emission concentrations (including baseline) for each non-participating receptor can be determined from the drawing package.

Based on the modelling results from the Air Quality and GHG Assessment Report completed by Hatch in 2025 (Appendix B), Facility emissions alone or cumulatively are not expected to contribute to the exceedance of the applicable NSAAQS limits at ground levels anywhere within the LAA (Table 7.6). Recall that the LAA is based on a 10 km by 10 km grid centred on the Project), and the modelling is conservative assuming continuous operations of the Facility by light fuel oil (worst-case emission scenario). No exceedances are predicted at any receptors.

Note that the CAAQS guidelines are used to compare $PM_{2.5}$ emissions, since they are not explicitly listed in the NS AQR; however, the NS AQR are used to determine compliance. The Facility achieves compliance under either the CAAQS or the NS AQR, and overall, Facility emissions are considered low-magnitude (as compared to the NS AQR), medium-term, intermittent, and within the LAA.

Mitigation

An Air Quality Management (AQM) Plan will be developed as a component of the EMP to define measures to be employed to minimize and mitigate the creation and emission of pollutants during the Project's construction and operation phases.

In addition, general mitigation measures for fugitive dust emissions are provided below:

- Conduct grading and site preparation in phases to minimize disturbed soil areas until just prior to construction activities.
- Stabilize exposed soil surfaces by sloping or using vegetation, stone, soil, or geotextiles to prevent dust and airborne particles from accumulating.
- Compact and/or ridge disturbed soil to prevent dust formation.
- Cease dust-generating construction activities during periods of excessive wind.
- Enclose or cover soil storage and/or stockpile areas.
- Wet (with water) aggregate and soil stockpiles to control dust, as required.
- Design storage areas and material stockpiles with prevailing wind directions in mind.
- Wet roadways and heavy traffic areas with water or dust suppressant technologies to minimize airborne emissions.
- Tie down, cover, and/or store loose site materials and/or products prior to inclement weather and wind events to prevent materials from becoming airborne.
- Cover open hauling trucks with tarps (where practical).
- Wash down vehicles and equipment using hoses and water to remove accumulated mud/dirt from undercarriages, tracks, or wheel wells, preventing off-site tracking of contaminants.
- Ensure Project personnel adhere to all safety protocols and wear appropriate personal protective equipment (PPE) in the event of significant fugitive emissions events (i.e., windstorms, dust storms).
- Revegetate with native species to cover and bind soil particles, thereby reducing soil erosion and dust.
- Restrict vehicles and machinery movement to designated paths with stabilized surfaces.
- Restrict site access to Project personnel during construction.
- Use low-speed limits on-site to reduce vehicle-generated dust.

General mitigation measures for exhaust emissions include:

- Ensure equipment meets all applicable provincial and air quality regulations and emissions standards.
- Maintain engines and exhaust systems according to the manufacturer's specifications and the recommended maintenance schedule.

- Remove from service malfunctioning equipment and/or equipment generating excess amounts of smoke, odour, or noise, until an assessment and necessary repairs can be completed.
- Remove from service construction equipment with improperly functioning emissions control systems.
- Restrict the idling of equipment where feasible.

General mitigation measures for process emissions are provided below:

- Install emission monitoring systems to track real-time concentrations of CO and NO_x during operations.
- Inspect and maintain gas lines, seals, and control equipment regularly to prevent leaks and malfunctions.
- Ensure burners undergo regular maintenance to achieve efficient combustion and minimize pollutants.
- Ensure personnel are adequately trained and specialized to perform daily inspections and maintenance on the combustion and emissions control equipment.

Monitoring

An updated air dispersion model may be completed at a later permitting stage if required based on revisions to the Facility engineering design. An AQM Plan (including monitoring) will be developed and submitted to NSECC for approval prior to Project commissioning. Pre-operation ambient air quality levels will be measured to establish baseline conditions. Upon commissioning, operational air quality monitoring will be conducted quarterly at the Facility for the first year of operation to verify modelling results and ensure compliance with ambient air quality levels. The quarterly monitoring results will be reviewed, and depending on the findings, ongoing operational monitoring may be required.

Conclusion

After mitigations, predicted residual effects atmosphere and air quality are characterized in Table 7.7.

Table 7.7: Atmosphere and Air Quality Residual Effects

VC Interactions	Mitigation and Compensation Measures	Nature of Effect	Magnitude of Effect	Geographic Extent of Effects	Duration of Effects	Frequency of Effects	Reversibility of Effects	Significance Level
Construction Emissions (Fugitive Emissions)	Restrict idling. Maintain equipment in proper working order. Revegetate exposed groundcover.	**Adverse**	**Low** Some air contaminant emissions are anticipated, but non-participating receptors are expected to be located far enough away for the impact to be minimal.	**PA**	**Short Term** Effects are mainly confined to the construction and decommission phases.	**Intermittent** Effects may occur during the Project's construction and decommission phases, but only intermittently.	**Reversible** Effects will return to baseline following construction (and decommission).	Not Significant
Operational (Stack) Emissions	Install emission-monitoring systems to track real-time concentrations of CO, NO_x.	**Adverse**	**Low** Some air contaminant emissions are anticipated; however, maximum ground-level concentrations are expected to remain below NSAAQS limits	**LAA**	**Medium Term** Effects are mainly confined to the operation phase.	**Intermittent** Effects may occur during the Project's operation phase, but only intermittently	**Reversible** Effects will return to baseline following the operation.	Not Significant

VC Interactions	Mitigation and Compensation Measures	Nature of Effect	Magnitude of Effect	Geographic Extent of Effects	Duration of Effects	Frequency of Effects	Reversibility of Effects	Significance Level
			beyond the Project Area.					

Effects Assessment Ratings (Refer to Table 4.2 for definitions)
Nature of Effect: Adverse, Positive
Magnitude: Negligible, Low, Moderate, High
Geographic Extent: PA, LAA, RAA
Frequency: Single Event, Intermittent, Continuous
Duration: Short Term, Medium Term, Long Term
Reversibility: Reversible, Irreversible, Partially Reversible

7.2 Greenhouse Gases

Climate change for this Project is addressed in terms of GHG emissions per the NSECC A Proponent's Guide to Environmental Assessment (2025a) and Guide to Considering Climate Change in Project Development in Nova Scotia (2011d) and various GHG regulations. For this EA, the GHG emissions encompass those from the Facility's construction and the combustion of fuel for energy generation. This review will consider the Project's anticipated carbon footprint and the possible options for reducing GHG emissions through mitigation controls.

7.2.1 Overview

Climate change is a long-term alteration of weather patterns and conditions strongly impacted by changes in temperature and precipitation. Climate change typically involves changes in average conditions and variability. The main contributor to climate change is GHGs from anthropogenic sources. Since GHGs disrupt the natural heat transfer processes in Earth's atmosphere, a buildup of these gases has enhanced the natural greenhouse effect. These human-induced enhancements are especially of concern since ongoing GHG emissions have the potential to warm the planet to levels that have yet to be experienced (ECCC, 2019d).

The impacts of climate change on the Project are assessed separately in Section 14.0.

7.2.2 Regulatory Context

The climate change assessment considered the following Acts and Regulations:

- *Environment Act*, S.N.S. 1994-95, c. 1
  - Greenhouse Gas Emissions Regulations, N.S. Reg. 305/2013
- *Environmental Goals and Sustainable Prosperity Act,* S.N.S. 2007, c. 7
- *CEPA* S.C.1999, c.33
  - Passenger Automobile and Light Truck Greenhouse Gas Emission Regulations, S.O.R./2010-201
  - Heavy-duty Vehicle and Engine Greenhouse Gas Emission Regulations, S.O.R./2013-24
  - Ozone-depleting Substances and Halocarbon Alternatives Regulations, S.O.R./2016-137
  - Halocarbon Regulations, S.O.R./2022-110

Regulatory guidance was used to determine the appropriate assessment methodologies, mitigation controls, best management practices, and emissions targets. Note that this Project is anticipated to be subject to GHG emission reporting requirements as set out in the ECCC Greenhouse Gas Reporting Program (GHGRP). A detailed GHG emission inventory compatible with the GHGRP will be completed when detailed engineering design and operation scenarios are determined.

7.2.3 Effects Assessment

Potential Interaction and Effects Assessment

The Project is anticipated to replace coal-fired electricity generation facilities within Nova Scotia. Although the Project will generate GHGs during operation, it is expected to reduce emissions compared to the coal-fired electrical generation it will replace. The following effects assessment will isolate and evaluate the GHG emissions from the Project's activities.

Project activities will emit GHGs during all phases of the Project (Table 7.8).

Table 7.8: Potential Project-GHG Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Site Preparation	X
Placement of Sedimentation and Erosion Control Measures	-
Clearing and Grubbing	X
Civil Site Construction	X
Equipment Installation	X
Interconnections for Services	-
Removal of Temporary Works and Site Restoration	X
Commissioning	-
Operations and Maintenance	
Facility Operation and Maintenance	X
Site Management	-
Decommissioning and Rehabilitation	
Infrastructure Removal	X
Site Reclamation	X

Assessment Boundaries

The LAA for GHGs is the Province of Nova Scotia. The RAA for GHGs is not applicable.

Assessment Criteria

Assessment criteria provided in Section 4.6 apply to Project-related GHG contributions. The VC-specific definition for magnitude is as follows:

- Positive: Project is expected to have a positive effect on GHG emissions.
- Negative: Project is expected to have a negative effect on GHG emissions.

Assessment Methodology

The objectives of this assessment include the following:

- Establish the sources of GHG contributions from the Project.
- Quantify baseline and Project-generated GHG emissions.
- Mitigate and minimize GHG generation from Project-related activities.

Sources of GHG emissions were identified through a review of Project phases, components, and equipment.

Construction GHG emissions were quantified using anticipated quantities of construction materials based on the provided site plans and construction timelines from the Proponent, as well as conservative assumptions where details were not available. GHG emissions were quantified in accordance with the specifications described in the International Standard ISO 14064 (2019) and using published values found in the literature (sources provided in applicable sections that follow).

Hatch provided operational GHG emissions through a GHG Assessment report completed in 2025 (Appendix B).

All GHG emissions are stated in tonnes of carbon dioxide equivalent (tCO2e).

Sources of Greenhouse Gas Emissions

The main GHGs of concern include:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Halocarbons
- Water vapour

GHGs may be natural or anthropogenic in origin, except halocarbons, which are human-made (ECCC, 2019a). The following subsections describe the GHGs and their contributors (sources) as anticipated during each phase of the Project.

Carbon Dioxide

The primary source of atmospheric CO_2 is burning carbon-containing fossil fuels (i.e., coal, oil, and natural gas) and deforestation/land clearing activities.

Site preparation and construction for the Project will include several activities that are likely to produce CO_2. These include, but are not limited to, the following:

- Use of heavy equipment (excavators, dozers, cranes, etc.).
- Use of light-duty vehicles and equipment (pick-up trucks, light plants, generators, etc.).

- Cement production results in the heating of limestone, which releases CO_2 (ECCC, 2019a)
- Steel production (offsite emission).
- Material transportation (rail and haulage trucks).

During the operations phase, CO_2 emissions will mostly occur due to process activities, including but not limited to the following:

- Use of vehicles and equipment for maintenance operations.
- Combustion of natural gas or light fuel oil.

Where maintenance activities are intermittent and short-term, the GHG contributions are negligible and are not considered further.

Methane

CH_4 is produced when fossil fuels are burned with insufficient oxygen to complete combustion (ECCC, 2019a).

The Project's construction phase requires different heavy- and light-duty equipment, contributing to methane emissions. The decay of waste (i.e., workforce waste production) will also contribute to methane emissions. Where these activities are intermittent and short-term, the GHG contributions from methane during construction are negligible and are not considered further.

During the operations phase, CH_4 emissions may be generated from the combustion of natural gas or light fuel oil and are considered in the modelling completed by Hatch as discussed in Section 7.2.6. However, where CH_4 emissions from maintenance activities are intermittent and short-term, these GHG contributions are negligible and are not considered further.

Nitrous Oxide

The primary sources of anthropogenic N_2O are related to the use of nitrogen-based synthetic fertilizers and manure. These sources have added significant amounts of reactive nitrogen to Earth's ecosystems. However, the Project will not use substantial amounts of fertilizer; instead, Project-related N_2O emissions will be generated during the combustion of fossil fuels (ECCC, 2019a).

The Project's construction phase requires heavy- and light-duty equipment, which can contribute to N_2O emissions. Overall, the production of N_2O in association with this Project is anticipated to be minimal.

During the operations phase, N_2O emissions may be generated from the combustion of natural gas or light fuel oil and are considered in the analysis completed by Hatch as discussed in Section 7.2.6. However, where N_2O emissions from maintenance activities are intermittent and short-term, these GHG contributions are negligible and are not considered further.

Halocarbons

Halocarbons are a group of synthetic chemicals containing a halogen group (e.g., fluorine, chlorine, and bromine) and carbon (ECCC, 2019a). They are typically used in refrigerants, fire-extinguishing agents, solvents, foam-blowing agents, and fumigants (ECCC, 2003). There are various industrial sources, but the main contributor is aluminum production (US EPA, 2024a). The primary source of halocarbon emissions from the Project will be associated with coolants in air conditioning units found in vehicles, and portable construction buildings (i.e., trailers), Fire-extinguishing agents (containing halocarbons) may also be used at the Project in the event of an emergency that requires a fire-fighting response.

During the operations phase, halocarbon emissions will be limited to the maintenance of coolants in air conditioning units. However, where halocarbon release may be required, procedures will include recovery to minimize emissions from maintenance activities. Such activities will be intermittent and short-term, and therefore, such GHG contributions are negligible and are not considered further.

Water Vapour

Water vapour is the most important naturally occurring GHG. Human activities do not directly influence the amount of water vapour in the atmosphere as it is a function of the atmosphere's temperature. The atmosphere can hold about 7% more water vapour for every additional degree Celsius in air temperature. When the air becomes saturated with water vapour, it condenses, forming fog, and falls as rain or snow, leading to climate change effects (i.e., variations in weather patterns).

As climate warming gases (i.e., CO_2, CH_4, N_2O) increase in the atmosphere, the temperature rise increases water evaporation from the Earth's surface and increases the atmospheric water vapour concentrations. This increased water vapour, in turn, amplifies the warming from the initial GHGs, causing the cycle to repeat and temperatures to keep rising (ECCC, 2019a).

Substantial water vapour emissions are not expected during the construction phase; however, water vapour is expected during the operations phase. Water vapour has a relatively short residence time in the atmosphere, as it quickly condenses into liquid or ice and falls back to the surface as precipitation (NASA, 2022). Project activities contributing to GHG emissions are not anticipated to significantly impact water vapour concentrations in the atmosphere.

Quantification of the GHG Baseline Conditions

The GHG baseline is a reference to sources, sinks (removing), and reservoirs (storing) occurring in the Project’s absence and is used to compare pre- and post-Project conditions.

The 2030 Clean Power Plan (NSNR, 2023a) calls for retiring coal-fired generation and replacing it with fast-acting generators, expanded renewable energy, and other updates to the province’s power generation mix. Because the Project is designed primarily to generate electricity during supply gaps left by must-run renewables, it will displace coal-fired output as existing coal facilities currently perform this role. Therefore, the GHG baseline has been calculated as the quantity of CO_2e emitted from current coal-fired electricity production for the equivalent generation capacity of the Project. No sinks or reservoirs have been attributed to the baseline scenario.

The GHG assessment for the Project assumes six 50 MW combustion turbines capable of generating up to 300 MW of energy. Based on the turbine design capacity and an estimated capacity factor of 25% (Hatch Ltd., 2025; Appendix B), the Project is expected to produce approximately 657,000,000 kilowatt-hours per year (kWh/year). The Project's lifespan is estimated to be a minimum of 30 years.

Table 7.9 summarizes the GHG emission factors and total baseline emissions for coal assuming equivalent power generation over the expected lifespan of the Project.

Table 7.9: Baseline Quantification Summary

Electricity Fuel Source	Electricity Generation (kWh/yr)	Emission Factor (tCO_2e/kWh)	Emission Factor (tCO_2e/kWh)
Coal	657,000,000	0.0010502	689,981

(EIA, 2023)

Quantification of Construction Phase GHG Emissions

Construction Phase

The Facility's construction is expected to occur over two years. Construction may affect the atmosphere by releasing GHGs, primarily from the combustion of fossil fuels.

Site Preparation

The Project will require constructing Facility components, which will involve the removal of vegetation and overburden, creating fugitive dust and GHG emissions. However, fugitive dust and GHG contributions for these activities, which are temporary and represent a small incremental addition to the overall Project emissions, were not quantified. Additionally, once completed, hydroseeding (or equivalent) will be used to cover exposed earth, helping prevent the resuspension of particulate matter.

Fugitive dust and air emissions as they relate to the Project are discussed in Section 7.1.1.

Mobile Equipment

Mobile construction equipment, such as backhoes and bulldozers, is required during construction. Estimations and assumptions were made for the quantification of the GHG emissions and require the following inputs:

- The operating days of the equipment.
- The operating shift schedule.
- The equipment fuel consumption per hour (litres per hour).
- The amount of equipment required.

The amount of mobile equipment required for the Project's construction phase is not yet known, nor is the fuel consumption for this equipment. Based on Strum's experience with similar construction projects, the amount of equipment and fuel consumption for the mobile equipment required for the construction of the Project has been estimated. The following mobile equipment was assumed to be required for the construction:

- Dozers (3)
- Excavators (3)
- Dump Trucks (3)
- Loaders (3)
- Trucks (Heavy Diesel) (3)
- Trucks (Light Gasoline) (8)
- Tree Clearing and Harvesting Equipment (3)
- Pile Boring/Driving Machines (3)
- Vacuum Trucks (3)
- Generators (3)
- Cranes and Manlifts (3)
- Rollers (3)
- Graders (3)

Although construction may occur 24 hours a day, this assessment assumed equipment would run for 14 hours each day, excluding weekends and holidays, for a period of two years (construction period). This reduction in equipment runtime was implemented because it is anticipated that approximately half of the equipment will be operational at any given time. The average fuel consumption for each piece of mobile equipment is presented in Table 1 (Appendix B).

The CO_2e emissions generated by the mobile equipment required to construct the Facility are expected to be approximately **19,934.99 tCO_2e** throughout the entire construction period.

Detailed CO_2e calculations are provided in Table 1 (Appendix B).

Construction Materials

Various construction materials will be required for the Project; however, for this assessment and as a conservative GHG estimate, the construction materials will be lumped into concrete and steel. The materials needed for the Facility are based on the details of the site plans provided by the Proponent and professional judgment from Strum. Since the site plan is a preliminary assessment, the Project details may vary as the design progresses. However, any updates to these Project details are not anticipated to affect the enclosed findings. Where specific details were unknown, Strum provided conservative estimates to quantify GHG emissions where possible. All materials are assumed to come from local suppliers.

Concrete

As a conservative estimate, it is assumed that the concrete components required for the Project Infrastructure include a slab foundation for the entire Project Footprint. The Facility will require a substantial quantity of concrete to be produced and delivered to the Project. This concrete was assumed to be supplied by the nearest local supplier, located in New Glasgow (approximately 21 km by road).

The quantification of the GHG emissions requires the following inputs:

- The quantity of concrete produced.
- Transportation distance of concrete.

For quantification purposes, the assessment assumed the following:

- Supplier location.
- Route to the Facility.
- Quantity of concrete required.

Table 7.10 summarizes the GHG emission factors for the different components used for concrete-related activities.

Table 7.10: Concrete Manufacturing Emission and Physical Property Factors

Component	Emission Factor / Density Factor
Concrete Production	3×10^{-4} tCO_2e/kg
Concrete Density	2,400 kg/m^3
Concrete Truck with Freight	1.35×10^{-4} $tCO_2e/tonne \cdot km$
Concrete Truck without Freight	1.106×10^{-3} tCO_2e/km

(Squared Consultants Inc, 2025; The Engineering ToolBox, n.d.-a)

The total amount of concrete required was based on an assumed slab foundation construction for a simplified, yet conservative GHG estimate. The slab area was calculated from the site plan provided by the Proponent and covers the entire Project Footprint. Note that the whole Project Footprint is not expected to require a concrete foundation; however, this assumption was used for the purposes of this assessment. The depth of the concrete foundation slab was assumed to be 0.25 m thick, resulting in a total concrete volume of 31,528 m^3 (75,666 t).

To determine the emissions associated with travel for the concrete, the following assumptions were made:

- Each concrete truck can transport 9 m^3 of concrete per trip.
- Each delivery comprises 21 km one-way.
- Emissions are calculated to the Facility as with freight, and the return trip is calculated without freight.

Given the volume of concrete required for the Project, the distance this concrete is required to travel, and the emission factors (Table 7.10), the CO_2e emissions for the concrete needed to construct the Facility are expected to be approximately **22,995.75 tCO_2e.**

Detailed CO_2e calculations are provided in Table 2 (Appendix B).

Steel Usage
The Project will incorporate metal structures and equipment into its infrastructure, requiring extensive steel and metal fabrication. These materials and equipment will be manufactured and transported to the Facility. While various types of metals will be utilized to meet the Project's demands, only steel will be included in the GHG quantification due to its significantly higher emissions during production than other metals (Ritchie, 2020).

To quantify GHG contributions from steel during the construction phase, the following items were assessed:

- The quantity of steel required.
- The transportation distances from the supplier to the Project location.

For quantification purposes, the assessment assumed the following:

- Supplier location.
- Route to the Facility.
- Quantity of steel required.

Table 7.11 provides the approximate physical properties of the steel required for the Project.

Table 7.11: Steel Manufacturing Emission and Physical Property Factors

Component	Emission Factor / Density Factor
Steel	1.5×10^{-3} tCO_2e/t
Steel Density	8,000 kg/m^3
Heavy-hauler Truck with Freight	1.35×10^{-4} $tCO_2e/tonne \cdot km$
Heavy-hauler Truck without Freight	1.106×10^{-3} tCO_2e/km

(Hammond & Jones, 2008; Squared Consultants Inc, 2025; The Engineering ToolBox, n.d.-b).

The amount of steel required was based on an assumed enclosed structure around the Project Footprint (for a simplified yet conservative GHG estimate). The Project Footprint was calculated based on the Proponent's site plan. The steel enclosure was assumed to be 0.0254 m thick and 10 m high. The enclosure geometry was assumed to be a square (five sides, including the roof), with each wall segment equal to the square root of the Project Footprint. The calculated total volume of steel for the enclosure is 451.00 m^3 (3,608.02 tonnes).

$$\left(\sqrt{\text{Footprint Area}} \times \text{Height} \times \text{Thickness}\right) \times Number\ of\ Sides = Enclosure\ Steel\ Volume$$
$$(355.12\ \text{m} \times 10\ \text{m} \times 0.0254\ \text{m}) \times 5 = 451.00m^3 \quad \text{(Eq. 1)}$$

Steel rebar is also assumed to be required for any foundation. A conservative estimate of the rebar required was made based on the Project Footprint, assuming 19.05 mm-diameter rebar spaced at 0.21 m in a single grid across the Facility foundation. These parameters were fed into a simplified rebar calculator for concrete pours (Finity, 2024). The total amount of steel required for all the foundation rebar was estimated at 341.52 m^3 (2,732.14 tonnes).

No equipment list was provided for the Project; however, it is anticipated that six 50 MW combustion turbines would achieve a gross Facility capacity of up to 300 MW. No specific turbine has been selected for this Project; however, for this GHG assessment, it was assumed that six Mitsubishi H-25 (41 MW) turbines would be used. Each turbine has a stated weight of 55 tons (49.90 tonnes) (H-25 Series; Gas Turbines, n.d.) and is considered to be fabricated of complete steel construction. The total required amount of steel for the combustion turbines is 299.40 tonnes.

To determine the emissions associated with travel for the steel, the following assumptions were made:

- One local supplier would supply all the steel for the Facility.
- Each heavy-hauler truck can transport 38 tonnes per trip.
- Each delivery comprises 83 km one-way.
- Emissions are calculated to the Facility as with freight, and the return trip is calculated without freight.

Given the amount of steel required for the Project, the travel distance, and the emission factors (Table 7.10 & 7.11), the CO_2e emissions for the steel needed to construct the Facility are expected to be approximately **13,222.07 tCO_2e**.

Detailed CO_2e calculations are provided in Table 2 (Appendix B).

Quantification of Operational Phase GHG emissions

Operational Phase

Upon completion of the construction phase, the Facility will be operational. Hatch (2025b) completed a GHG Assessment (Appendix B) to quantify these operational emissions.

To determine the emissions associated with the Facility's operation, the following parameters were considered by Hatch:

- The gross power generation capacity of the Facility is up to 300 MW
- The annual fuel consumption was based on a 25% capacity factor.
    - Annual operating hours of 2,190 per year
    - Annual power generation of 657,000,000 kWh/year.

- The Facility fuel consumption for combustion turbines was split between natural gas and light-fuel oil.
  - Natural gas (80%)
  - Light-fuel oil (20%)
- The emissions were calculated using published emission factors from ECCC, and inclusive of:
  - CO_2
  - CH_4
  - N_2O

The Facility's operation will require activities including scheduled routine mechanical, process, and operational maintenance. Where maintenance activities are intermittent and short-term, their GHG contributions are negligible, and no significant emissions are expected from these activities.

Based on the GHG emission calculations completed by Hatch (2025b), the Facility is anticipated to generate **325,594 tCO_2e/yr** when in operation (Appendix B).

Decommissioning

The decommissioning of the Facility will generate emissions similar to those during construction. However, future technologies may reduce carbon emissions, allowing GHG emissions associated with the Facility's decommissioning to be lower than those of the construction phase.

Effects

The Project is expected to have a net positive effect on the GHG environment (Table 7.12).

Table 7.12: Project GHG Emission Summary

Component	Emissions (tCO_2e)
Baseline	
Electricity Generated from Coal (Annual)	689,981.00
Total	**689,981.00**
Construction Phase	
Mobile Equipment	19,934.99
Steel Production and Transportation	13,222.07
Concrete Production and Transportation	22,995.75
Total	**56,152.81**
Annual [Lifetime Emissions (30-years)]	**1,871.76**
Operations Phase	
Facility Emissions (Annual)	325,594.00
Total	**325,594.00**

Operational Facility Emissions determined by Hatch (2025) (Appendix B)
Rounding errors may cause the values in this table to differ from those in Appendix B; however, the rounding errors are negligible and do not change their representation.

The Facility is anticipated to produce **56,153 tCO_2e** during the construction phase. When considering these construction-related GHG emissions over the Facility's lifespan (30 years), the annual GHG emissions from construction amount to **1,872 tCO2e annually.** These emissions are not anticipated to be significant on an annualized basis over the Project's lifetime and are therefore excluded from the quantification of their magnitude.

During operation, the Project is expected to generate **325,594 tCO_2e** annually. The Project's operational emissions are compared to the baseline emissions scenario to determine the percent change from the baseline conditions (i.e., coal-fired generation). Compared with coal-fired generation, the Project is expected to achieve a 52.8% reduction of GHG emissions annually (Equation 2).

(Eq. 2)

$$\frac{\text{Operation Emissions} - \text{Baseline Emissions}}{\text{Baseline Emissions}} * 100 = \text{Percent Reduction from Baseline}$$

$$\frac{325{,}594\,\frac{\text{tCO2e}}{\text{year}} - 689{,}981\,\frac{\text{tCO2e}}{\text{year}}}{689{,}981\,\frac{\text{tCO2e}}{\text{year}}} * 100 = 52.8\,\%$$

Over the Project's lifespan, the Facility is expected to reduce approximately 10,931 kilotonnes of CO_2e compared to the baseline scenario (coal-fired electricity).

The assumptions considered in this assessment provide an estimate of GHG emissions for the Project, which may differ if manufacturer locations are closer or further to the Project, manufacturing materials are more or less than assumed, construction equipment differs from that assumed, or calculated Facility inputs (e.g., fuel types) differ from those assumed.

Mitigation

Mitigation measures to reduce the Project's contributions to GHG emissions, thus reducing the overall impact of climate change, include:

- Use locally sourced materials, where possible, to reduce emissions associated with transport.
- Incorporate the shortest construction and transportation routes where possible to minimize the use of fossil fuels during construction.
- Recover and recycle construction and demolition/decommissioning waste, where possible
- Minimize deforestation during land clearing by only clearing the area that will be needed.
- Plan construction activities to reduce the double handling of materials, reducing GHG emissions associated with heavy equipment operations.
- Require that Project equipment meets all applicable provincial and federal emissions standards.
- Maintain engine and exhaust systems according to the manufacturer's specifications and applicable maintenance schedule.
- Remove from service malfunctioning equipment or equipment generating excess amounts of smoke, odour, or noise until an assessment and necessary repairs can be completed.
- Require that construction equipment with an improperly functioning emission control system not be operated.
- Require that regular equipment maintenance is undertaken to maintain good operations and fuel efficiency.
- Require that equipment containing coolant (i.e., air conditioning units) undergoes preventative maintenance and inspections (i.e., leak testing).
- Hire from a local labour force to reduce emissions associated with workforce transportation.
- Dispose of halocarbon-containing substances at an approved hazardous waste facility per applicable regulations and in compliance with local requirements.
- Require that trucks removing waste from or bringing materials to the Project are filled to the maximum allowable capacity where practical (dependent on the truck size and load weight) to reduce transportation requirements and limit the number of trips.
- Implement an anti-idling policy to limit GHG emissions from vehicles and equipment and limit the use of fossil fuels.
- Incorporate energy-efficient infrastructure where feasible to limit GHG emissions and the use of fossil fuels resulting from standard equipment (e.g., diesel-powered generators or light stands).
- Incorporate domestic supplies of clean fuels such as green hydrogen, renewable natural gas and biodiesel as such local supply chains mature.

Monitoring

The Project will be subject to GHG monitoring in accordance with provincial and ECCC/GHGRP (federal) reporting requirements once the Facility is operational.

Conclusion

After mitigations, predicted residual effects of GHG are characterized in Table 7.13.

Table 7.13: Greenhouse Gas Residual Effects

VC Interactions	Mitigation and Compensation Measures	Nature of Effect	Magnitude of Effect	Geographic Extent of Effects	Duration of Effects	Frequency of Effects	Reversibility of Effects	Significance Level
Construction Emissions	Restrict idling. Maintain equipment in proper working order. Revegetate exposed groundcover.	**Adverse**	**Negative** Construction is anticipated to generate GHGs above baseline	**LAA**	**Short Term** Effects are mainly confined to the construction and decommission phases	**Intermittent** Effects may occur during the Project's construction and decommission phases, but only intermittently	**Irreversible** Effects will not return to baseline following construction (and decommission)	Not Significant
Operational (Stack) Emissions	Implement an anti-idling policy to limit GHG emissions from vehicles and equipment and limit the use of fossil fuels.	**Positive**	**Positive** Facility operation is anticipated to reduce GHGs compared to baseline	**LAA**	**Medium Term** Effects are confined to the operation phases	**Intermittent** Effects may occur during the Project's operation phase, but only intermittently	**Irreversible** Effects will not return to baseline following the operation	Not Significant

Effects Assessment Ratings (Refer to Table 4.2 for definitions)
Nature of Effect: Adverse, Positive
Magnitude: Positive, Negative
Geographic Extent: LAA, RAA
Frequency: Single Event, Intermittent, Continuous
Duration: Short Term, Medium Term, Long Term
Reversibility: Reversible, Irreversible, Partially Reversible

7.3 Sound

7.3.1 Overview

The assessment of sound considered both construction and operational sound generated from the Project.

During construction, heavy equipment, machinery, and light vehicles will emit sound into the surrounding environment due to activities associated with the construction of the Facility, as well as the subsequent assembly and commissioning of the combustion turbines. To qualify potential impacts, sound levels of equipment anticipated for the Project's construction were used to determine sound levels from the Project Area, considering nearby receptors.

During the Project's operational phase, the combustion turbines (air intake, exhaust stack, fin fan, coolers), as well as associated infrastructure (transformers), will emit sound to the surrounding environment, and these impacts were modelled to predict sound levels at sensitive receptors, primarily residential homes surrounding the proposed facility.

7.3.2 Regulatory Context

Changes to the acoustic environment during construction and operational activities could result in displacement, annoyance, and interference with communication, sleep, and/or working efficiency, as well as avoidance behaviour and sensory disturbance in wildlife. Further assessment of sensory disturbance to fauna and birds is presented in Sections 10.3.6 and 10.4.6, respectively. Sound levels are regulated at the various government levels to protect the public and ensure occupational health/safety at relevant receptor locations (Table 7.14).

Table 7.14: Summary of Sound Level Regulations and Guidelines

Regulated By	Regulation/Guidance	Permissible Sound Levels (dBA)	Hours / Duration
For Residential Receptors			
NSECC	Guidelines for Environmental Noise Measurement and Assessment (NSECC, 2023a)	≤ 53	0700 to 1900
		≤ 48	1900 to 2300
		≤ 40	2300 to 0700
For Occupational Safety			
Workplace Health and Safety Regulations & Canadian Centre for Occupational Health and Safety (CCOHS)	Noise – Occupational Exposure Limits in Canada (CCOHS, 2024; Nova Scotia, 2013)	85	8-hour maximum

The Guidelines for Environmental Noise Measurement and Assessment (NSECC, 2023a) are intended for the Facility's operational phase. Where specific municipal or provincial regulations related to construction noise are not available for the Project Area, the operational noise guidelines are also used to assess construction-related noise.

Construction of the Facility is expected to take two years. Following this, the Facility is expected to operate to provide peaking capacity on the Nova Scotia grid over a 30-year lifespan, which may include operations at any time of day.

7.3.3 Existing Environment

Aerial imagery was used to identify nearby sources of sound and characterize the ambient sound within the Project Area. The Project Area is a previously undeveloped forested land surrounded by a rural residential community. Sound sources include activities related to residences, vehicle traffic on nearby roads, and the natural environment. Highway 374 is approximately 3.6 km east of the Project Area, while the Marshdale Quarry is located 1.4 km to the north, and the Lorne Quarry is located 856.5 m to the south. Health Canada estimates quiet rural communities as having baseline, day-night, sound levels of approximately 35 dBA to 45 dBA (2017). However, these quarries near the Project Area also contribute to ambient sound levels, including those that may exceed the sound levels defined by Health Canada. Lastly, in addition to anthropogenic sources, there are also natural sources of sounds originating from wildlife, wind, water, and vegetation.

7.3.4 Effects Assessment

Project-Sound Interactions

Project activities will interact with the acoustic environment during all phases of the Project. Sound related to the decommissioning phase is not specifically addressed, as levels are expected to be comparable to or less than those during construction (Table 7.15).

Table 7.15: Potential Project-Sound Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Site Preparation	X
Placement of Sedimentation and Erosion Control Measures	X
Clearing and Grubbing	X
Civil Site Construction	X
Equipment Installation	X
Interconnections for Services	X
Removal of Temporary Works and Site Restoration	X
Commissioning	X
Operations and Maintenance	
Facility Operation and Maintenance	X
Site Management	X
Decommissioning and Rehabilitation	
Infrastructure Removal	X
Site Reclamation	X

Assessment Boundary
The LAA for sound includes a 2 km buffer around the Project Area, which is the extent of the Hatch noise model and maximum expected impact (Drawing 7.1) (Appendix C). The RAA is not applicable for sound.

Assessment Criteria
VC-specific definition for magnitude is provided for operational sound as follows:

- Negligible: Sound levels from Project activities are expected to always be indiscernible at receptor locations.
- Low: Sound levels from Project activities may be discernible at receptor locations but will remain below regulatory thresholds.
- Moderate: Sound levels from Project activities are expected to be discernible at receptor locations, and may exceed regulatory thresholds during intermittent, high-impact activities.
- High: Sound levels from Project activities are expected to exceed regulatory thresholds at receptor locations during multiple activities (continuously).

Assessment Methodology
Anticipated sources and levels of sound associated with the Project were assessed to understand the potential effects on local receptors. The assessment of Project-related sound considers the construction and operational Project phases. Construction sound related to the Project was assessed through a review of expected sound sources, expected sound levels, and a qualitative assessment of potential effects on human receptors, as well as the application of relevant guidelines.

Hatch completed a desktop review of potential sensitive receptors through available imagery. The identified receptors nearest to the Project were then field-verified (Drawing 3.4).

Sound levels and related impacts from blasting activities are not included in this assessment as blasting requirements have not been confirmed. If blasting is determined to be required during construction, the Proponent will notify NSECC and apply for any required permits and approvals.

Operational Sound Modelling
Operational sound related to the Facility was determined through modelling in the Community Noise Impact Assessment completed by Hatch in 2025 (Appendix C).

The screening (i.e. worst-case) sound model considered the following significant sources and sound levels of sound emission from the Project.

- (6 Units) Turbine Air Intake – Overall sound levels 104 dBA per unit
- (6 Units) Exhaust Stack – Overall sound levels 93 dBA per unit
- (6 Units) Fin Fan Cooler – Overall sound levels 104 dBA per unit

- (3 Units) Transformer – Overall sound levels 104 dBA per unit
- (4 Units) Station Service Transformer – Overall sound levels 81 dBA per unit

Following the screening model, refined modelling was conducted to assess suitable mitigations for the Facility as exceedances were observed at the screening level. The refined model was conducted with the following potential sound mitigations applied:

- (6 Units) Fin Fan Cooler – Overall sound levels limited to 101 dBA per unit
- (6 Units) Turbine Air Intake – Overall sound levels limited to 102 dBA per unit

The sound model also considered site traffic sound for fuel deliveries. Note that fuel deliveries would only be required to supply light fuel oil to the Facility, as natural gas will be delivered via pipeline. The fuel delivery modelling was completed as a conservative measure and is not anticipated to be the primary fuel source.

The methodology employed to model the estimated impacts included the following:

- Sound modelling completed using CadnaA software, which employs the ISO 9613-2 algorithm for stationary sources.
- Road traffic sound modelling completed using the CadnaA Federal Highway Administration (FHWA) Traffic Noise Model (TNM) version 2.5.
- Modelled comprehensive sound levels used to determine guideline exceedances (if any).

The assumptions and limitations made for the screening model were as follows:

- Assumed baseline sound levels Ldn (average day-night) of 35 dBA
  - Daytime sound levels – 35 dBA
  - Nighttime sound levels – 25 dBA
- Ground attenuation factor of 0.7 to balance hard, reflective surfaces (e.g., paved roads), and porous, absorptive ground surfaces (e.g., forest floor).
- Receiver height set to 1.5 m above ground surface (MAGS) for daytime two-storey structures, and 4.5 MAGS for two-storey structures at night.
- Receiver height set to 1.5 m for single-storey structures.
- Vehicle speed limit is 20 km/h on the site, and 30km/h along the access road to the site (off-site).
- Sound emission sources are based on preliminary design details.

It is essential to note that the sound emission rate calculations are based on preliminary design data and have been chosen to represent a reasonable worst-case scenario for sound impacts. Updated modelling may be required once detailed engineering is completed and definitive equipment specifications, operating modes, and control efficiencies are confirmed.

For a detailed account of the technical approach, including modelling methodology, assumptions, and boundary conditions, refer to Appendix C.

Sound Assessment Results

Construction Sound

Sound will predominantly be generated by construction equipment and heavy machinery, such as cranes, backhoes, excavators, dump trucks, graders, and vehicles (Table 7.16).

Table 7.16: Decibel Limits of Construction Equipment Required for the Project

Equipment	Average Sound Level Ranges (dBA)
Concrete Truck/Pump	103-108(1)
Roller	95-108(1)
Vacuum Truck	102-110(2)
Dozer	89-103(3)
Dump Truck	84-88(3)
Excavator	97-106(1)
Harvesting Equipment (log truck, manual faller, etc.)	85-103(4)
Loaders	77-106(5)
Pickup/Light Truck	95(6)
Drilling Units	91-107(7)
Man Lift/Bucket Machines	85(5)
Flatbed Truck	75(7)
Crane	78-103(3)
Handheld Air Tools	115(1)
Grader	86-93(7)
Generator	103-111(7)
Compressor (drilling, pneumatic tools, etc.)	85-104(5)

Note that measurements shown are relevant to the decibel level ranges within close proximity (i.e., less than 15 m of distance) between a receptor and the associated piece of equipment.
Sources: (1)(Transport Scotland, 2018)
(2)(WorkSafe BC, 2018)
(3)(WorkSafe BC, 2019)
(4)(WorkSafe BC, 2016)
(5)(IHSAO, 2022)
(6)(Oregon State Parks, n.d.)
(7)(SCE, 2015; The Driller, 2005)

The range of decibels anticipated for the Project's construction activities will be between 77 dBA to 115 dBA (from a single piece of equipment within 15 m from the source). To determine the spatial extent of elevated construction sound, three representative pieces of equipment were selected for further evaluation of sound attenuation. The three selections represent the range and median sound levels identified in Table 7.15. The following methods, outlined by

(CDT, 2016), approximate sound levels experienced at incremental distances through construction activities for the Project are provided in Table 7.17.

Table 7.17: Attenuation of Construction-Related Sounds

Case	Example Equipment Type	Sound Level @ 15 m (dBA)*	Point Source Sound Levels (dBA) at Incremental Distances						
			30 m	60 m	120 m	240 m	480 m	960 m	1,920 m
Minimum	Crane	78	70.5	63	57	51	45	39	33
Median	Pickup/ATV	95	87.5	80	74	68	62	56	50
Maximum	Handheld Air Tools	115	107.5	100	94	88	82	76	70

This table calculates sound attenuation with respect to distance at a standard 6.0 dBA per doubling of distance. An additional 1.5 dBA of sound attenuation applies within the first 60 m of the noise source due to ground attenuation (California Department of Transportation, 2016).

In addition to the sound attenuation expected through air and ground, a barrier that obstructs the line of sight between the noise source and the receiver typically provides at least 5 dB (approximately 2 dBA at 500 Hz) of attenuation. Increasing the barrier height can enhance this effect, with well-designed, taller barriers achieving reductions of up to approximately 20 dB (approximately 23 dBA at 500 Hz).

Operational Sound

The Community Noise Impact Assessment (Appendix C), completed by Hatch, identified seven representative non-participating residential receptors surrounding the Facility. These seven receptors were then modelled to determine the sound-emission characteristics of the Facility. The most conservative (worst-case) modelled comprehensive sound levels at these receptors were below the permissible sound levels outlined in Table 7.15, for daytime (53 dBA), evening (48 dBA) and nighttime (40 dBA) at all receptors (Appendix C).

Table 7.18: Hatch Unmitigated Noise Assessment Results Summary

Receptor ID	Permissible LAeq, 1hr (dBA)			Comprehensive LAeq, 1hr (dBA)			Meets Criteria?
	Day	Evening	Night	Day	Evening	Night	
MR01	53	48	40	39	38	39	Yes
MR02	53	48	40	40	39	40	Yes
MR03	53	48	40	35	30	25	Yes
MR04	53	48	40	35	30	25	Yes
MR05	53	48	40	35	30	25	Yes
MR06	53	48	40	38	37	37	Yes
MR07	53	48	40	38	36	35	Yes

Effects Summary

The Facility will be located in an industrial area within a rural setting, near existing industrial operations to the northeast and northwest of the Project Area.

During construction and decommissioning, operation of mobile equipment and hand tools is expected to generate noise, as described in Table 7.17. The sound attenuation rate presented does not account for local landscape/topography, or for buildings/trees. It therefore represents a “worst-case” or most conservative scenario for sound levels produced by a single piece of equipment. The anticipated median equipment example would indicate that sound levels are expected to be compliant with the permissible sound levels (Table 7.15) during daytime hours within 960 m of the emission source, provided there is a broken line of sight between the receptor and the emission source. The maximum sound level scenario assessed shows elevated sound at a distance of 960 m. The closest receptor (identified as MR02) is located approximately 833 m from the Project Footprint. However, with a broken line of sight, as anticipated, given the forested buffer between the Project Area and the receptor, construction sound levels are expected to be further attenuated, although it may still be discernible at the receptor. Finally, construction-related sounds are considered a temporary, intermittent source generated by the Project. Activities producing higher levels of sound, such as handheld air tools, will be less frequent and of shorter duration.

There are seven modelled receptors located near the Project Area, as identified by Hatch (Appendix C). The closest modelled receptor (MR02) is approximately 833 m from the Project Footprint, and none of the modelled receptors are considered sensitive (e.g., schools, daycares, etc.) (Figure 4 in Appendix D – Hatch Community Noise Impact Assessment). During operations, worst-case modelling results show that comprehensive sound levels are expected to remain within regulatory limits outlined in Table 7.15, for daytime (53 dBA), evening (48 dBA), and nighttime (40 dBA) (Drawing 7.5) for all receptors (Appendix C).

Mitigation

To minimize construction and operational sound and the potential to disturb receptors during construction and operation, the following general mitigation/protective measures will be implemented:

- Limit vehicle idling.
- Conduct construction activities within the recommended daytime hours, where feasible (7:00 am to 9:00 pm).
- Post and maintain speed limits for on-site transportation and mobile equipment [20 km/hr on site; 30 km/hr on access road (off-site)].
- Design Project with sound suppression technologies as necessary to maintain compliance with regulatory thresholds.
- Create a Complaint Resolution Plan to address sound-related issues during Project construction and operation.

Throughout all Project phases, activities will be designed to meet occupational health and safety guidelines and regulations related to sound levels and applicable exposure limits.

Monitoring

No monitoring is recommended.

Conclusion

After mitigations, predicted residual effects of sound are characterized in Table 7.19.

Table 7.19: Sound Residual Effects

VC Interactions	Mitigation and Compensation Measures	Nature of Effect	Magnitude of Effect	Geographic Extent of Effects	Duration of Effects	Frequency of Effects	Reversibility of Effects	Significance Level
Construction and Decommissioning Sound	Design Project with sound suppression technologies as necessary to maintain compliance with regulatory thresholds. Restrict idling. Post and maintain speed limits for on-site transportation and mobile equipment. Conduct construction activities within the recommended daytime hours.	**Adverse**	**Moderate** Construction sound may temporarily exceed available regulatory thresholds during intermittent, high-impact activities	**LAA**	**Short Term** Effects are mainly confined to the construction and decommission phases	**Intermittent** Effects may occur during the Project's construction and decommission phases, but anticipated to be rare and intermittent.	**Reversible** Effects will return to baseline following construction (and decommission.	Not Significant

VC Interactions	Mitigation and Compensation Measures	Nature of Effect	Magnitude of Effect	Geographic Extent of Effects	Duration of Effects	Frequency of Effects	Reversibility of Effects	Significance Level
Operational Sound	Post and maintain speed limits for on-site transportation and mobile equipment. Design Project with sound suppression technologies as necessary to maintain compliance with regulatory thresholds	**Adverse**	**Low** Operational sound is not anticipated to exceed regulatory thresholds at receptors	**LAA**	**Medium Term** Effects are confined to the operation phases	**Intermittent** Effects may occur during the Project's operation phase, but only intermittently	**Reversible** Effects will return to baseline following the operation	Not Significant

<u>Effects Assessment Ratings (Refer to Table 4.2 for definitions)</u>
Nature of Effect: Adverse, Positive
Magnitude: Negligible, Low, Moderate, High
Geographic Extent: LAA, RAA
Frequency: Single Event, Intermittent, Continuous
Duration: Short Term, Medium Term, Long Term
Reversibility: Reversible, Irreversible, Partially Reversible

8.0 GEOPHYSICAL ENVIRONMENT

8.1 Overview

The assessment of the geophysical environment included a review of topography, surficial geology, bedrock geology, hydrogeology (groundwater), and any related natural or artificial hazards (e.g., abandoned mine openings). As the Project may impact geological features and groundwater quality and quantity, an effects assessment was conducted to determine how the Project will interact with the geophysical environment.

8.2 Regulatory Context

Legislation relevant to the geophysical environment of the Project Area includes:

- Sulphide Bearing Material Disposal Regulations, N.S. Reg. 57/1995
- *Environment Act*, S.N.S. 1994-95, c. 1

Groundwater is provincially regulated under the *Environment Act* (Nova Scotia, 1995) and through several of its associated regulations. The regulations protect ecological receptors (i.e., lakes and streams) and the health of the general public who rely on groundwater as a water supply. As noted in Section 9.1, NSECC has the authority to promote the sustainable management of water resources in Nova Scotia, including groundwater, as defined in the *Environment Act*. The Activities Designation Regulations (Division I) require a water withdrawal approval if groundwater is withdrawn in excess of 23,000 litres per day.

If blasting is required for construction, groundwater wells within 800 m must undergo an assessment in accordance with NSECC's Procedure for Conducting a Pre-Blast Survey (1993).

8.3 Assessment Methodology

The assessment was completed through a review of the following resources:

- Aerial imagery and topography
- Ecological Land Classification for Nova Scotia (Neily et al., 2017)
- Nova Scotia Geoscience Atlas (NSNR, 2021e)
- Mineral Resource Land-Use Atlas (NSNR, 2021d)
- Karst Risk Map (NSNR, 2019b)
- Nova Scotia's Registry of Claims (NSNR, n.d.)
- Abandoned mine openings (AMO) Database (NSNR, 2024a)
- Potential for Radon in Indoor Air (NSNR, 2009a)
- Nova Scotia Groundwater Atlas (NSNR, 2024b)
- Well Logs Database (NSECC, 2020a)
- Nova Scotia Pumping Test Database (NSNR, 2022c)
- Nova Scotia Groundwater Observation Well Network (NSECC, 2015a)

A Water Resources Assessment, including a desktop hydrogeological investigation, was prepared by Hatch (2025; Appendix D) and was reviewed to inform the effects assessment.

8.4 Assessment Results

8.4.1 Topography

The Project Area lies within the Central Uplands Ecodistrict (380) of the Nova Scotia Uplands Ecoregion (Drawing 8.1). The Central Uplands Ecodistrict is situated between the Cobequid Hills and Pictou Antigonish Highlands, and contains the headwaters of rivers including the Stewiacke, Calvary, Pictou, and Musquodoboit Rivers. Topography consists of flat to gently rolling terrain to 270 m above sea level (masl) (Neily et al., 2017; NSNR, 2021e). Much of the area is forested due to favourable soil conditions, with wetlands associated with poorly drained soils in flat areas (Neily et al., 2017). Within the Project Area, elevations range from approximately 121 masl to 166 masl (Drawing 8.2).

A review of the NS Karst Risk Map (based on provincial geology maps, sinkhole occurrence data, LiDAR data, and hydrogeological databases) indicates that the Project Area is within "Medium-Risk" and "High-Risk" areas (Drage, 2019) (Drawing 8.3). Karst is a distinct type of terrain that develops over soluble bedrock. Features associated with karst terrain include sinkholes, caves, and springs. The primary geohazard in karst areas is sudden ground collapse, which has potential to result in extensive infrastructure damage (Drage, 2019). This may occur when groundwater dissolves underlying soluble bedrock (such as limestone, gypsum, or anhydrite), creating cavities that allow overlying soil to gradually wash into them. As soil is removed, a void develops and migrates upward through the overburden, eventually causing surface collapse (Drage, 2019).

8.4.2 Surficial Geology

The Project Area's surficial geology consists of silty till between 3 m and 30 m thick, originating from melting glaciers (NSNR, 2021c; Drawing 8.4). Glaciofluvial deposits, including kames, eskers, and outwash, are present throughout the Central Uplands Ecodistrict (Neily et al., 2017).

8.4.3 Bedrock Geology

Bedrock within the Project Area consists of the Mabou group dating to the early to late Carboniferous period (Drawing 8.5). The Mabou Group extends to depths of up to 1,000 m and lies above the Windsor Group and below the Cumberland Group. It is of sedimentary origin and composed of sandstone (green), coal, siltstone, shale, gypsum, anhydrite, and conglomerate (NSNR, 2021d).

In Nova Scotia, several bedrock formations are known to contain acid-generating rock (sulphide minerals such as pyrite and pyrrhotite) that, when disturbed, can result in acid rock drainage (ARD). ARD occurs when sulphide-bearing rocks are disrupted and exposed to air or water, producing sulphuric acid and metal oxides that are subsequently mobilized/leached through freshwater systems (NSNR, 2021a). According to the Mineral Resource Land-Use

Atlas, there are no occurrences of sulphide-bearing slates within the Project Area (NSNR, 2021d); therefore, an elevated risk of ARD is not expected.

In addition, the Project Area is located in a “Low Risk” and “Medium Risk” area for radon in indoor air (Drawing 8.6). Radon gas is not considered a risk for outdoor inhalation but can pose risks for indoor air (NSNR, 2009a). Given the planned industrial use of the site, it is not expected that radon gas represents a concern for the Project.

8.4.4 Mineral Resources

The Project Area is located within the Central Uplands Ecodistrict, within which a fault line running east to west is associated with deposits of iron oxide, copper, and gold. The Carboniferous rocks of the Mabou group (which underlie the Project Area) contain notable deposits of coal, salt, gypsum, and base metals (NSNR, 2019a). A review of Nova Scotia’s Registry of Claims (NSNR, n.d.) identified no active licenses for mineral exploration occurring within the Project Area.

8.4.5 Abandoned Mine Openings

No AMOs were identified within the Project Area based on a review of the AMO Database (NSNR, 2024a). The nearest AMO is located 425 m from the Project Area boundary.

8.4.6 Groundwater Quality and Quantity

The Project Area is underlain by sedimentary bedrock (Keppie, 2000). Wells located in sedimentary bedrock typically have higher dissolved solids and hardness, and higher well water yields, as groundwater can flow through the rock itself and along fractures. Naturally occurring trace metals such as iron, arsenic, and manganese are found in all groundwater regions; however, they are more commonly associated with plutonic and metamorphic groundwater regions (NSNR, 2009b).

According to groundwater risk mapping for bedrock aquifers, the Project Area is located in a “Medium Risk” area for arsenic (Drawing 8.7), a “Medium Risk” and “High Risk” area for manganese (Drawing 8.8), and a "Low Risk" area for uranium (Drawing 8.9) in bedrock wells. Disturbance of arsenic-, manganese-, and/or uranium-containing bedrock (e.g., through blasting) can mobilize these metals in groundwater and subsequently degrade nearby groundwater quality. It should be noted that arsenic is considered the most prevalent naturally occurring groundwater contaminant in the province. Arsenic, manganese, and uranium are normally treatable using conventional treatment systems (Kennedy & Drage, 2016, 2017; NSECC, 2025d).

8.4.7 Groundwater Wells

A desktop assessment of groundwater wells within 5 km of the Project Area was conducted by Hatch (2025; Appendix D) using the NSECC Well Logs Database (NSECC, 2020a). Strum also reviewed the database to identify groundwater wells that may exist in or near the Project Area in consideration of minimum blasting setbacks (800 m) outlined in the Nova Scotia Pit and Quarry Guidelines (Nova Scotia Environment and Labour, 1999); however, there are limitations associated with the spatial accuracy of this database. During Strum's assessment, any groundwater wells with a spatial uncertainty greater than 1,000 m were not considered/assessed.

The Hatch (Hatch Ltd., 2025c) assessment (Appendix D) identified 26 drilled wells within 5 km of the Project Area installed between 2000 and 2015. The well depths range from 22 m to 104 m. One well was identified by Strum within 800 m of the Project Area (Table 8.1; Drawing 8.10). This well (ID: 012559) is located approximately 581 m west of the Project Footprint; however, no building was identified during desktop review at the well location (a heavily forested area). The reported spatial accuracy of this well is 707 m. Within a radius of 707 m of the well; the only receptor within this range is MR02 and it is likely that the well is associated with this receptor. The metadata associated with the well log database is missing the civic address or PID associated with this record.

Table 8.1: Summary of Well Records within 800 m of the Project Area

Drilled Date (year)	Well Depth (m)	Casing Depth (m)	Depth to Bedrock (m)	Static (m)	Estimated Yield (Lpm)
2001	77.65	6.09	4.57	5.18	2.27

Source: NSECC Well Logs Database (2020).

The 26 wells within 5 km identified by Hatch (2025) are all drilled wells for domestic usage. The identified wells are generally concentrated within the town of Hopewell along Highway 374, to the northeast of the Project Area, and the community of Lorne, to the southeast.

It should be noted that not all wells are reported to NSECC; therefore, they do not appear in the Well Logs Database (2020). For example, a well record for the nearest receptor does not appear to be provided in the Well Logs Database (2020). However, the absence of a groundwater well located at the nearest receptor may be due to inaccuracies with the well geographic positioning. The closest receptor to the Project Footprint is 833 m to the northwest (MR02). This receptor is assumed to have a drilled well along with two additional receptors located 899 m and 1174 m (southwest and east, respectively) from the Project Footprint (Drawing 8.10).

The NSNR Pumping Test Database (NSNR, 2022c) provides longer-term yields for select wells throughout the province. The nearest test well is approximately 4.2 km northeast of the Project Area boundary in the community of Hopewell (Well #PIC-30), which indicates a long-term safe yield (Q_{20}) of 80 litres per minute (Lpm) and an apparent transmissivity of 5.4 square metres per day (m^2/day). This well is located in a sedimentary groundwater region (NSNR, 2022c)

NSECC maintains the Nova Scotia Groundwater Observation Well Network to monitor groundwater levels and water quality, evaluate the impacts of human activities, and assess long-term trends in groundwater levels. The nearest active provincial observation well to the Project Area is approximately 19.8 km northwest of the Project Area boundary in Durham, NS (Well #782683). This well was drilled to a depth of 75.3 m through the Boss Point Formation with sandstone/shale bedrock. Additional details on this well are provided in the Water Resources Assessment Report (Hatch Ltd., 2025c) (Appendix D). There are no active observation wells within the Mabou Group, which underlies the Project Area.

NSECC also maintains the Nova Scotia Chemistry Well database (NSNR, 2024b), which identified six chemistry wells within 5 km of the Project Area (Sample ID: NSDM876, GSC1432, GSC1433, GSC1431, Reg4279, Ptest593). The Chemistry Well Database is a compilation of various federal, provincial, and municipal groundwater quality sources, including registered drinking water supplies, government buildings, and municipal potable water supply wells. Four wells were below the aesthetic objective for pH, iron, and manganese. Two wells exceeded the maximum allowable arsenic concentration. Five of the identified wells were recorded prior to 1980, and all were compared to the 2025 Guidelines for Canadian Drinking Water Quality (GCDWQ) (Health Canada, 2025).

8.5 Effects Assessment

8.5.1 Project-Geophysical Interactions

Project activities interact with the geophysical environment during all Project phases. Ground disturbance will primarily occur during site preparation, construction, and decommissioning with earth-moving activities. Groundwater will primarily be impacted during Project operations (Table 8.2).

Table 8.2: Potential Project-Geophysical Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Site Preparation	X
Placement of Sedimentation and Erosion Control Measures	X
Clearing and Grubbing	X
Civil Site Construction	X
Equipment Installation	-
Interconnections for Services	-
Removal of Temporary Works and Site Restoration	X
Commissioning	-
Operations and Maintenance	
Facility Operation and Maintenance (Active Groundwater Withdrawal)	X
Site Management	-
Decommissioning and Rehabilitation	
Infrastructure Removal	X
Site Reclamation	X

8.5.2 Assessment Boundaries

The LAA for the geophysical environment is a modified 800 m buffer of the Project Area (Drawing 8.2). The 800 m Project Area has been expanded on the eastern side to include the confluence of the unnamed watercourse and Cameron Brook (Drawing 8.2). The 800 m buffer was selected to represent the maximum extent of the expected groundwater radius of influence, and to be respective of blasting guidelines as established under the Pit and Quarry Guidelines (Nova Scotia Environment and Labour, 1999). The RAA is not applicable.

8.5.2.1 Technical Boundaries

The determination of impacts on the geophysical environment was completed based on available desktop information, without field invasive assessments (e.g., geotechnical reports and hydrogeological testing). Furthermore, the well logs database is limited and cannot accurately determine exact well locations or their presence.

8.5.2.2 Temporal Boundaries

The temporal boundaries used for the assessment of effects on the geophysical environment include three phases:

- Site Preparation & Construction: 2 years
- Operations: 30 years
- Decommissioning: 2 years

8.5.2.3 Administrative Boundaries

No administrative boundaries were identified for the geophysical environment.

8.5.3 Assessment Criteria

The VC-specific definition for magnitude is as follows:

- Low: No geologic hazards are present within the Study Area; impacts to the quality/quantity of potable wells are not anticipated.
- Moderate: Risk mapping indicates a “Moderate” or “High Risk” of a geologic hazard(s) within the Study Area, but the hazard(s) is/are anticipated to be mitigated with routine measures; impacts to the quality/quantity of potable wells are possible, but able to be mitigated with routine measures.
- High: Risk mapping indicates a “Moderate” or “High Risk” of a geologic hazard(s) within the Study Area, which cannot be mitigated with routine measures; impacts to the quality/quantity of potable wells are anticipated.

8.5.4 Effects

The geophysical environment will be disturbed within the Project Area during the site preparation and construction phase, and again during infrastructure removal and site decommissioning phases. During operations, the primary pathway of effect on the geophysical environment is through continued water withdrawal from groundwater wells to support the

Facility's operations. The Project's impacts on the geophysical environment and groundwater may involve:

- Disturbance of geologic existing hazards, including sulphide-bearing slates (i.e., acid-generating rock), karst topography, radon, arsenic-, manganese-, and/or uranium-containing rock
- Fuel and chemical spills
- Groundwater drawdown and potential interaction with nearby potable wells
- Groundwater drawdown and potential interaction with surface water features (wetlands and watercourses)

8.5.4.1 Disturbance of Existing Geologic Hazards

The review of provincial mapping revealed no sulphide-bearing slates or formations recorded within the Project Area. The presence/absence of sulphide-bearing minerals and the likelihood of ARD will be confirmed following the results of a geotechnical investigation.

The Project Area was categorized as having "Medium Risk" to "High Risk" for karst. Infrastructure siting will be assessed as part of planned geotechnical investigations; if karst topography or other constructability limitations are encountered, the geotechnical investigation recommendations will be followed.

Radon potential mapping indicates that the majority of the Project Area falls within a "Medium Risk" zone, with the southeast corner of the Project Area located within a "Low Risk" zone for radon in indoor air (NSNR, 2009a). As an industrial site, there are limited indoor air pathways for radon gas associated with the Project. Given that indoor air radon guidelines are not typically applied to industrial buildings, and that radon venting will be incorporated into foundation designs as required (e.g., administrative buildings), radon gas is not considered a risk for indoor inhalation. Additionally, radon gas is not considered a risk for outdoor inhalation.

In addition to water quality, groundwater quantity can be affected if blasting activities (if required) alter local hydrogeological flow regimes, potentially resulting in reduced well yield. Based on the desktop review, there are three expected wells within 800 m of the Project Area boundary, but no potential wells within 800 m of the Project Footprint where blasting activities (if required) would be anticipated. The requirements for blasting and pre-blast surveys will be confirmed and further assessed during geotechnical investigations and detailed engineering design.

8.5.4.2 Groundwater Quality and Quantity

Groundwater Quality

Desktop groundwater quality indicates naturally elevated concentrations of arsenic, uranium, and manganese, which are common in several regions of Nova Scotia due to local geology, including arsenic-bearing slate, granitic bedrock, and mineralized tills. These constituents exceed some NS Tier I EQS, but their presence reflects existing hydrogeochemical conditions rather than project-related activity. Risk mapping shows the Project Area is primarily situated in a region with a "Medium Risk" for arsenic and a "Medium-Risk" to "High-Risk" for manganese. Risk for uranium was "Low" across the Project Area (Drawings 8.7, 8.8, and 8.9). Construction activities, primarily blasting (if required), can affect the quality and quantity of the surrounding groundwater supply, depending on proximity to drinking water wells and the extent of disturbance. Disturbance of arsenic-, manganese-, or uranium-containing bedrock can mobilize contaminants in groundwater and subsequently degrade nearby groundwater quality. At this time, blasting is not expected to be required; however, this will be confirmed through geotechnical investigations planned for the Project Area. Therefore, the proposed Facility is not expected to alter the geochemical environment in a manner that would mobilize or increase these naturally occurring metals.

During operations, the primary potential pathway for groundwater impacts from the Project is the storage and handling of diesel fuel. Groundwater impacts may occur during a spill or accidental release. This risk is considered low given that all diesel will be stored in double-walled above-ground tanks equipped with secondary containment and managed under Nova Scotia's Petroleum Management Regulations (N.S. Reg. 44/2002) and the Emergency Spill Regulations (N.S. Reg. 16/2013). Fuel handling areas will be located on impermeable pads with controlled drainage, and a Spill Prevention and Response Plan will be implemented. These measures substantially limit the potential for infiltration or the creation of localized geochemical changes in groundwater.

Given the engineered controls, regulatory safeguards, and the nature of the contaminants of potential concern, the Facility is unlikely to exacerbate existing groundwater quality issues or contribute to increases in arsenic, uranium, or manganese concentrations. Residual effects on groundwater quality; therefore, the effects are assessed as negligible to low, and no measurable change to baseline groundwater chemistry is anticipated over the Project's life.

Groundwater Quantity

Drawdown

Groundwater quantity may also be affected by groundwater extraction during Project operations. The Project will require the extraction of groundwater through production wells to supply process water needs.

The Water Resources Assessment Report, conducted by Hatch (2025; Appendix D), provides a preliminary desktop investigation of water needs and available resources for the proposed configuration of the Facility, with a wide range of water consumption based on the combustion turbine model selection options available (i.e., reasonable, conservative estimates of water consumption). At peak withdrawal, the estimated raw water consumption is approximately 175 cubic metres per hour (m^3/hr). However, given the Facility's limited operating hours, the average raw water consumption over a year may range from 23 m^3/hr to 31 m^3/hr (Appendix D). In addition, the Facility's peak water consumption is tied to diesel fuel use, which is expected to meet only 20% of the Facility's fuel needs. Natural gas (comprising 80% of the

Facility's operation) requires substantially less water consumption than diesel. Table 8.3 outlines the estimated number of production wells required for the average and peak-demand scenarios, as provided by Hatch (2025). Note that these values are based on a desktop assessment of the existing wells within 5 km of the Project Area. In actuality, these values may vary once a hydrogeological assessment is undertaken.

Table 8.3: Estimated Production Wells Needed by Demand Scenario for the Marshdale Site (300 MW)

Demand Scenario	Estimated Yield per Well (m^3/hr)	Median	75th Percentile	90th Percentile	Maximum
		1.08	**1.62**	**3.67**	**6.84**
Average Demand (23 to 31 m^3/hr)	No. of Required Production Wells	21 to 29	14 to 19	6 to 9	4 to 5
Peak Demand (175 m^3/hr)		162	108	48	26

Source: Water Resources Assessment Report by Hatch (2025).

The closest groundwater well and receptor to the Project Footprint are located approximately 581 m west and 833 m northwest (MR02), respectively (Drawing 8.10). While dependent on aquifer characteristics (e.g., hydraulic conductivity, transmissivity, and long-term yield), continuous high pumping from fractured bedrock can lower water levels and affect nearby wells. Groundwater vulnerability ultimately depends on the thickness and permeability of the overlying soils, the degree of bedrock fracturing, and the proximity of potential contaminant sources or recharge areas.

The radius of influence was calculated to determine the maximum horizontal distance from the Project Area at which pumping operations would have a negligible effect on lowering the groundwater table. The Cooper-Jacob (1946) method was used and assumes the following:

- The aquifer is confined, homogeneous, and isotropic.
- The drawdown threshold was set to 0 m, representing the outer bounds of the cone of depression where negligible drawdown is exhibited.
- The aquifer has infinite areal extent (no boundaries).
- Pumping and observation wells are fully penetrating.
- Constant pumping rate during operations.
- Negligible well losses (drawdown reflects aquifer behaviour only).
- Instantaneous storage response.

Nearby groundwater wells (within the same bedrock) in the NS Pumping Test Database with available transmissivity and storativity data were assessed. Transmissivity from these wells ranged from approximately 0.4 m^2/d to 5.4 m^2/d, and storativity ranged from 1.2E-4 to 9.1E-4. Considering the variability in aquifer parameters identified through the pumping-well testing, the resulting analysis indicates a radius of influence of approximately 650 m. Note that the extent of the radius of influence will differ based on well placement; a well centered in the Project Area was assumed. For this high-level radius-of-influence analysis, one well was assumed. A single well will create one cone of depression, and the radius of influence is controlled by the well's pumping rate, aquifer transmissivity and storativity. When multiple wells pump simultaneously, the cones of depression overlap and interfere, typically resulting in a combined increase in total drawdown. The radius of influence should be reassessed after an invasive groundwater assessment of site-specific wells. This assessment will consider the number of wells required and the placement of those wells.

Note that the radius of influence calculation assumes a pumping time of 365 days, a conservative assumption given that the Facility is a fast-acting supplemental power supply (sometimes referred to as a peaker plant) and will not operate continuously. In addition, the transmissivity and storativity of the underlying aquifer largely impact the radius of influence calculation. As a result, an invasive groundwater assessment, including pumping tests, should be conducted to validate the aquifer property assumptions. If the invasive groundwater assessment indicates lower transmissivity and higher storativity, the radius of influence would decrease, thereby reducing the potential impact on nearby groundwater users.

Given the inaccuracy of the nearby groundwater well records, effects to groundwater well users are based on nearest receptors rather than the groundwater well record. There are no receptors or expected groundwater well users within the expected groundwater drawdown radius of influence. During the invasive groundwater assessment, a field reconnaissance should be undertaken to identify and validate the location all groundwater well users within 800 m of the Project Area [aligning with the Procedure For Conducting a Pre-Blast Survey (1993)].

8.5.4.3 Baseflow Stream Depletion

The proposed Facility will require groundwater withdrawals from a confined sedimentary aquifer to supply process water. Pumping from confined aquifers can reduce baseflow to nearby streams through vertical leakage across the overlying aquitard or the streambed. Using the Glover-Balmer method, the estimated contribution of streamflow to pumped groundwater is predicted to be moderate and will depend on the distance between the well and the stream, the aquifer transmissivity, and storativity.

The reduction in baseflow to nearby surface water features was calculated using the Glover-Balmer method. Depletion in baseflow was calculated for a nearby unnamed watercourse tributary to Cameron Brook and for Cameron Brook, located 482 m and 803 m from the Project Area center, respectively (Drawing 8.2). The following was assumed:

- The aquifer is confined, homogeneous, isotropic, and of infinite extent.
- The fully penetrating stream forms a straight, infinite boundary with zero resistance to flow.
- Stream stage remains constant during pumping.
- The pumping well is located at a fixed distance from the stream and fully penetrates the aquifer.
- Flow is horizontal in the aquifer (assumes Dupuit conditions).
- The aquifer responds instantaneously to pumping.

- No leakage from overlying/underlying formations.
- Pumping rate is constant over time.

Given the average pumping demands of 23 m^3/hr to 31 m^3/hr, aquifer properties from existing wells in the area, and the underlying geology, the overall baseflow depletion from a nearby unnamed watercourse and from Cameron Brook (Drawing 8.2) ranges from approximately 135 m^3/day to 314 m^3/day. Note that the extent of baseflow stream depletion will differ based on well placement; wells centered in the Project Area was assumed. However, depending on the Facility and well placement, as well as the number of wells, baseflow stream depletion may be much lower.

For a scenario with a well located 482 m to 803 m from the watercourses, estimations indicate that 18% to 42% of the pumping rate could be supplied by reduced streamflow over the first year of operation. The magnitude of stream depletion is expected to decline with increased distance from the stream. These predictions inform the assessment of potential impacts on aquatic habitat, particularly during low-flow periods, and support mitigation and monitoring strategies to ensure that stream baseflow is maintained within ecologically acceptable limits.

The Glover–Balmer method assumes a fully penetrating, perfectly hydraulically connected stream and horizontal flow in an unconfined aquifer. When the stream is only partially penetrating, as in this system, and the pumping well is in a confined aquifer, vertical flow, streambed leakage, and delayed hydraulic connection occur. These violate the assumptions of the Glover–Balmer model, making it inaccurate (overestimating) for predicting stream depletion in layered or confined systems.

To achieve the desired yields, the well is expected to be sufficiently deep below the ground surface, assuming the aquifer is confined and disconnected from nearby surface water features. During drilling operations, stratigraphy will be documented to determine the interconnectedness between the unnamed watercourse and Cameron's Brook. Furthermore, it is recommended to monitor nearby surface water features during the pump tests. Assuming the process water meets water quality guidelines, a portion of the streamflow depletion will be mitigated by discharging process water into the nearby watercourse (further discussed in Section 10.1.6).

8.5.4.4 Water Protection Area

The Project partially overlaps the Town of Stellarton Source Water Protection Area (Drawing 3.3). Groundwater and surface water are closely connected within a municipal water supply area, and changes to one system can influence the other. Construction activities, land clearing, and infrastructure development can alter natural infiltration and runoff patterns, potentially reducing groundwater recharge or increasing sediment and contaminant transport to nearby watercourses. If contaminants (e.g., fuels, oils, or suspended solids) enter surface water, they can infiltrate through permeable soils or fractured bedrock, degrading groundwater quality. Conversely, lowering of the water table through dewatering or excessive groundwater withdrawal can reduce baseflow to streams, wetlands, and springs, affecting aquatic habitats and the reliability of municipal water supplies. The effects of the Project on the water protection area us further described in Section 9.1.

8.6 Mitigation

The following general mitigation measures related to the geophysical environment are recommended:

- Conduct blasting (if required) in accordance with provincial legislation and subject to the terms and conditions of applicable permits.
    - Conduct pre-blast surveys for wells within 800 m of blasting activities, including ground-truthing for nearby wells.
        - If demonstrable changes in groundwater quality or quantity to a well are detected due to Project activities, an alternative water supply of equal or better quality/quantity than that impacted will be provided to the landowner.
    - Require that all blasts are conducted and monitored by certified professionals.
    - Notify landowners (within 800 m) in advance of any blasting activities.
    - Recover and revegetate exposed soils or bedrock as required to minimize erosion and sedimentation.
- Assess for elevated sulphide potential in bedrock during pre-construction geotechnical surveys. If identified, develop a site-specific mitigation plan for sulphide-bearing materials in accordance with the Sulphide Bearing Material Disposal Regulations, N.S. Reg. 57/95 and in consultation with relevant regulatory departments.
- Store excavated soils temporarily next to the excavation until they are needed for backfilling, if required. Any remaining excavated material will be used on-site or removed and sent to an approved facility.
- Limit the disturbed areas to the extent practical.
- A stormwater management plan will be developed with specific procedures to manage surface runoff and erosion and sedimentation during construction and operation of the Project.
- Install erosion and sediment control measures prior to excavation activities and inspect them regularly. Inspections will also take place before and after heavy precipitation events to identify whether erosion and sedimentation control measures have failed; if failure occurs, repairs will be immediately undertaken
- Remove temporary erosion and sediment controls once backfilled material has stabilized.
- Storage, stockpiling and use of fuel, lubricant and other hazardous substances will be in designated areas outside of buffer zones designed to protect sensitive habitats including watercourses and wetlands.
- Throughout all phases of the Project, equipment will be kept in good working order and inspected regularly for leaks.
- Pump groundwater at sustainable yields from each individual well.
- Maintain adequate well spacing to minimize groundwater interference.

- Install a network of observation wells in surrounding areas to monitor groundwater table fluctuations in real time.
- Implement user-reported monitoring: allow nearby users to report water shortages or changes in quality.
- Regularly sample groundwater for chemistry, turbidity, and contaminants in production wells to ensure pumping doesn't degrade water quality and compare against baseline and regulatory water-quality standards.
- Compare against baseline and regulatory water-quality standards.
- Provide secondary containment and impermeable surfaces for all fuel, chemical, and hazardous-materials storage and handling areas.
- Use spill-prevention features such as sealed transfer systems, drip trays, and automatic shutoff valves.
- Implement a spill prevention and emergency response plan (ERP) with trained staff, on-site spill kits, and clear procedures.
- Conduct routine inspections and maintenance of tanks, piping, and containment structures to detect leaks early.

8.7 Monitoring

Following the EARD/IPD submission, a hydrogeological study with test drilling will determine the number, location, and design of production wells and inform an operating plan for groundwater protection. The Proponent will then update sustainable yield estimates and the radius of influence and prepare a Water Conservation Plan. Alternative plant configurations and turbine models may also reduce water use and effluent requirements. In addition, the invasive hydrogeological field study will support a provincial groundwater withdrawal application and determine site-specific properties of the underlying aquifer.

Further invasive assessments (e.g., pump testing) will refine predictions of groundwater interactions. A groundwater monitoring and management program will include baseline data collection at nearby receptors identified through field surveys. Monitoring will also be conducted at residential wells to track water levels and yields. If decreases coincide with facility operations, the Proponent will implement a Complaint Resolution Plan that may include temporary water restrictions.

If blasting activities are required to construct the Project (to be confirmed during geotechnical investigations), groundwater wells within 800 m of blasting activities will be monitored as per the Procedure for Conducting a Pre-Blast Survey (NSECC, 1993).

Additionally, a Surface Water Monitoring and Management Plan will be developed to integrate wellfield controls, storage operations (both raw and demineralized), maintenance scheduling (e.g., compressor washing), and peak-shaving strategies aligned with plant operating fuel type.

If geologic hazards (ARD, etc.) are identified during geotechnical investigations within the Project Area, a site-specific mitigation plan will be developed. Geotechnical investigation will continue to validate or identify karst risk in the field. The presence/absence of sulphide-bearing minerals and the likelihood of ARD will be confirmed through geotechnical evaluations.

8.8 Conclusion

The predicted residual effects of the Project on the geophysical environment (after mitigation) are characterized in Table 8.4.

Table 8.4: Geophysical Environment Residual Effects

VC Interaction	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
Encountered Geologic Hazard	Perform geotechnical surveys prior to facility construction.	**Adverse**	**Moderate** Risk mapping shows the potential for geologic hazards in the Study Area.	**LAA**	**Continuous** If present, effects may occur continuously.	**Medium Term** If present, effects may occur throughout the Project's operations phase.	**Partially Reversible** Some, but not all effects may be reversible.	Not Significant
Change to Groundwater Quality or Quantity	Conduct pre-blast surveys prior to blasting (if required). Conduct hydrogeological studies prior to groundwater withdrawal.	**Adverse**	**Moderate** Groundwater wells located within 800 m of the Project Area.	**LAA**	**Intermittent** Effects may occur during blasting (if required), construction, or operational phases (groundwater withdrawal).	**Medium Term** Effects are possible throughout the Project's operations phase.	**Partially Reversible** Change to the groundwater flow regime is not anticipated to be reversible; however, alternative technological systems can be introduced (if required).	Not Significant

Effects Assessment Ratings (Refer to Table 4.2 for definitions)

Nature of Effect: Adverse, Positive
Magnitude: Low, Moderate, High
Geographic Extent: PA, LAA
Frequency: Single Event, Intermittent, Continuous
Duration: Short Term, Medium Term, Long Term
Reversibility: Reversible, Irreversible, Partially Reversible

9.0 FRESHWATER AQUATIC ENVIRONMENT

9.1 Surface Water and Fish and Fish Habitat

9.1.1 Overview

The objective of the aquatic assessment was to inform the Project's design and collect the information necessary to assess baseline biophysical data and potential impacts to surface water and fish and fish habitat, resulting from the Project. This was accomplished using the following approach:

- Identify surface water and fish and fish habitat within watercourses within the PA using desktop resources.
- Traverse the entirety of the Project Area to ground truth surface water features and provide characterization of any identified features.
- Evaluate interactions between the Project and surface water and fish and fish habitat.
- Use the information collected to inform Project design (e.g., avoid/minimize impacts to surface water and fish and fish habitat).
- Use the information collected to inform mitigation and management practices.

9.1.2 Regulatory Context

Under the provincial *Environment Act,* SNS 1994-95, c. 1, (Nova Scotia, 1995), NSECC has the authority to promote the sustainable management of water resources in Nova Scotia. More specifically, as per section 5A of the Activities Designation Regulations, NS Reg 47/95, the alteration of a watercourse or the flow of water within a watercourse is an activity that requires an approval from NSECC, or a notification to NSECC if the work will be completed in accordance with the Nova Scotia Watercourse Alterations Standards (NSECC, 2015c).

The Nova Scotia *Environment Act* (Nova Scotia, 1995, Section 3be) defines a watercourse as:

(i) The bed and shore of every river, stream, lake, creek, pond, spring, lagoon or other natural body of water, and the water therein, within the jurisdiction of the Province, whether it contains water or not.
(ii) All groundwater.

Using this guidance, watercourses were identified and described throughout the Project Area to support the description of fish habitat, and effects to regulated watercourses which may require provincial approval. While groundwater is included in the regulatory definition of a watercourse under the *Environment Act*, this section focuses on surface water features in the context of fish habitat provision. In addition to the above-mentioned definition, the watercourse parameters listed in the Guide to Altering Watercourses (NSECC, 2015b) were used to aid in determining the presence of a watercourse.

The *Fisheries Act* R.S.C., 1985, c. F-14 is the primary federal legislation governing the conservation and protection of fish and fish habitat in Canada. The *Fisheries Act* prohibits any work, undertaking, or activity that results in Harmful Alteration, Disruption, or Destruction (HADD) of fish or fish habitat, unless such activities are authorized through appropriate regulatory approvals.

The *Fisheries Act* defines the following:

Fish:

> "(a) parts of fish, (b) shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and (c) the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals."

Fish Habitat:

> "waters frequented by fish and any other areas on which fish depend directly or indirectly to carry out their life processes, including spawning grounds and nursery, rearing, food supply and migration areas (Authorizations Concerning Fish and Fish Habitat Protection Regulations, 2019)".

Section 34.4(1) of the *Fisheries Act* states that "No person shall carry on any work, undertaking or activity, other than fishing, that results in the death of fish", and Section 35(1) states that "No person shall carry on a work undertaking or activity that results in the harmful alteration, disruption or destruction of fish or fish habitat". Under Section 35(2) of the *Fisheries Act*, authorization may be granted for a proposed work, undertaking or activity that may, respectively, result in the death of fish or the HADD of fish habitat.

If an alteration to a watercourse or waterbody is required, or impacts to fish and fish habitat are expected, a review under the DFO Request for Review process may be required. DFO review typically occurs through the provincial watercourse alteration application process.

SARA provides federal protection for species listed as "Endangered", "Threatened", or "Special Concern". These species are determined through the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (ECCC, 2022e).

Provincially, the *Endangered Species Act*, S.N.S., 1998, c.11 (ESA) lists species as "Endangered", "Threatened" or "Vulnerable" (Nova Scotia, 1998). These species also have a subnational (provincial) rank (S-Rank) of "S1", "S2", or "S3" (ACCDC, 2025b) to further define their status.

Section 5.37.1 of the Municipality of Pictou County Land Use Bylaw (Municipality of Pictou County, 2025a) states the following:

> "All development, with the exception of the following, shall be prohibited within 50.0 horizontal metres of the ordinary high water mark of Forbes Lake, 15.24 horizontal metres of the ordinary high water mark of watercourses identified on Schedule 'D', the Major Watercourses Map, and 30.0 metres of the top of bank on the marine shoreline:

a) Boardwalks, walkways, and trails with a maximum width of 3.0 metres, b) Boat houses, fishing gear sheds, docks, wharves, piers, and slipways, c) Conservation uses, d) Fishing uses, e) Parks and Open Space uses, f) Public roads and infrastructure, g) Pumphouses, h) Safety fences that do not exceed a height of 1.9 metres, i) Scientific research structures, and j) Shoreline stabilization works."

The Pictou County Land Use Bylaw Schedule D has been reviewed; no applicable waters are present within the Project Area.

9.1.3 Desktop Review

The goal of the surface water and fish and fish habitat desktop review was to identify watercourses and waterbodies within or in proximity to the Project Area based on mapped systems, topography, and satellite imagery, while also identifying where the Project Area lies within primary and secondary watersheds and the potential fish community.

The desktop review was conducted using the following sources:

- NS 1:10,000 Primary Watersheds (NSECC, 2011a)
- 1:10,000 Secondary and Shore Direct Watershed of Nova Scotia (NSECC, 2011b)
- CanVec Database – Hydrographic Features (NRCan, 2023b)
- Wet Areas Mapping (WAM) (NSECC, 2022)
- NS Topographic Database – Water Features (GeoNOVA, 2025)
- Atlantic Canada Conservation Data Centre (ACCDC) Data Report (ACCDC, 2025a)
- Aquatic Species at Risk Map (DFO, 2025)
- Significant Species and Habitats Database (NSNR, 2024e)
- Nova Scotia Freshwater Fish Species Distribution Records (NSFA, n.d.)
- Centre for Marine Applied Research (CMAR) Wild Salmon Assessment (CMAR, n.d.)

Surface Water

The Project Area is located within the East/Middle/West (Pictou) primary watershed (1DP), and the East River Pictou secondary watershed (1DP-3) (Drawing 9.1). The East River Pictou secondary watershed includes East River and its tributaries, which flow north, draining into Pictou Harbour.

A review of the federal CanVec Database – Hydrographic Features (NRCan, 2023a) identified no waterbodies or watercourses within the Project Area (Drawing 9.1). Outside of the Project Area, the closest mapped watercourse is an unnamed tributary to Cameron Brook, located approximately 97 m south of the Project Area. Prominent aquatic features near the PA include Cameron Brook and West Branch East River. Cameron Brook is a tributary to West Branch East River that flows outside the northeast corner approximately 300 m from the Project Area before flowing into West Branch East River. West Branch East River is approximately 3.7 km east of the Project Area and flows north, joining East River.

Throughout the PA, WAM data indicates that groundwater ranges from 0 m to >10 m from the surface, with the majority being between 2.01 to 10 m of the surface (Drawing 9.2). WAM results highlighted the potential for watercourses throughout the PA (NSECC, 2022).

As identified in the ACCDC Data Report, the Town of Stellarton Source Water Protection Area partially overlaps the PA (ACCDC, 2025a) (Drawing 9.1).

Potential Fish Community

The Aquatic Species at Risk Map (DFO, 2025) is a federal database showing the distribution of SAR and their associated critical habitat within Canadian waters. A review of this database identified no records of critical habitat within the Project Area.

The Nova Scotia Significant Species and Habitat Database (NSNR, 2024e) contains no records of aquatic significant species or habitat within 5 km of the Project Area.

The ACCDC database identified one priority fish species and one priority aquatic invertebrate species within 5 km of the PA (Appendix E):

- Atlantic salmon - Gaspe - Southern Gulf of St. Lawrence population (*Salmo salar pop. 12*; COSEWIC Special Concern, S1)
- Eastern pearlshell (*Margaritifera margaritifera;* S2)

The Nova Scotia Freshwater Fish Species Distribution Records show the following species as potentially present within the East/Middle/West (Pictou) primary watershed:

- Alewife (*Alosa pseudoharengus*; S3B)
- American eel (*Anguilla rostrata;* COSEWIC threatened)
- Atlantic salmon (Gaspe - Southern Gulf of St. Lawrence population (COSEWIC Special Concern, S1)
- Banded killifish (*Fundulus disphanus*; S5)
- Brook trout (*Salvelinus fontinalus;* S3)
- Brown bullhead (*Ameiurus nebulosus*; S5)
- Chain pickerel (*Esox niger*; SNA)
- Common shiner (*Luxilus cornutus*; S5)
- Golden shiner (*Notemigonus crysoleucas*; S4)
- Lake chub (*Couesius plumbeus*; S5)
- Mummichog (*Fundulus heteroclitus*; S5)
- Ninespine stickleback (*Pungitius pungitius;* S5)
- Smallmouth bass (*Micropterus dolomieu;* SNA)
- Threespine stickleback (*Gasterosteus aculeatus*; S5)
- White perch (*Morone americana*, S5)
- White sucker (*Castostomus commersoni;* S5)
- Yellow perch (*Perca flavescens*; S5)

A review of the CMAR Wild Salmon River Assessment database identified East River (Pictou) as having medium significance for supporting the long-term viability of Atlantic salmon – Gaspe-Southern Gulf of St Lawrence populations (CMAR, n.d.). This indicates that current conditions in West Branch East River, which is approximately 3.7 km from the PA, may support Atlantic salmon populations (Weitzman et al., 2025).

9.1.4 Field Assessment Methodology

The results of the desktop review were used to inform early planning for Project siting and field survey design. The results of the field surveys have informed Project design (e.g., avoid/minimize impacts to surface water and fish and fish habitat).

Watercourse delineations were completed in conjunction with wetland delineations on July 2 and 3, 2025

WAM data and predicted flow data were provided to field staff to guide the identification and assessment of watercourses within the Project Area. Confirmed watercourses were delineated to their termination point or to the boundary of the Project Area. The watercourses were characterized using Strum's Baseline Delineation Form, which records the following general survey details:

- Date and time
- Weather
- Watercourse type
- Flow characteristics (direction, velocity, etc.)
- Physical characteristics (width, length, etc.)
- Substrate composition
- Instream cover
- Riparian habitat
- Bank stability and siltation presence
- Photos, global positioning system (GPS) location, etc.
- Fish presence/habitat potential

This information was collected and georeferenced using Survey123, an Environmental Systems Research Institute (ESRI) application for creating, sharing, and analyzing data.

In accordance with current regulatory guidelines, fish habitat was identified as any aquatic feature contiguous with a fish-bearing system, whether it is located within a watercourse, wetland, or waterbody. Where habitat was present within a channelized watercourse flowing through a wetland, it was assessed in the context of the watercourse. If habitat was located outside a defined channel, it was assessed in the context of the wetland, based on fish accessibility or the presence of open water features.

9.1.5 Field Assessment Results

There were four watercourses identified within the Project Area during field assessments (Drawing 9.3): two intermittent and two ephemeral features ranging in channel width from 0.50 m to 1.70 m. Characteristics presented are limited to the extent of the watercourse contained within or overlapping the Project Area (Table 9.1). Representative photographs are provided in Appendix F.

Table 9.1: Watercourse Characteristics Within the Project Area

Watercourse ID	Flow[1]	Velocity Range (m/s)	Channel Width Range (m)	Depth Range (m)	Substrate (%)	Habitat Types	Cover Types[2]
WC1	E	--	0.80-1.07	N/A	Rubble 10 Cobble 20 Gravel 10 Muck/Detritus 60	Riffle-run	O
WC2	E	--	0.80-1.20	0-0.02	Rubble 5 Cobble 5 Gravel 40 Sand 10 Clay/Mud 30 Muck/Detritus 10	Flat	IN, O
WC3	I	<0.05	0.50-1.00	0.03-0.08	Cobble 10 Gravel 5 Sand 85	Run	IN, O
WC4	I	--	1.00-1.70	0-0.02	Rubble 5 Cobble 15 Gravel 20 Muck/Detritus 60	Riffle-run, pool, flat	AP, IN, O

[1]Intermittent (I) – Streams that go dry during protracted rainless periods when percolation depletes all flow, Ephemeral (E) – A watercourse that flows during snowmelt and rainfall runoff periods only (Svec et al., 2005)
[2]Cover Types: AP = aquatic plants (submergent and/or emergent); IN = instream objects/in situ cover within the streambed in the form of fallen trees, submerged logs, rocks, boulders, undercut banks, and accumulated debris; O = overhead cover from riparian vegetation overhanging the stream
-- indicates that velocity could not be measured due to dry conditions.

Intermittent watercourse features observe variances in consistent flow throughout the year, either due to changes in their water source or other abiotic factors such as temperature or geological properties (Buttle et al., 2012). Intermittent watercourses are often first, and second order streams fed by lakes, wetlands, springs, groundwater, and run-off. They are often also episodic and flow more prominently following rainfall events and snowmelt conditions. Intermittent flow can occur underground as well as above the water table, along the surface. These features also differ in that they can observe partial channelization but will often enter below the surface (Buttle et al., 2012).

Ephemeral features are often surface water flows and only present following snowmelt periods or rainfall events. These conditions are the sole sources of stream flow present in many of these features and as a result, their flow is always observed above the water table near the surface (Buttle et al., 2012). In Nova Scotia, and within the Project Area, ephemeral conditions within wetlands which are sometimes referred to as “wetland corridors”.

WC1 and WC2 are ephemeral features. WC1 emerges near the western boundary of the Project Area and flows southeast, exiting the southern boundary of the Project Area. WC1 is moderately entrenched with medium bank stability. No water was present at the time of assessment. WC2 emerges from a slope and flows south, exiting the southern boundary of the Project Area. WC2 is moderately entrenched with high bank stability.

WC3 is an intermittent feature that originates from WL6 and flows south, eventually exiting the southern boundary of the Project Area. WC3 is moderately entrenched with medium bank stability.

WC4 is an intermittent feature that emerges in the northeast portion of the Project Area and flows east, eventually exiting along the eastern boundary of the Project Area. WC4 is moderately entrenched with medium bank stability.

Fish habitat within the Project Area is based on qualitative assessments. In an effort to make conservatively inclusive decisions in the effects assessment, all watercourses within the Project Area are currently considered fish habitat. Fish species identified during the desktop review that are more likely to be present within suitable habitats within the Project Area include brook trout and American eel; these species have wide freshwater ranges and are known to inhabit intermittent headwater systems (Shepard, 2015). (Petty et al., 2012). Watercourses within the Project Area are described as intermittent or ephemeral, with potential fish habitat being limited by seasonality of flow.

Detailed fish habitat assessments, during which fish habitat is described and quantified, may be completed during the permitting process to support requirements of the *Fisheries Act*, as needed.

9.1.6 Effects Assessment

Project-Surface Water and Fish and Fish Habitat Interactions
Project activities, primarily those that involve earth moving or vegetation removal, have the potential to impact surface water and fish and fish habitat (Table 9.2).

Table 9.2: Potential Project Interactions for Surface Water and Fish and Fish Habitat

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Site Preparation	X
Placement of Sedimentation and Erosion Control Measures	X
Clearing and Grubbing	X
Civil Site Construction	X
Equipment Installation	-
Interconnections for Services	-
Removal of Temporary Works and Site Restoration	X

Project Phase	Potential for Interaction
Commissioning	-
Operations and Maintenance	
Facility Operation and Maintenance	X
Site Management	X
Decommissioning and Rehabilitation	
Infrastructure Removal	-
Site Reclamation	X

Assessment Boundaries
The LAA for surface water and fish and fish habitat is the East River Pictou tertiary watershed (1DP-3-D) (Drawing 9.1). No RAA is defined for this VC, as the LAA is the maximum expected extent of indirect impacts to surface water, fish, and fish habitat (in the unlikely event of an accident).

Assessment Criteria
The VC-specific definition for magnitude is as follows:

- Negligible: No loss of fish habitat. No expectation for altered hydrology.
- Low: Small loss of fish habitat, with minimal potential for altered hydrology.
- Moderate: Moderate loss of fish habitat. Altered hydrology expected but can be managed with routine measures.
- High: Loss of fish habitat. Altered hydrology expected that would be challenging to manage with routine measures.

Direct Effects
The Project has been sited to avoid all watercourses and associated wetlands; therefore, no direct habitat destruction or death of fish by means other than fishing is anticipated.

Indirect Effects
Indirect effects such as changes in surface water quality, quantity, and temperature can be farther reaching, extending outside of the Project Area into the LAA. Blasting, if required, can impact both the quality and quantity of surface water in addition to fish survival and behaviour.

Change in Surface Water Quality
Changes in the quality of surface water can arise from wastewater and stormwater management and alterations to the surrounding environment. Effects can include an increase in water temperature from decreased shade, an increase in pollutants from machinery and infrastructure, and the mobilization of sediments (MTO, 2009). Surface water management, including controlled wastewater discharge during operations and stormwater management during construction, operations, and decommissioning, may interact with surface water and fish and fish habitat through changes in surface water quality. Changes in surface water quality may result from increased contaminants and elevated suspended solids and turbidity resulting from stormwater runoff and wastewater discharge.

The mobilization of sediment within aquatic environments can cause shifts in ecological integrity, including changes to the plant species composition, the distribution of primary and secondary producers, and the habitat suitability for vulnerable species (Tilman et al., 1997). Furthermore, sedimentation can irritate the gills of fish, sometimes resulting in death, bury and suffocate fish eggs, transport toxic industrial and agricultural compounds into fish habitat, and increase water temperature (ECCC, 2007). As bottom dwellers, American eel are susceptible to exposure to contaminated sediments and can bioaccumulate toxins and heavy metals (Haro et al., 2000). Eels are particularly sensitive to bioaccumulation of lipophilic contaminants (like PCBs) because they are long-lived species with a high fat content (DFO, 2014). Sedimentation can lead to infilling of interstitial spaces important to eels as habitat, and may also increase the level of contaminants (DFO, 2014). Sedimentation can result in severe negative impacts on brook trout populations and habitat, primarily by smothering eggs, reducing food sources, and destroying essential spawning and cover areas (Alexander & Hansen, 1983).

Erosion and sedimentation can occur throughout the lifecycle of the Project; however, the highest potential for these effects is related to construction activities. These effects are often foreseeable, and research-based, standardized BMPs can be implemented to mitigate the resulting outcomes and the magnitude at which they are felt. Ensuring that any construction or operation of machinery does not fall within a 30 m buffer of any mapped or delineated watercourse will assist with mitigating changes in surface water quality in these systems.
The quality (and quantity) of wastewater that will be generated by the Project is currently unknown, as this will vary depending on the specific technologies chosen for operation of the facility and demineralized water production. Nevertheless, wastewater composition is expected to include elevated concentrations of the minerals in the incoming water stream once pure water is extracted for operational use. Wastewater can be expected to have a three-times increase in the concentration of non-H_2O components (e.g., salts, residual impurities, and high hardness) compared to incoming groundwater while employing technologies with relatively high water demands. Depending on the technology used, there may also be spent reagents or biocides from the treatment process.

Various demineralized water production technologies exist that range in their ability to recover water. A reasonably conversative estimate expects the recovery of demineralized water at approximately two-thirds (Appendix D); however, some combinations of filtration-demineralization-polishing technologies can recover over 95%. Ultimately, the ideal technologies and their recovery performance will depend on the incoming water quality and overall design of the facility.

Regardless of the operational technologies chosen, the facility will be equipped with stormwater and wastewater management systems as needed to protect surface water, fish, and fish habitat and ensure any water discharge or run off from the project site meets local environmental regulations. These systems may include:

- Oil/water separator system to process rainwater drainage from the fuel storage tank containment.

- Oil/water separator system to process drainage from areas where oil and fuel products are handled and there is the potential for spillage to the drainage system.
- Neutralization system and property monitoring system for plant wastewater.
- Settling pond to receive stormwater and wastewater and manage release rates.

Wastewater discharge will be treated as necessary to meet CCME FWAL guidelines and NS Tier I EQS prior to being released. Typical treatment system designs include neutralization systems to ensure wastewater is safe to discharge. All discharged water will be tested to ensure CCME FWAL guidelines and NS Tier I EQS are met before being released from the settling pond at a controlled rate into the receiving environment. The release location for treated process water discharge is planned for WC4, as it is the largest of all on-site watercourses (Drawing 9.3).

Investigations are ongoing to determine how water needs of the facility can be reduced, including recycling wastewater through the facility. Treatment and release of wastewater will be described in a Surface Water Monitoring and Management Plan to be developed in consultation with NSECC and DFO. With the implementation of these mitigation and monitoring strategies, no change in water quality is anticipated. Consultation with DFO and NSECC will be conducted during the permitting stage to ensure permitting requirements are met.

Thermal Effects

Treated process water from the Facility is not anticipated to be elevated in temperature, as water used for cooling is released as steam through the stack. Thermal effects are evaluated herein in the event that any residual heat remains in treated process water and to demonstrate that thermal effects have been considered.

Under the CCME FWAL guidelines, temperature is discussed through a narrative framework that requires human activities to avoid altering the natural thermal regime of a waterbody. Rather than prescribing a single numeric limit, the guideline emphasizes maintaining the natural seasonal, daily, and depth-related temperature patterns that aquatic species rely on for critical life functions such as spawning, migration, feeding, and overwintering. The NS Tier 1I EQS do not refer specifically to temperature.

Species-specific thermal preferences and tolerances are critical biological characteristics that dictate the suitability of habitats for certain fish species. Water temperature is particularly important for cold-water fish species like salmonids, which require specific thermal ranges for optimal growth, reproduction, egg incubation, and larvae survival (Petty et al., 2012). For example, brook trout have a narrow range of tolerable water temperatures to properly carry out their life processes, and actively seek out cold-water refugia in the summer months. Thermally sensitive species like brook trout are therefore likely to exhibit greater adverse effects from increases in temperatures than non-sensitive species. American eel can generally tolerate wider temperature ranges (Fuller et al., 2019).

While the CCME FWAL guidelines do not prescribe an acceptable temperature or temperature range (as it varies based on the nature of the receiving environment and the requirements or sensitivities of the fish species present), they do caution against rapid or repeated temperature fluctuations, as abrupt changes cause physiological stress or mortality in aquatic organisms, particularly during sensitive life stages. As a result, temperature will be measured within the settling pond prior to release, and within the receiving environment.

Change in Surface Water Quantity

Water quantity within aquatic habitats can be altered from operational groundwater extraction, stormwater management, and wastewater discharge. Changes in water quantity within watercourses can have implications to the viability of fish or habitat conditions. The Pathways of Effects diagram developed by DFO outlines potential impacts to fish and fish habitat as a result of changes water level and flow modification (DFO, 2024). Effects may include changes to, or losses of:

- Habitat structure and cover
- Fish passage
- Wetted area

The probability of these impacts to fish and fish habitat increases with increasing alteration to the natural flow regime. As outlined in the DFO Framework for Assessing the Ecological Flow Requirements to Support Fisheries in Canada (DFO, 2013), flow alterations of less than +/- 10% of the magnitude of actual (instantaneous) flow in the river relative to a “natural flow regime” have a low probability of detectable negative impacts to ecosystems.

Baseflow Stream Depletion

Groundwater extraction during Project operations can impact surface water features by lowering the water table, which can reduce the natural discharge of groundwater into nearby rivers, lakes, and wetlands. Groundwater baseflow can directly support life processes of fish present. It is particularly important for providing sustained flow for species more sensitive to changes in flow regime, like brook trout. Moreover, brook trout may directly use groundwater seepage areas for key life stages such as spawning, egg incubation, overwintering, and summer thermal refuge (Cunjak & Power, 1986; Linnansaari et al., 2023; Quilbé et al., 2025).

Estimations of reduction in baseflow to nearby surface water features are provided in Section 8.5.4.3. Calculations were performed for mapped watercourses located 482 m and 803 m from the Project Area centre (Cameron Brook and an unnamed tributary, Drawing 9.1). Based on average pumping demands for a facility with high needs, estimations indicate that 18% to 42% of the pumping rate could be supplied by reduced streamflow over the first year of operation. Watercourses within the Project Area could expect a greater magnitude of baseflow depletion as they are anticipated to be closer to well locations. A baseflow reduction of this magnitude, if unmitigated, could impact the habitat’s capacity to support one or more life history stages of fish.

All watercourses within the Project Area are ephemeral or intermittently flowing and are expected to exhibit natural variability in streamflow and seasonal dryness throughout the year. All watercourses are first order, headwater streams that provide no passage to upgradient fish habitat. The magnitude of impact to habitat structure, cover, and wetted area within these systems will ultimately depend on the duration, timing and seasonality, rate of change, and frequency of baseflow reduction. As a baseline condition, all on-site watercourses are dry during summer low flows with fish habitat capacity restricted to temporary refuge during storm events. Habitat availability is expected to increase through the fall into spring, which overlaps the sensitive time period for brook trout (spawning, overwintering, rearing) and American eel (overwintering). A consistently large reduction or abrupt changes in baseflow during these sensitive time periods could impact the viability of fish habitat to support one or more life stages of these species. Potential impacts to fish passage are expected to be negligible, given that on-site watercourses provide no pathways to upstream fish habitat.

It should be noted that estimations of baseflow depletion assume a perfect hydraulic connection between stream and aquifer, which produces an overestimation of stream depletion (Section 8.5.4.3). Wells are expected to be sufficiently deep below the ground surface in a confined aquifer and disconnected from nearby surface water features. A hydrogeological field study will be conducted at the permitting stage to support a provincial application for groundwater withdrawal. The application will incorporate key protective hydrogeological study elements such as sustainable yield, and a groundwater-surface water interaction assessment will be included as required to ensure groundwater withdrawal does not negatively impact fish habitat and its capacity to fish. Water consumption can also be greatly reduced depending on the ultimate power plant configuration selected by the successful bidder.

Water Protection Area

The Project partially overlaps the Town of Stellarton Source Water Protection Area (Drawing 9.1). Excessive groundwater that lowers the water table can affect the reliability of municipal water supplies. Potential reductions in baseflow to nearby surface water features (an unnamed tributary and Cameron Brook) as a result of average, conservative pumping demands have been described in Section 8.5.4.4. Estimated contribution of streamflow to pumped groundwater is predicted to be moderate but is expected to decline with increased distance to the stream. The total drainage area of the municipal watershed supply area of the East River is approximately 412 km^2, of which the Cameron Brook contributing drainage area accounts for approximately 2%. Predicted changes in baseflow would be expected to occur only to segments of the system in proximity to groundwater wells, with impacts lessoning with increasing distance. As a result, changes in baseflow to portions of this system are not expected to result in detectable effects to water quantity within the water supply (East River).

Treated Process Water Release

Wastewater discharge will be produced during operations. Based on the power plant configurations with a high range of water consumption (i.e., reasonable worst-case estimates for water consumption), peak water demand for operation of the demineralized water plant is 175 m^3/hr. At peak operation, treated process water release from the demineralized water plant is expected to be 50 m^3/hr. Under this scenario, wastewater would be directed to a settling pond and would be discharged at a controlled rate into WC4 as it is the largest watercourse within the Project Area (Drawing 9.3)

During detailed design, the outfall will be designed to minimize impact to the receiving environment. This will include considerations for the physical outfall structure and the method of treated process water release to ensure no impact to fish habitat occurs that would affect the habitat's capacity to support one or more life processes of fish (DFO, 2024). This would include ensuring that potential changes in flow as a result of discharge remains below 10% relative to the natural flow regime, as this is considered to have a low probability of detectable impacts to aquatic ecosystems (DFO, 2013).To ensure the design criteria for the outfall are appropriate, flow and water quality monitoring are proposed in the WC4 to identify the capacity of that system to receive flows. This will assist in establishing treated process water release parameters to be protective of altered timing and duration of flows. Detailed design and mitigations will ensure that wastewater discharge is controlled and no measurable changes to surface water quantity or fish and fish habitat will occur.

Stormwater management will be required during construction, operations, and decommissioning. Stormwater will be released in accordance with a Stormwater Management Plan, which will be developed as part of the permitting process to fully understand on-site water management, particularly stormwater capture and flow.

Blasting

Blasting is not currently expected to be required; this will be confirmed through planned geotechnical investigations. If required, blasting may result in sensory disturbance to fish, impacting fish behaviour, spawning grounds, and migration patterns. The detonation of explosives near watercourses can produce post-detonation shock waves which involves a rise to a high peak pressure and then a subsequent fall to below ambient hydrostatic pressure. This pressure deficit can cause impacts in fish. An overpressure in excess of 100 kilopascals can result in effects to fish including damage to the swim bladder in finfish, and potential rupture and hemorrhage to the kidney, liver, spleen, and sinus venous. It is also possible that fish eggs and larvae can be damaged (Wright & Hopky, 1998). The degree of damage is related to the type of explosive, size and pattern of the charges and the distance to the watercourse, depth of water within the watercourse, and species, size and life stage of the fish.

Sublethal effects have also been observed including changes in fish behaviour as a result of noise produced during blasting (Wright & Hopky, 1998). Should blasting be required, guidance outlined by Wright and Hopky (1998) will be used to develop a Blast Management Plan. The Blasting Management Plan will be designed to ensure that appropriate setback distances are maintained, or mitigations are implemented to protect fish and fish habitat from the potential impacts of blasting. No death of fish by means other than fishing is anticipated.

As described in Section 8, blasting can also increase the connectivity between surface water and groundwater by creating short-term changes in water quality and quantity. To mitigate these risks, controlled blast designs, monitoring programs, and post-blast inspections will be implemented if blasting is required. Maintaining natural drainage patterns, erosion controls, and sediment management will help safeguard both groundwater and surface water resources during project construction and operations. Mitigations relating specifically to accidents and malfunctions (e.g., fuel spills) are described in Section 15.

Mitigation

The following mitigation measures will be implemented to avoid and mitigate any potential effects on surface water and fish and fish habitat. The Proponent will develop and implement a Surface Water Monitoring and Management Plan, Erosion and Sediment Control Plan, Blast Management Plan, and a site-specific Contingency Plan.

In addition, the following mitigation measures will be implemented:

General Mitigation

- Educate Project personnel on the sensitivity of aquatic habitat.
- Flag watercourses and avoid impacts to the watercourse and adjacent riparian habitat to the extent possible.
- Require that Project activities (fuelling included) or removal of vegetation shall not be conducted within 30 m of any delineated or mapped watercourse.

Changes in Surface Water Quality

- Properly install, monitor, and maintain erosion and sediment control devices.
- Limit the area of exposed soil and the length of time soil is exposed without mitigation (e.g., mulching, seeding, rock cover).
- Limit the slope and gradient of disturbed areas to minimize the velocity of surface water runoff.
- Minimize surface run-off containing suspended materials or other harmful substances.
- Direct run-off from construction activities away from wetlands and watercourses.
- Maintain 30 m vegetated buffers around watercourses.
- Ensure water discharge meets CCME FWAL guidelines (including temperature) prior to release.

Changes in Surface Water Quantity

- Integrate surface water management systems including diversion and collection ditches, roadside drainage channels, vegetated swales, and a settling pond, where required.

Blasting

- Develop a Blast Management Plan, if blasting is required, that is informed by the guidance provided in Wright and Hopky (1998).

Monitoring

A Surface Water Monitoring and Management Plan will be developed as part of the permitting process to confirm any changes to surface water quality and quantity, through further consultation with DFO. This Surface Water Monitoring and Management Plan will be employed to ensure water quality meets regulatory requirements and may include monitoring locations for water quantity.

Conclusion

After mitigations, predicted residual effects on surface water and fish and fish habitat are characterized in Table 9.3.

Table 9.3: Surface Water and Fish and Fish Habitat Residual Effects

VC Interaction	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
Change in Surface Water Quality	ESC Plan Maintain 30 m buffers Ensure wastewater discharge meets CCME FWAL guidelines Surface Water Monitoring and Management Plan	**Adverse**	**Low** Erosion and sediment controls and a 30 m buffer are expected to minimize impacts	**PA**	**Intermittent** Effects may occur during initial construction and during operations (continuously while operating, but operation is intermittent)	**Medium Term** Residual effects are expected to extend through the operation and maintenance phase.	**Partially Reversible** Mitigations and decommissioning cannot guarantee a return to baseline conditions	Not significant
Change in Surface Water Quantity	Implement water management systems Installation of a settling pond to hold water for	**Adverse**	**Low** Water management systems and monitoring are expected to minimize impacts	**PA**	**Intermittent** Effects may occur during construction and operations (continuously while operating, but	**Medium Term** Residual effects are expected to extend through the operation and maintenance phase.	**Partially Reversible** Mitigations and decommissioning cannot guarantee a return to baseline conditions	Not significant

VC Interaction	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
	treatment prior to release Evaluate potential changes to WC4 during fish and fish habitat permitting (if required).				operation is intermittent)			
Thermal Change	Monitoring temperature of treated process water	**Adverse**	**Negligible** Elevated temperature is not expected in treated process water	**PA**	**Intermittent** Effects may occur during construction and operations (continuously while operating, but operation is intermittent)	**Medium Term** Residual effects are expected to extend through the operation and maintenance phase.	**Partially Reversible -** Mitigations and decommissioning cannot guarantee a return to baseline conditions	Not significant
Blasting	Develop a Blast Management Plan	**Adverse**	**Low** Blast Management Plan is	**PA**	**Single Event** Effects may occur during	**Short Term** Effects are expected only	**Reversible** Return to baseline following initial	Not significant

VC Interaction	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
			expected to minimize impacts		initial construction	during construction	construction phase is expected	

Effects Assessment Ratings (Refer to Table 4.2 for definitions)
Nature of Effect: Adverse, Positive
Magnitude: Negligible, Low, Moderate, High
Geographic Extent: PA, LAA
Frequency: Single Event, Intermittent, Continuous
Duration: Short Term, Medium Term, Long Term
Reversibility: Reversible, Irreversible, Partially Reversible

9.2 Wetlands

9.2.1 Overview

Wetland assessments were conducted to identify and delineate wetland habitat so that impacts to wetland area and function could be avoided and minimized, to the extent possible. This was achieved by using the following approach:

- Identify wetland habitat in the Project Area using desktop resources.
- Use the findings of the desktop review to inform initial Project siting efforts (e.g., avoid/minimize impacts to wetlands), thus informing planning and logistics for field studies.
- Ground-truth and delineate wetland habitat within the Project Area.
- Complete functional assessments for delineated wetlands identified within the Project Area.
- Identify the potential for, and confirm the presence of, Wetlands of Special Significance (WSS) within the Project Area.
- Use the information collected to inform Project design (e.g., avoid/minimize impacts to wetlands).
- Use the information collected to inform mitigation and management practices.

9.2.2 Regulatory Context

The Federal Policy on Wetland Conservation outlines seven strategies to provide for the use and management of wetlands so that they can continue to provide a broad range of functions on a sustainable basis (Environment Canada, 1991). The Federal Policy on Wetland Conservation is applicable to Federal owned lands. Provincial governments are responsible for wetland protection outside of Federal lands (Environment Canada, 1991). Therefore, the Nova Scotia Wetland Conservation Policy applies to this Project.

The Nova Scotia Wetland Conservation Policy outlines a policy goal of no loss of WSS and no net loss in area and function for other wetlands (NSECC, 2019b). Wetlands are considered for WSS designation based on the wetland having significant species or species assemblages, high levels of biodiversity, significant hydrological value, or high social or cultural importance. Under this policy, the following are considered WSS:

- All salt marshes.
- Wetlands that are within or partially within a designated Ramsar site, Provincial Wildlife Management Area (Crown and Provincial lands only), 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 the Nova Scotia Eastern Habitat Joint Venture program.
- Wetlands known to support at-risk species as designated under SARA or the ESA.

- Wetlands in designated protected water areas as described within Section 106 of the Nova Scotia *Environment Act,* S.N.S 1994-95, c. 1.

Alterations deemed to provide necessary public function, based on an Environmental Assessment (if required) with public review or other approvals (e.g., Wetland Alteration Approval) may be approved for a WSS as appropriate (NSECC, 2019b).

As per Section 5 of the Nova Scotia *Environment Act,* S.N.S 1994-95, c. 1, approval from NSECC is required to alter a wetland. Nova Scotia considers a wetland alteration to be any activity that may affect wetland function and habitat. Such activities include, but are not limited to, excavating, flooding, infilling, or draining (NSECC, n.d.-b).

SARA provides federal protection for species listed as “Endangered”, “Threatened”, or “Special Concern”. These species are determined through COSEWIC (ECCC, 2022e).

Provincially, the ESA lists species as “Endangered”, “Threatened” or “Vulnerable” (Nova Scotia, 1998). These species also have a subnational (provincial) rank (S-Rank) of “S1”, “S2”, or “S3” (ACCDC, 2025a) to further define their status.

9.2.3 Desktop Review

A desktop review for the location and extent of potential wetlands across the PA was completed using the following information sources:

- Wetlands Inventory (NSNR, 2021i)
- WSS Database (NSECC, 2020b)
- NS Topographic Database – Water Features (GeoNOVA, 2025)
- Nova Scotia WAM Database (NSECC, 2022)
- Nova Scotia Digital Elevation Model (DEM) (GeoNOVA, 2024b)
- Provincial Landscape Viewer (NSNR, 2024d)
- Satellite and aerial imagery

The NSNR Wetland Inventory (NSNR, 2021i) did not identify any wetlands within the PA. The closest wetland outside of the PA is located 305 m to the east (Drawing 9.1).

According to the WSS database (NSECC, 2020b), there are no WSS located within the Project Area. The nearest NSECC-mapped WSS is a swamp, located approximately 1 km east of the Project Area (Drawing 9.1).

The NS Topographic Database – Water Features (GeoNOVA, 2025) was used in conjunction with the Nova Scotia WAM database and Nova Scotia DEM layer to further assess the distribution of confirmed and potential wetland habitat within the Project Area.. These sources identified potential wet areas and predicted flow based on the assumed depth-to-water generated from digital elevation data (Drawing 9.2) (NSECC, 2022). The depth-to-water ranged from 0 m to >10 m from the surface across the PA.

The Provincial Landscape Viewer (NSNR, 2024d) was reviewed to confirm the presence of wetlands and WSS, as well as to identify areas of interest including significant habitat, special management practice zones, and protected areas. The results show that the Project Area does not contain watercourses and waterbodies identified as significant habitat for species at risk (discussed in Section 9.1).

Satellite and aerial imagery were used as a quality assurance/quality control tool when reviewing desktop resources.

9.2.4 Field Assessment Methodology

General
Wetland field assessments were completed across the Project Area on July 2 and 3, 2025. This included high-level assessments for hydrology, complemented by in-depth wetland delineations and functional assessments. Wetland surveys were done in conjunction with watercourse assessment surveys. Field assessments aimed to minimize wetland alterations by establishing areas to be avoided during Project construction.

To accompany wetland field surveys, a list of SAR and SOCI known to occur within the general area of the Project was compiled to help with incidental identification (Appendix G). Throughout the wetland surveys all incidental observations of SAR and SOCI were noted; details of these observations, if present, are captured within the EARD/IPD under their respective reporting sections, as applicable to the species observed.

Field Delineations
Strum biologists surveyed the Project Area, delineating and characterizing each wetland identified. In accordance with the U.S. Army Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, 1987), wetland boundaries were determined by confirming the following:

- Presence of hydrophytic (water loving) vegetation
- Presence of hydrologic conditions which result in periods of flooding, ponding, or saturation during the growing season
- Presence of hydric soils

A positive indicator must typically be present for all three parameters to definitively identify any given site as a wetland (Environmental Laboratory, 1987). If the identified wetland extended outside of the Project Area, the extent of its boundary was estimated using aerial imagery and other desktop resources.

Identification of Hydrophytic Vegetation
Hydrophytic vegetation is defined as the sum of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produces permanent or periodically saturated soils of sufficient duration to exert a controlling influence on the plant

species present (Environmental Laboratory, 1987). Hydrophytic vegetation should be the dominant plant type observed in wetland habitat (Environmental Laboratory, 1987). Dominant plant species observed in each wetland were classified according to indicator status (i.e. probability of occurrence in wetlands), in accordance with the U.S. Fish and Wildlife Service National List of Vascular Plant Species that Occur in Wetlands: NE Region (Region 1) (US FWS, 1988) (Table 9.4). These indicators are used as this region most closely resembles the flora and climate regime of Nova Scotia. Further relevant information was reviewed in Flora of Nova Scotia (Zinck, 1998).

Table 9.4: Classification of Wetland-Associated Plant Species[1]

Plant Species Classification	Abbreviation[2]	Probability of Occurring in Wetland
Obligate	OBL	>99%
Facultative Wetland	FACW	66-99%
Facultative	FAC	33-66%
Facultative Upland	FACU	1-33%
Upland	UPL	<1%
No indicator status	NI	Insufficient information to determine status
Plants That Are Not Listed (assumed upland species)	NL	Does not occur in wetlands in any region.

[1] Source: (US FWS, 1988)
[2] A '+' or '-' symbol can be added to the classification to indicate greater or lesser probability, respectively, of occurrence in a wetland.

If the majority (greater than 50%) of the dominant vegetation at a data point is classified as obligate (OBL), facultative wetland (FACW), or facultative (FAC), then the location of the data point is considered to be dominated by hydrophytic vegetation.

Identification of Hydric Soils

A hydric soil is formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper layer (USDA NRCS, 2003). Indicators of the presence of hydric soils include soil colour (gleyed soils and soils with bright mottles and/or low matrix chroma), aquic or preaquic moisture regimes, reducing soil conditions, sulfidic material (odour), soils listed on the hydric soils list, iron and manganese concretions, organic soils (histosols), histic epipedons, high organic content in the surface layer of sandy soils, and organic streaking in sandy soils.

During field surveys, soil pits were excavated to a maximum depth of 40 cm or until (auger) refusal. The soil in each pit was then examined for hydric soil indicators. The matrix colour and mottle colour (if present) of the soil were determined using Munsell Soil Colour Charts.

Identification of Wetland Hydrology

Wetland habitat, by definition, either periodically or permanently has a water table at, near, or above the land surface (Environmental Laboratory, 1987). To be classified as a wetland, a site should have at least one primary indicator or two secondary indicators of wetland hydrology

(Table 9.5) Wetland habitat is assessed for signs of hydrology via visual observations across the area and through the assessment of soil pits.

Table 9.5: Indicators of Wetland Hydrology[1]

Examples of Primary Indicators	Examples of Secondary Indicators
Surface Water	Oxidized Root Channels in the Upper 30 cm
Saturation	Local Soil Survey Data
Sediment Deposition	Dry Season Water Table
Drainage Patterns	Stunted or Stressed Plants
Water-stained Leaves	Drainage Patterns
Sparsely Vegetated Concave Surfaces	Surface Soil Cracks
Hydrogen Sulfide Odor	Moss Trim Lines

[1]As identified in the Nova Scotia Wetland Delineation Data Form (NSECC, 2011c), which has been adapted from the U.S. Source: Army Corps of Engineers form for Northeast-North Central Supplement for use in Nova Scotia (Environmental Laboratory, 1987)

Functional Assessments

Wetland functional assessments were completed for all wetlands identified within the PA. Functional assessments were completed using the Wetland Ecosystem Services Protocol – Atlantic Canada (WESP-AC) evaluation technique. The WESP-AC process involves the completion of three forms; a desktop review portion (Office Form) that examines the landscape level aerial conditions to which the wetland is situated, and two field forms identifying biophysical characteristics of the wetland (Field Form) and stressors to the wetland (Stressors Form), if any. The process serves as a rapid method for assessing individual wetland functions and values. WESP-AC addresses 16 specific functions that wetlands may provide (Table 9.6).

Table 9.6: WESP-AC Function Parameters

Grouped Wetland Function	Specific Wetland Functions
Hydrologic Function	Surface Water Storage
Water & Climate Protection	Sediment Retention & Stabilization
	Phosphorus Retention
	Nitrate Removal & Retention
	Carbon Stock Preservation
Aquatic Support	Aquatic Primary Productivity
	Stream Flow and Temperature Support
	Organic Nutrient Export
Aquatic Habitat	Anadromous Fish Habitat
	Resident & Other Fish Habitat
	Waterbird Feeding Habitat
	Waterbird Nesting Habitat
	Amphibian Habitat
Transition Habitat	Raptor and Wetland Songbird Habitat
	Pollinator Habitat
	Native Plant Habitat

Source: (Adamus, 2025)

The specific wetland functions are individually allocated into grouped wetland functions and measured for "functional" and "benefit" scores. Wetland function relates the wetland's natural ability (i.e., water storage), whereas wetland benefits are benefits of these functions, whether it is ecological, social, or economic. The highest functioning wetlands are those that have both high 'function' and 'benefit' scores for a given function. WESP-AC enables a comparison to be made between individual wetlands within a province to gain a sense of the importance each has in providing ecosystem services.

For each wetland evaluated, the WESP-AC process calculates the overall score for the grouped wetland functions and the specific wetland functions listed in Table 9.6. One score each is provided for function and benefit. Scores are ranked as 'Lower', 'Moderate', or 'Higher', allowing for analysis of the wetland as compared to calibrated baseline wetland scores in Nova Scotia to date. A 'Higher' WESP-AC score means that wetland has a greater capacity to support those processes as compared to other wetlands in the province. A 'Higher' WESP-AC score in both the function and benefits category means the wetland supports the natural ecosystem functions and provides services with potentially societal importance.

Additionally, the WESP-AC process assesses the wetland for a determination of WSS based on the functional results. The grouped functions outlined in Table 9.6 are further combined into "supergroups" for habitat (Aquatic Habitat and Transition Habitat) and support (Hydrologic, Water & Climate Protection, and Aquatic Support) functions. WSS designation is dependent on a certain combination of 'moderate' and 'high' scores within these groups.

The WESP-AC functional evaluation technique recognizes that, in many cases, delineation of entire wetlands where they extend beyond a Project Area is not always feasible (e.g., property ownership) or required to complete an appropriate assessment using this tool (Adamus, 2018). Instead, WESP-AC permits the delimitation of an assessed area, defined as the wetland or portion of wetland physically assessed in the field, while the Office Form considers the broader landscape characteristics and functions that extend beyond the assessed area and/or PA.

9.2.5 Field Assessment Results

General

Field surveys completed during 2025 identified eight wetlands within the Project Area (Drawing 9.3). Detailed results are found in Appendix F.

Four of the eight identified wetlands were treed swamps, and four were shrub swamps. The Canadian Wetland Classification System (NWWG, 1997) defines a swamp as a wetland characterized by the dominance of woody vegetation in which the water table is typically at or near the surface or inundates the soil for a significant portion of the growing season. Swamps are often associated with poorly drained or saturated soils, and they provide important habitat for various plant and animal species adapted to wet conditions. Swamps can be further sub-divided into treed swamps or shrub swamps, depending on their physiological makeup.

Treed swamps are characterized by the presence of trees as the dominant vegetation (>7.5 cm DBH) and an environment that is not as waterlogged as other wetland types, such as shrub swamps or marshes, and typically experience their highest hydroperiod during spring and fall precipitation events (NSNR, 2018b). As a result, treed swamps provide deciduous trees [e.g., red maple (*Acer rubrum*) and yellow birch (*Betula alleghaniensis*)] and coniferous trees [e.g., black spruce (*Picea mariana*) and balsam fir (*Abies balsamea*)] the opportunity to establish themselves and adapt to the inconsistent inundation periods (NSNR, 2018b).

Of the treed swamps observed by field staff, typical species composition consisted of cinnamon fern (*Osmundastrum cinnamomeum*), yellow birch, balsam fir, white ash (*Fraxinus americana*) and red maple. Surface water was not always observed, though saturation was ubiquitously present as identified through the excavation of small soil pits.

Shrub swamps are dominated by shrubs and smaller woody plants (<7.5cm DBH, >1m tall) with a denser understory and tend to form in permanently or seasonally flooded areas where the surface is moist from ground saturation. Trees may be present but are less dominant than in treed swamps. In many cases, shrub swamps eventually transition into treed swamps via succession (NSNR, 2018b).

Of the shrub swamps observed by field staff, typical species composition consisted of cinnamon fern, sensitive fern (*Onoclea sensibilis*), speckled alder (*Alnus incana*), red maple, and balsam fir. Surface water was not always observed, though saturation was ubiquitously present as identified through the excavation of small soil pits.

Functional Assessments

Functional assessments were completed in 2025 by Strum wetland specialists for eight wetlands located within the Project Area.

None of the field-delineated wetlands met the criteria for WSS, as dictated by the Functional WSS Interpretation Results within the WESP-AC spreadsheet calculator. Based on the results of field and desktop evaluations, however, WL1 and WL4 have been identified as potential WSS. The specific rationale is not provided herein, however, data to support potential WSS triggers will be submitted to the regulators along with this EARD/IPD. Official WSS designation will be made by NSECC.

A summary of WESP-AC results is provided in Table 9.7.

Table 9.7: Summary of WESP-AC Assessments for Wetlands within the Project Area

WL ID	Hydrologic Group		Water & Climate Protection Group		Aquatic Support Group		Aquatic Habitat Group		Transitional Habitat Group		Average Function	Average Benefits	WSS
	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits			
WL1	4.52	11.11	8.77	2.21	0.81	5.62	1.81	3.14	6.99	9.21	4.58	6.26	**No**
WL2	8.62	13.93	9.34	2.41	1.33	5.61	1.53	3.18	7.08	9.57	5.58	6.94	**No**
WL3	4.12	11.11	8.33	2.92	1.57	5.50	0.76	3.11	6.07	9.21	4.17	6.37	**No**
WL4	5.01	15.66	5.53	6.56	5.99	7.69	5.06	6.94	8.06	9.33	5.93	9.24	**No**
WL5	6.88	7.13	8.58	3.52	0.48	0.05	0.98	3.13	7.39	9.23	4.86	4.61	**No**
WL6	5.11	11.14	8.56	3.01	1.51	5.56	1.35	3.12	7.24	9.21	4.76	6.41	**No**
WL7	5.46	9.70	8.47	1.96	0.59	5.63	1.90	3.15	7.30	9.27	4.74	5.94	**No**
WL8	7.24	11.11	8.43	2.21	-0.07	5.61	1.67	3.16	7.24	9.27	4.90	6.27	**No**
Average Score	5.87	11.36	8.25	3.10	1.52	5.16	1.88	3.62	7.17	9.29	4.94	6.50	
Average Rating*	Moderate	Higher	Higher	Lower	Lower	Moderate	Lower	Moderate	Higher	Higher			

Note: Ratings are represented by colours, where red corresponds to a ‘lower’ rating, yellow corresponds to a ‘moderate’ rating, and green corresponds to a ‘higher’ rating.

Hydrological Group

The hydrologic group evaluates the effectiveness of a wetland to store or delay the downslope movement of surface water. However, the model does not account for wetland size, and in turn, the ability of larger wetlands to store more water than smaller wetlands. Wetlands that have the highest function scores within this group tend to lack surface water outlets, and instead, are isolated from flowing surface water, whereas high benefit scores may be associated with developed areas where water storage is more valuable to reduce flood risks.

The majority of the wetlands had a moderate hydrologic function score (88%), and all wetlands had a higher hydrologic benefit score.

Water and Climate Protection Group

The water and climate protection group is compiled from four different functions: sediment retention and stabilization; phosphorus retention; nitrogen removal and retention; and carbon stock preservation. The main function of this group is to evaluate the wetland’s potential to intercept, retain, and filter sediments, particulates, and organic matter. Similar to the hydrologic group, the wetlands that have the higher benefit score in this regard include those that do not have a surface water outlet and instead are isolated from flowing surface water. This model also does not account for wetland size and as such, larger wetlands do not necessarily score higher than small wetlands, although size may factor into this function.

All wetlands had a higher functional water and climate protection scores, and the majority (75%) had a lower water and climate protection benefit score.

Aquatic Support Group

The aquatic support group comprises three individual functions: stream flow and temperature support; aquatic primary productivity; and organic nutrient export. The main function of this group is to determine the wetland’s ability to support ecological stream functions that promote habitat health. Wetlands lying adjacent to or containing flowing water score higher than those that do not (e.g., isolated wetlands). Additionally, headwater wetlands are crucial for supporting stream flow during the dry season by contributing to water flow via groundwater input and storage capacity. Headwater wetlands provide stream flow and cooling functions due to their typically limited exposed surface water, insulating properties and groundwater water storage and retention time. Treed swamps can also provide aquatic support through groundwater discharge (e.g., seeps) and vegetation shading.

The majority of wetlands (88%) had lower scores for the aquatic support functional group, and the majority of wetlands (75%) had a moderate aquatic support group benefit score.

Aquatic Habitat Group

The aquatic habitat group is compiled from five different functions: anadromous fish habitat; resident and other fish habitat; amphibian habitat; waterbird feeding habitat, and waterbird nesting habitat. Wetlands that have the higher functions within this group include those that are adjacent to or contain water features with potential habitat characteristics (e.g., in-stream cover, aquatic vegetation, etc.).

The majority of wetlands received a lower aquatic habitat functional score (88%), while aquatic habitat group benefit scores were mostly moderate (63%).

Transition Habitat Group

The transition habitat group comprises three different functions: raptor and wetland songbird habitat, native plant habitat and pollinator habitat. The main function of the collective group is to evaluate the wetland's ability to support healthy habitat for birds, mammals, and native plants. The Project Area has a mix of remote habitat and fragmented or disturbed habitat.

The majority of wetlands scored lower on transition habitat function (63%) and all wetlands scored higher on transition habitat group benefit.

Wetlands of Special Significance

Following interpretation of field and desktop results, WL1, WL2 and WL4 were determined to be potential WSS. Official WSS designation will be determined by NSECC.

9.2.6 Effects Assessment

Project-Wetland Interactions

Project activities, primarily those that involve earth moving or vegetation removal, have the potential to impact wetlands through habitat removal, disruptions to hydrology, and/or displacement of sediment (Table 9.8).

Table 9.8: Potential Project-Wetland Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Site Preparation	X
Placement of Sedimentation and Erosion Control Measures	X
Clearing and Grubbing	X
Civil Site Construction	X
Equipment Installation	-
Interconnections for Services	-
Removal of Temporary Works and Site Restoration	X
Commissioning	-
Operations and Maintenance	
Facility Operation and Maintenance	X
Site Management	X

Project Phase	Potential for Interaction
Decommissioning and Rehabilitation	
Infrastructure Removal	-
Site Reclamation	X

Assessment Boundaries
The LAA for wetlands is the East River Pictou tertiary watershed (1DP-3-D) (Drawing 9.1). No RAA is defined for this VC, as the LAA is the maximum expected extent of indirect impacts to wetlands (in the unlikely event of an accident).

Assessment Criteria
The VC-specific definition for magnitude is as follows:

- Negligible: No direct loss of wetland habitat or alteration to wetland functions expected.
- Low: Direct loss of wetland habitat, but overall wetland functions remain intact.
- Moderate: Direct loss of wetland habitat and impact to wetland functions, but wetland area loss will not impact the hydrology of the wetland's watershed and/or the impacted wetland is not a WSS.
- High: Direct loss of wetland habitat and impact to wetland functions; and wetland area loss will affect the hydrology of the wetland's watershed and/or the impacted wetland is a WSS.

Direct Effects
Direct effects on wetland habitat and functionality such as habitat loss can occur throughout the life of the Project but are likely to be most prominent during construction. Effect-specific active management, mitigation, and monitoring are required to eliminate, mitigate, or otherwise manage the magnitude of these direct effects.

Habitat Loss
Habitat loss can occur both directly (i.e., excavation or infilling) and indirectly (i.e., altered hydrology or canopy cover) as a result of the Project (Trombulak & Frissell, 2000). Loss of habitat can fragment wildlife corridors, potentially isolating species and lowering species richness. Habitat loss can also disrupt vital habitat characteristics that support vulnerable species. Further, the removal or infilling of wetland habitat can impact the hydroperiod of neighbouring wet areas, resulting in farther reaching impacts on habitat quality (Mitsch & Gosselink, 2000).

Direct loss is most likely to occur during Project construction through infilling or excavation of wetland habitat. Of the eight wetlands that were identified either within or overlapping with the PA, three will require alteration as a result of Project construction activities.

A summary of the wetlands identified within the Project Area (Drawing 9.3) and how they will be affected by the Project is provided in Table 9.9.

Table 9.9: Habitat Alteration Potential for Field-Delineated Wetlands within the PA

Wetland ID	Wetland Type	Delineated Area (m^2)	Alteration Expected (m^2)
WL3	Shrub swamp	1,651	252
WL4	Treed swamp	16,648	16,635
WL5	Treed swamp	651	651

Bold text indicates the wetland is a potential WSS

The results of the field assessments indicate that there is potential for three field delineated project-wetland interactions comprising one partial and two complete infills to facilitate Project development for a total impact area of 1.7 ha.

A total of three wetlands were assessed as potential WSS within the Project Area. Of those three wetlands, one (WL4) is expected to be altered. Where practical, the potential WSS will be avoided through the detailed design process. Potential WSS will be reviewed with NSECC and final WSS designations will be made by NSECC. Furthermore, alterations can be adequately mitigated through the wetland permitting process. Permission can be granted for alteration of a WSS at a higher compensation ratio if the alteration is required to support necessary public function.

During the detailed design phase, further efforts will be made to microsite Project infrastructure further away from wetlands, specifically WSS, to avoid impacts, as is practicable. In areas where wetland alteration is unavoidable, the detailed design phase, where possible, will refine the layout so that wetland impacts are further minimized. Furthermore, any necessary partial wetland impacts will be designed to avoid any permanent diversion, restriction or blockage of natural flow, such that the hydrologic function of the remaining portion of the wetland is maintained. Specific details of wetland alterations will be finalized during the detailed design phase and will be included in the application for wetland alteration.

Provincial wetland data obtained from the Canadian Wetland Inventory (ECCC, 2024) was used to estimate the total amount of wetland habitat within the 14,120 ha LAA. An estimated 600.2 ha of mapped wetland habitat was identified, which equates to approximately 4.2% of the LAA. Field delineated wetland habitat that may be directly impacted by the Project comprises approximately 1.7 ha, or 0.01% of the total area within the LAA, which is approximately 0.3% of the potential wetland habitat within the LAA. Mitigations for loss of wetlands will ensure that the provincial wetland policy of no net loss of wetland habitat and function will be upheld.

None of the wetlands proposed for alteration were determined to contain fish habitat based on a lack of connectivity to potentially fish bearing features.

Indirect Effects

The temporal and spatial extent of indirect effects such as hydrological effects and erosion and sedimentation can be far reaching, but are often foreseeable, and research based, standardized BMPs can be implemented to mitigate the resulting outcomes. These effects will be discussed in more detail in Section 10.2.

Hydrological Effects

The hydrology of a wetland is one of the most important aspects of its overall structure and function. Project infrastructure within or near a wetland can result in changes in the timing and quantity of flow, potentially impacting species composition, water treatment capabilities, and nutrient export (Mitsch & Gosselink, 2000). Further, disruption to the hydrology of one area may hinder the hydrological connectivity to other areas, thus resulting in impacts being felt in neighbouring wet areas.

The capture of rainwater on the site will be limited to the area in the immediate vicinity of fuel storage to serve as a secondary containment measure. Captured water will be directed to oil/water separator system to process rainwater drainage from the fuel storage tank containment. No other ditching is anticipated within the Project Footprint. Furthermore, the facility will be unpaved. Indirect hydrological effects to wetlands as a result of stormwater management are therefore not currently expected; however, they will continue to be assessed during permitting to inform monitoring and will be considered during wetland alterations. A Stormwater Management Plan will be developed as part of the permitting process and will be inclusive of protective elements for aquatic habitats.

Groundwater extraction during Project operations can impact surface water features by lowering the water table, which can reduce the natural discharge of groundwater into nearby wetlands. An initial radius of influence of potential groundwater drawdown of 650 m as a result of pumping operations was calculated for a well centred within the Project Area (Section 8.4.7). Wetlands within this radius of influence could experience a change in groundwater interactions and as result, a change in hydrological function. Isolated discharge wetlands which are reliant on groundwater inputs, such as isolated swamps which make up the majority of delineated wetlands within the Project Area, may be more vulnerable to this change. It should be noted, however, that the analysis depends on a number of assumptions including that the aquifer has an infinite aerial extent, is fully penetrating, and that there is constant pumping. In reality, wells are expected to be sufficiently deep below the ground surface, assuming the aquifer is confined and disconnected from nearby surface water features. In addition, the Facility will not operate continuously.

A hydrogeological field study will be conducted at the permitting stage to support a provincial application for groundwater withdrawal and the wetland permitting process. The application will incorporate key protective hydrogeological study elements such as sustainable yield, and a groundwater-surface water interaction assessment will be included as required to ensure groundwater withdrawal does not negatively impact wetland habitat. Water consumption can also be greatly reduced depending on the ultimate power plant configuration selected by the project development team.

Erosion and Sedimentation

Erosion and sedimentation can occur throughout the lifecycle of the Project, including during construction efforts such as clearing and grubbing, and during operations activities such as routine road maintenance and daily traffic. These activities disturb soil, exposing it to erosion. Consequently, runoff deposits sediment into wetlands, resulting in sedimentation. The accumulation of sediment within wetland environments can cause shifts in ecological integrity, including the plant species composition and subsequent nutrient retention potential, hydrological storage capabilities, and habitat suitability for vulnerable species (Tilman et al., 1997).

Of the three wetlands expected to be directly impact, two (WL4 and WL5) are isolated from flowing surface water and are therefore less likely to transport sediments downstream aquatic features. WL3, which is contiguous with WC4, is expected to be partially impacted in habitat that excludes surface water features. This system has greater capacity to transport sediments down-gradient, as does WL6 (with WC3 as an outflow watercourse). All other wetlands are hydrologically isolated, Indirect effects resulting from erosion and sedimentation are expected to be mitigated with the implementation of an Erosion and Sediment Control Plan, which will be developed during the detailed design phase.

Mitigation

The following specific mitigation measures will be implemented to avoid and mitigate potential effects on wetlands.

Habitat Loss

- Flag wetlands to avoid interference with wetland habitat to the extent possible.
- Avoid impacts to wetlands to the extent possible.
    - Where unavoidable, complete wetland alterations in accordance with the NS Wetland Conservation Policy and the wetland alteration process during the permitting stage, which includes a requirement to compensate for lost wetland habitat and functions.
- Storage, stockpiling, and use of fuel, lubricant and other hazardous substances will be in designated areas outside of buffer zones (30 m) designed to protect sensitive habitats including wetlands and watercourses.
- Use spill prevention features such as sealed transfer systems, drip trays, and automatic shutoff valves.
- Implement a spill prevention and ERP with trained staff, on-site spill kits, and clear procedures.
- Conduct routine inspections and maintenance of tanks, piping, and containment structures to detect leaks early.

Hydrological Effects

- Design wetland alterations to avoid permanent diversion, restriction or blockage of natural flow, such that hydrologic function of wetlands will be maintained.

- Utilize materials that allow for the flow of water during construction activities where possible.

Erosion and Sedimentation

- Develop a site-specific Erosion and Sedimentation Control (ESC) Plan during the detailed design phase.
- Limit the area of exposed soil and the length of time soil is exposed without mitigation (e.g., mulching, seeding, rock cover).
- Use the existing roads and access routes to the extent feasible.
- Avoid travel through wetlands. If travel through wetlands is required:
    - Use anti-rutting mitigation (e.g., mud mats), as appropriate.
    - Cross the wetland at the narrowest portion, where possible.
    - Time work to occur during frozen ground conditions, where possible.
- Equipment will be cleaned prior to mobilization.
- Avoid surface run-off and material stockpiling runoff containing suspended materials or other harmful substances.
- Direct run-off from construction activities away from wetlands.
- Maintain existing vegetation cover, where possible.
- Maintain 30 m buffers on wetlands wherever possible.
- Temporarily disturbed areas will be restored to pre-construction conditions.

Monitoring

A site-specific post-construction wetland monitoring plan will be developed to facilitate adaptive management and contribute to the safeguarding of ecological integrity and environmental stability. The plan will be provided to NSECC as part of the wetland alteration permitting process and will consist of detailed monitoring and general spot checks. Detailed monitoring will include vegetative, hydrological, and soil assessments within the wetland habitat adjacent to the infill site. Spot checks will involve a general overview of vegetative, hydrological, and soil conditions, focusing on evidence of significant hydrologic alterations and sedimentation.

Conclusion

After mitigations, predicted residual effects on wetlands are characterized in Table 9.10.

Table 9.10: Wetlands Residual Effects

VC Interaction	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
Habitat Loss	Flag and avoid wetlands to the extent possible Wetland alteration approval Implement wetland compensation program	**Adverse**	**High** Direct loss of wetland habitat and impact to wetland functions. Complete loss of WL4 (1.66 ha), which has been determined to be a potential WSS.	**PA**	**Single Event** Effects will occur during initial clearing and ground disturbance	**Medium Term** Effects to wetlands are expected to extend through the operation and maintenance phase	**Partially Reversible** Many of the wetlands may naturally rehabilitate upon decommissioning, however long-term changes to the structure and composition of wetlands is expected.	Not Significant High magnitude is based on potential designation of WSS; however, this is expected to be mitigated through increased compensation ratio through the wetland alteration permitting process
Hydrological Effects	Maintain hydrological functions of wetlands to the extent possible	**Adverse**	**Low** Mitigations are expected to minimize impacts	**PA**	**Intermittent** Effects may occur during construction and operations	**Medium Term** Effects to wetlands are expected to extend through the operation and maintenance phase	**Partially Reversible** Mitigations and decommissioning cannot guarantee a return to	Not Significant

VC Interaction	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
							baseline conditions	
Erosion and Sedimentation	ESC plan Maintain 30 m buffers on wetlands wherever possible	**Adverse**	**Low** Erosion and sediment controls and a 30 m buffer are expected to minimize impacts	**PA**	**Intermittent** Effects may occur during construction and operations	**Medium Term** Effects to wetlands are expected to extend through the operation and maintenance phase	**Partially Reversible** Mitigations and decommissioning cannot guarantee a return to baseline conditions	Not Significant
Effects Assessment Ratings (Refer to Table 4.2 for definitions) **Nature of Effect:** Adverse, Positive **Magnitude:** Negligible, Low, Moderate, High **Geographic Extent**: PA, LAA **Frequency:** Single Event, Intermittent, Continuous **Duration:** Short Term, Medium Term, Long Term **Reversibility:** Reversible, Irreversible, Partially Reversible								

10.0 TERRESTRIAL ENVIRONMENT

Assessments of vegetation communities, flora, fauna were completed based on the requirements outlined in the Guide to Addressing Wildlife Species and Habitat in an Environmental Assessment Registration Document (NSECC, 2009a). Prior to completing field assessments, a priority species list was created for the Project in accordance with this guide, as outlined below, and used for the following purposes:

- To identify which targeted surveys were recommended based on species, vegetation communities, and habitats present within the Project Area.
- To identify key detection times for targeted surveys.
- To inform field staff of priority species which may be encountered during biophysical surveys.

10.1 Development of a Priority Species List

The priority species identified for the Project include:

- Species of Conservation Interest (SOCI): Rare species lacking formal designation under provincial or federal endangered species legislation:
    - Species assessed by COSEWIC
    - Species ranked by ACCDC as S1, S2, and S3, or any combination thereof (i.e., S3S4 is considered a SOCI)
- SAR: Species listed under provincial or federal endangered species legislation:
    - ESA: All species listed as Endangered, Threatened, or Vulnerable under *ESA* (Nova Scotia, 1998)
    - SARA: All species listed as Endangered, Threatened, or Special Concern under (SARA)

The priority list of species (Appendix G) was first narrowed by broad geographic area and then further narrowed by identifying specific habitat requirements for each species. For example, if a species listed under ESA or SARA required karst topography and no karst topography was present inside the Project Area, this species would not be carried forward to the priority species list. The compilation of a priority species list is habitat driven, rather than observation driven [e.g., an ACCDC record of the Maritime Breeding Bird Atlas (MBBA)]. This is based on the recognition that observation-based datasets are not comprehensive lists of species identified in any given area. As such, the information provided by observation-driven sources are supplementary to the priority species list, rather than forming the basis of the priority species list.

The seasonality of mobile species was not used to screen species into, or out of, the desktop priority species list. All field staff reviewed the desktop evaluation for priority species prior to commencing field work to ensure they were familiar with priority species identification and their status ranks and listings. Status rank and listing definitions are provided in Table 10.1.

Table 10.1: Status Rank and Listing Definitions

Source	Status/Listing	Definition
COSEWIC	Extinct	A wildlife species that no longer exists.
	Extirpated	A wildlife species that no longer exists in the wild in Canada but exists elsewhere.
	Endangered	A wildlife species facing imminent extirpation or extinction.
	Threatened	A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
	Special Concern	A wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats.
	Data Deficient	A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.
	Not at Risk	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
SARA	Extirpated	Species which no longer exist in the wild in Canada but exist elsewhere in the wild.
	Endangered	Species facing imminent extirpation or extinction.
	Threatened	Species which are likely to become endangered if nothing is done to reverse the factors leading to their extirpation or extinction.
	Special Concern	Species which may become threatened or endangered because of a combination of biological characteristics and identified threats.
ESA	Endangered	A species facing imminent extirpation or extinction.
	Threatened	A species likely to become endangered if limiting factors are not reversed.
	Vulnerable	A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events.
	Extirpated	A species that no longer exists in the wild in NS but exists in the wild outside of the province.
	Extinct	A species that no longer exists.
ACCDC	SX	Presumed Extirpated - Species or community is believed to be extirpated from the province. Not located despite intensive searches of historical sites and other appropriate habitats, and virtually no likelihood that it will be rediscovered.
	S1	Critically Imperiled - Critically imperiled in the province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
	S2	Imperiled - Imperiled in the province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

Source	Status/Listing	Definition
	S3	Vulnerable - Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
	S4	Apparently Secure - Uncommon but not rare; some cause for long term concern due to declines or other factors.
	S5	Secure - Common, widespread, and abundant in the province.
	SNR	Unranked - Nation or state/province conservation status not yet assessed.
	SU	Unrankable - Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
	SNA	Not Applicable - A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
	S#S#	Range Rank - A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
	Not Provided	Species is not known to occur in NS.
Breeding Status Qualifiers		
Source	**Qualifier**	**Definition**
ACCDC	B	Breeding - Conservation status refers to the breeding population of the species in the province.
	N	Nonbreeding - Conservation status refers to the non-breeding population of the species in the province.
	M	Migrant - Migrant species occurring regularly on migration at particular staging areas or concentration spots where the species might warrant conservation attention. Conservation status refers to the aggregating transient population of the species in the province.

Several sources were used to further develop the priority species list. These sources are described herein and include observations-based datasets (i.e., ACCDC data) and proximal datasets (e.g., AMO database). Proximal datasets are those that provide information that may support the understanding of priority species in proximity to an area. For example, AMOs may support bat hibernacula, but this dataset does not represent known bat hibernacula or observations of the species.

ACCDC houses the most comprehensive biodiversity database available in Atlantic Canada. ACCDC compiles and distributes georeferenced data on species occurrences to governments, private industry, and academia. ACCDC reports provide important supplementary, observation-driven data sources including sightings of priority species recorded within 5 km and 100 km of a requested reporting area. An ACCDC report (Appendix E) was prepared for the Project on January 6, 2025. The requested reporting area for the Project includes the combined areas around two locations under consideration early in the Project’s development (and includes the Project Area).

When ACCDC prepares a rare species report, they provide the user with georeferenced shapefile points of rare species records within 5 km of a requested reporting area. However, NSNR has classified several species as “location sensitive”, meaning that ACCDC is not permitted to provide specific location data for these species in their reports.

Concern about the exploitation of location-sensitive species precludes inclusion of coordinates in the rare species reports. Location sensitive species in NS include mainland moose (*Alces alces americana*), black ash (*Fraxinus nigra*), blanding’s turtle (*Emyboidea blandingii*), wood turtle (*Glyptemys insculpta*), bat hibernaculum or bat species occurrences, and snake hibernaculum. If any of these species (or associated landscape attributes/known dwellings) are present within 5 km of the requested reporting area, the ACCDC report will simply identify that they are present but will not provide specific location data. Location sensitive species were noted in the ACCDC report for the Project, and Strum consulted with NSNR to obtain additional information on the observations. A summary of regulatory correspondence regarding location sensitive species is included in Section 6.1

The priority species list is referenced across the various biophysical assessments and is provided in Appendix G.

10.2 Terrestrial Vegetation Communities and Flora

10.2.1 Overview

The vegetation community and flora assessment was completed using a combination of desktop resources and field studies to achieve the following objectives:

- Develop a preliminary understanding of the ecological context, vegetation communities, and flora species within and near the Project Area using desktop resources.
- Undertake field surveys to document the range of vegetation communities and flora present within the Project Area, with a focus on sensitive and/or uncommon communities and flora SAR and SOCI (and their supporting habitat).
- Use the information collected during field studies to iteratively update the Project design to avoid or minimize interactions between the Project and priority vegetation communities (defined in Section 10.1.6) and flora SAR and SOCI.
- Apply mitigation, construction, and operational management practices to minimize the effects of the Project on vegetation communities, flora, and their supporting habitat.

10.2.2 Regulatory Context

Several laws and regulations provide protection for vegetation communities and rare flora in NS. Flora species that are listed as Endangered or Threatened receive individual protection from harm and destruction under SARA and/or ESA (including their “habitually occupied spaces”). Protection of SAR habitat is granted through the designation of Critical Habitat and/or Core Habitat. Critical Habitat under SARA refers to specific geographic areas that are identified as essential for the survival or recovery of a species. It is designated for federally Endangered or Threatened species and is enforceable on federal lands. Core Habitat under ESA refers to areas of habitat essential for the long-term survival and recovery of a species. It may be designated on public land (and/or private land where it is deemed that insufficient habitat is available on public land) for provincially Endangered or Threatened species. Restrictions on development are imposed in areas designated as Core or Critical Habitat. Best management practices for SAR are described in federal and provincial species recovery documents, including recovery strategies and plans, action plans, and management plans, as applicable.

Federal and provincial recovery strategies/plans are planning documents intended to identify what is required to stop or reverse the decline of a species, outlined through a series of recovery goals and objectives (ECCC, 2025d; Nova Scotia, 1998). Action plans, developed for species that are federally listed as Endangered, Threatened, or Extirpated, outline activities that are needed to meet the recovery goals and objectives included in species recovery strategies (ECCC, 2025d). Species management plans outline the needs and actions required to keep sensitive species (or a group of species; including those listed as Vulnerable and/or Special Concern) from becoming at greater risk of extinction (ECCC, 2025d; Nova Scotia, 1998).

For certain rare and sensitive lichen species, special management practices have been established to limit disturbance to individuals and their supporting habitat on provincial Crown land, as outlined in the At-Risk Lichens–Special Management Practices (NSNR, 2018a). For example, limitations to the type and extent of land development are prescribed within protected and/or restricted zones around the occurrence of certain rare lichens. Additional regulations aim to protect important landscape features such as wetlands (described in Section 9.2) that support many flora SAR and SOCI.

The *Environment Act* (Nova Scotia, 1995) supports and promotes the protection, enhancement, and use of the provincial environment while maintaining ecosystem integrity and sustainable development. The *Biodiversity Act* (Nova Scotia, 2021) provides for the stewardship, conservation, sustainable use, and governance of biodiversity in NS.

Finally, the Silvicultural Guide for the Ecological Matrix (SGEM) (McGrath et al., 2021) and An Old-Growth Forest Policy for Nova Scotia (NSNR, 2022a) recommend and regulate forestry and forest management practices on provincial Crown land and offer best management practices for forests on private land. The publications provide direction for maintaining forest ecological integrity and identifying and preserving old-growth forests. Old-growth forest stands hold high ecological value and are defined in NS as “area(s) where 20% or more of the basal area is in trees greater than or equal to the reference age for that forest (ecosystem classification) type” (NSNR, 2022a). The Old-Growth Forest Policy requires no net loss of old-growth forests on Crown land and stipulates development limitations within 100 m of a confirmed old-growth stand.

10.2.3 Desktop Review

Several databases were referenced as part of the desktop review to provide an initial understanding of the ecological context, vegetation communities, and flora species present within and near the Project Area. The following references were included in the desktop review:

- Ecological Land Classification for Nova Scotia (Neily et al., 2017)
- Provincial Landscape Viewer (NSNR, 2024d)
- NS Forest Inventory (NSNR, 2021f)
- Wet Areas Mapping (WAM) (NSECC, 2022)
- Canopy Height Model (GeoNOVA, 2024a)
- Old-Growth Policy Layer (NSNR, 2024c)
- ACCDC Data Report (ACCDC, 2025a)
- Boreal Felt Lichen (*Erioderma pedicellatum*) Habitat Layer (NSNR, 2012a)
- MTRI Vole Ears (*Erioderma mollissimum*) and Extant Boreal Felt Lichen GIS Databases (MTRI, 2019a, 2019b)
- SARA Critical Habitat Layers (ECCC, 2025c)
- Priority Species List (Appendix G)

Landscape Characteristics

The Project Area falls within the Nova Scotia Uplands Ecoregion (300) (Drawing 8.1) which spans from the Chignecto Bay in northern mainland NS to Cape Breton Island (approximately 19.8% of the province). The ecoregion is described as being geographically complex and geologically diverse, consisting of summits, plateaus, and lower elevation uplands/lowlands (Neily et al., 2017). Climatic conditions within the ecoregion are influenced by elevation and proximity to water bodies.

Within the Nova Scotia Uplands Ecoregion, the Project Area lies within the Central Uplands Ecodistrict (380) (Drawing 8.1). This ecodistrict is located between the Cobequid Hills (340) and Pictou Antigonish Highlands (330) and is 1,291 km^2 in size (11.8% of the province). It is characterized by gently rolling uplands (up to 270 masl) and contains the headwaters of several river systems. Soils in this ecodistrict tend to be fine to coarse textured, with podzols and luvisols being most common. Acadian softwood forest [red spruce (*Picea rubens*) and hemlock (*Tsuga canadensis*)] occurs on hummocky terrain and gentle slopes, with hemlock typically confined to moist areas (e.g., ravines and slopes). Tolerant mixedwood forests are common on well drained soil with sufficient fertility (Neily et al., 2017). Stand-level disturbances are uncommon in this ecodistrict, which promotes uneven-aged forests with old-growth characteristics. Due to its central location in the province, the Central Uplands Ecodistrict has an important role in maintaining connectivity for biodiversity (Neily et al., 2017).

Vegetation Communities

To characterize the extent and variety of major cover types present on site, a desktop land cover model was developed by merging data from the NS Forest Inventory (NSNR, 2021f), the provincial canopy height model (GeoNOVA, 2024a), and the WAM Database (NSECC, 2022). The resulting polygons were then recategorized into land cover categories. Resulting polygons were also manually adjusted if required based on disturbances visible on aerial imagery (sourced from July 2022). A limitation of the model is that its accuracy depends on the recency and availability of forestry data. The most prominent effect of this limitation is that the extent of land disturbances, such as forest harvesting, may be underestimated in the final land cover model (e.g., if harvesting has occurred since the latest iteration of the Forest Inventory or canopy height model).

The land cover categories and the estimated percent cover of each class within the Project Footprint (the physical areas where direct disturbance can be expected to occur in relation to the Project), the Project Area, and the surrounding 5 km are presented in Table 10.2 and Drawings 10.1A and 10.1B.

Table 10.2: Land Cover Types Within and Near the Project Area

Land Cover Class	Project Footprint		Project Area		5 km from Project Area	
	ha	%	ha	%	ha	%
Cutover[1]	0.00	0.00	0.00	0.00	556.12	5.87
Cutover[1] Wetland	0.00	0.00	0.00	0.00	36.87	0.39
Hardwood Forest	0.00	0.00	4.44	7.94	656.09	6.93
Hardwood Wet Forest	0.00	0.00	0.04	0.07	56.14	0.59
Mixedwood Forest	6.91	55.06	28.14	50.29	2,245.55	23.72
Mixedwood Wet Forest	0.17	1.35	0.90	1.62	304.02	3.21
Open Areas	1.47	11.71	5.99	10.70	1437.76	15.19
Open Wetland	0.00	0.00	0.00	0.00	182.27	1.93
Shrub/Alders	0.00	0.00	0.00	0.00	292.10	3.09
Softwood Forest	3.50	27.89	15.02	26.84	2,869.76	30.31
Softwood Wet Forest	0.50	3.98	1.20	2.14	291.46	3.08
Urban/Developed	0.00	0.01	0.22	0.40	518.63	5.48
Water	0.00	0.00	0.00	0.00	20.73	0.22
Total	**12.55**	**100**	**55.95**	**100.00**	**9,467.50**	**100.00**

[1]Cutover class represents harvested and/or windthrow/dead forest areas as identified in the provincial Forest Inventory database.

The land cover model indicates that approximately half of the Project Footprint and Project Area consist of mixedwood forest, with softwood forest and open areas being the next most abundant cover classes. Based on an inspection of aerial imagery as well as field observations, the actual extent of disturbance due to forest harvesting and access trail development in the Project Area is much greater than what was captured by the land cover model (which indicates 0.00% of the Project Area consists of cutovers). Polygons identified as open areas tended to be associated with existing trails and harvested areas that are present throughout the northern portion of the Project Area (including the Project Footprint). A 4.44 ha polygon classified as hardwood forest was identified in the southeastern portion of the Project Area. In the 5 km surrounding the Project Area, softwood and mixedwood forest cover were the most abundant cover types identified.

The Project Area and adjacent properties consist of privately owned land, such that the Old-Growth Forest Policy is not applicable to the development of the Project.

Flora Species

An ACCDC data report (2025a) was prepared for the Project to identify known occurrences of SAR and SOCI within and near the Project Area. Data included in the report are from the combined 5 km areas around two locations in the Marshdale area considered for development early in the Project planning stage, which represents an area > 5 km from the Project center.

The ACCDC data report (2025a) contains 22 records of 12 vascular plant SOCI and four records of four lichen SOCI (Table 10.3 and Drawing 10.2). None of these records are located within the Project Area, and no flora SAR were identified during this desktop review. The complete ACCDC data report for the Project, which include species records within approximately 100 km of the Project Area, is provided in Appendix E.

Table 10.3: ACCDC Plant and Lichen SOCI Recorded Near the Project Area

Scientific Name	Common Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
Vascular Plants					
Bidens beckii	Water beggarticks	-	-	-	S3S4
Carex lupulina	Hop sedge	-	-	-	S3
Caulophyllum thalictroides	Blue cohosh	-	-	-	S2S3
Fagus grandifolia	American beech	-	-	-	S3S4
Fallopia scandens	Climbing false buckwheat	-	-	-	S3S4
Laportea canadensis	Canada wood nettle	-	-	-	S3
Lilium canadense	Canada lily	-	-	-	S2
Platanthera grandiflora	Large purple fringed orchid	-	-	-	S3
Platanthera orbiculata	Small round-leaved orchid	-	-	-	S3S4
Potamogeton praelongus	White-stemmed pondweed	-	-	-	S3
Sceptridium dissectum	Dissected moonwort	-	-	-	S3
Triosteum aurantiacum	Orange-fruited tinker's weed	-	-	-	S3
Lichens					
Leptogium acadiense	Acadian jellyskin lichen	-	-	-	S3S4
Peltigera ponojensis	Pale-bellied pelt lichen	-	-	-	S1S2
Scytinium teretiusculum	Curly jellyskin lichen	-	-	-	S3S4
Sticta fuliginosa	Peppered moon lichen	-	-	-	S3S4

In addition to the ACCDC data report (2025a), several geospatial resources were reviewed to further assess the potential for encountering rare lichens within and near the Project Area and to inform the approach for field surveys. No records of boreal felt lichen (SARA and ESA Endangered) or vole ears lichen (SARA and ESA Endangered) were identified within 5 km of the Project Area in the rare lichen databases maintained by MTRI (2019a, 2019b). Similarly, no

areas of high potential for boreal felt lichen occurrence were identified within 5 km of the Project Area in the boreal felt lichen potential habitat layer provided by NSNR (2012a).
No buffers for Atlantic Coastal Plains Flora (NSNR, 2024d) or areas of Critical (ECCC, 2025c) or Core Habitat for flora species (including black ash) (NSNR, 2021f)were identified within 5 km of the Project Area.

10.2.4 Field Assessment Methodology

Vegetation Communities

An inventory of terrestrial vegetation communities present in the Project Area was completed during field surveys in 2025 (concurrent with terrestrial flora surveys). Vegetation communities were classified according to the Forest Ecosystem Classification (FEC) for NS (Neily et al., 2023) or, for some non-forested vegetation types, the Natural Landscapes of Maine (NLM) classification system (Gawler & Cutko, 2018), as applicable. The NLM classification is an appropriate supplement to the FEC as the proximity and geographic/climatic similarities with Maine are such that many of the community types described in the NLM also occur in NS. In addition to classifying vegetation communities, observations of the following were recorded if encountered: landscape features such as watercourses, wetlands, and caves/mine shafts; forest stands noted as having old-growth potential; and vegetation communities known to serve as habitat for rare flora or that provide important lifecycle functions for moose, birds, insects [e.g., milkweed (*Asclepias* spp.)] and bats (e.g., large, hollowed trees and snags). Wetland characteristics and terrestrial habitat for fauna are described in detail in Sections 9.2 and 10.2, as applicable.

Flora Species

Vascular flora surveys were completed on June 17, 2025, by a qualified botanist with experience identifying the flora of NS. Meandering transects guided by the desktop review were completed on foot throughout the Project Area with additional time spent in areas expected to have elevated potential to serve as habitat for rare flora (e.g., wetlands, riparian areas, mature forests, and seepages). During the survey, a list of vascular flora species encountered was maintained, and specimens were collected to confirm species identification, if required. Additional information, including GPS coordinates, photographs, and habitat descriptions, was recorded for observations of flora SAR and SOCI, non-native species, and invasives.

A rare lichen survey was completed on August 19, 2025, by a qualified botanist with experience identifying rare lichens in NS. Meandering transects were completed on foot while targeting areas with mature trees appropriate for hosting lichen SAR and SOCI. Potential host trees were visually inspected, focusing on tree trunks, branches, and twigs. Detailed information, including GPS coordinates, photographs, descriptions of habitat and host trees, and estimated number of thalli present, was collected for any lichen SAR or SOCI encountered.

If a lichen specimen could not be readily identified in the field, photos and/or specimens were collected and identified later. Specimens were only collected if they were abundant and were not collected if only one or two individuals were observed. If necessary, collected samples were inspected via microscope and standard chemical spot tests in accordance with Brodo et al. (2001), to determine the species.

In addition to targeted flora surveys, incidental observations of rare flora were also recorded during other biophysical surveys (e.g., wetlands and watercourse assessments), if observed.

10.2.5 Field Assessment Results

Vegetation Communities

Evidence of vegetation disturbance was observed throughout of the Project Area, including much of the Project Footprint, where stumps, regenerating trees, and overgrown roads/access trails were indicative of timber harvesting. Forest cover was observed to be more intact in the southern half of the Project Area, particularly the southeast, where mature hardwood trees were observed.

During vegetation community assessments, four upland communities were identified in the Project Area, comprised of five different vegetation types (Table 10.4). Three wetland vegetation types/communities were also identified. Disturbed, vegetated areas ("Anthropogenic") were largely composed of clearcuts, young regeneration, and overgrown trails/roads. Representative points for the vegetation types/communities observed in the Project Area displayed in Drawing 10.1B. Photos are provided in Appendix H.

Table 10.4: Vegetation Communities Identified within the Project Area

Community Type	Forest Group[1]	Vegetation Types/Community	Representative Survey Point
Upland Communities	Mixedwood	MW7 (Balsam fir – Red maple / Wood sorrel–Goldthread)	VP5, VP6, VP10
	Spruce Hemlock	SH8 (Balsam fir / Wood fern / Schreber's moss)	VP9
	Tolerant Hardwood	TH3 (Sugar maple – White ash / Christmas fern)	VP13, VP14, VP15
		TH8 (Red maple – Yellow birch / Striped maple)	VP1, VP7
	Flood Plain	FP1 (Sugar maple - White ash / Ostrich fern - Wood goldenrod)	VP8
Wetland Communities	Wet Deciduous	WD3 (Red maple / Sensitive fern – Lady fern / Sphagnum)	VP2, VP11
	-	Cattail marsh[2]	VP12
	-	Alder thicket[2]	VP4
Anthropogenic	-	Cutover*	VP3

[1](Neily et al., 2023); [2](Gawler & Cutko, 2018)

Upland Vegetation Communities

Mixedwood (MW) Forest Group

The mixedwood forest group is a diverse group of closed canopy forests that include early to late successional vegetation types. Early successional forests often include red maple, white and gray birch (*Betula papyrifera* and *Betula populifolia*), aspen(s) (*Populus* spp.), and/or balsam fir. Overstory structure, soil attributes, and disturbance history influence the formation of the shrub and herbaceous layer, which is often well developed in areas of deciduous tree cover. Although few fauna occur exclusively in mixedwood forests, their diverse structure and composition creates a range of habitat features for wildlife (Neily et al., 2023). One vegetation type belonging to the mixedwood forest group, MW7, was identified in the Project Area.

Spruce Hemlock (SH) Forest Group

The SH forest group is widespread throughout NS and consists of mid to late successional vegetation types. Canopies are dominated by shade tolerant softwoods such as balsam fir, red spruce, and eastern hemlock. The shrub layer often consists of regenerating conifers and soils are often derived from glacial till. The SH forest group provides habitat for a diverse community of birds and mammals (Neily et al., 2023). One vegetation type belonging to this group, SH8, was observed in the Project Area.

Tolerant Hardwood (TH) Forest Group

This vegetation group is classified as a mid to late successional hardwood vegetation group. The TH vegetation group is generally composed of a closed canopy dominated by sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), yellow birch (*Betula alleghaniensis*), and red maple, with balsam fir as a significant understory species. The shrub layer in TH groups can be extensive and will show high diversity and abundance of ferns. Most TH sites contain soils ranging from fresh to moist. Due to the fertile soils of the TH group, rare plants are often associated with this group (Neily et al., 2023). Two vegetation types belonging to this group, TH3 and TH8, were observed in the Project Area.

Flood Plain (FP) Forest Group

The floodplain forest group occurs on riparian floodplains that are enriched by alluvial sediments. Canopies are usually dominated by hardwood species [sugar maple, red maple, red oak (*Quercus rubra*), white ash (*Fraxinus americana*), ironwood (*Ostrya virginiana*), balsam poplar (*Populus balsamifera*), black cherry (*Prunus serotina*), and white spruce (*Picea glauca*)] and understories are characterized by high species richness. Floodplain forests offer a diverse range of microhabitats for wildlife and have high biodiversity value; plant species diversity in these forests is the highest of all forest groups in NS (Neily et al., 2023). One vegetation type within the floodplain forest group, FP1, was identified in the Project Area.

Wetland Vegetation Communities

Wet Deciduous (WD) Forest Group

Forests within the wet deciduous forest group have water at or near the ground surface throughout most of the growing season, and partly open to closed canopies that are often dominated by red maple. Nutrient availability is moderate to high, with white ash present in areas of elevated soil richness. Natural disturbance within this group can arise from fluctuating water levels, windthrow, and insects and disease. Wet deciduous forests provide habitat for many wildlife groups, including wood turtle, mainland moose, lichens, and various avifauna. One vegetation type in the wet deciduous forest group, WD1, was identified in the Project Area.

Wetlands

Two wetland types were classified in the Project Area following the NLM classification system (Gawler & Cutko, 2018): cattail marsh and alder thicket. Vegetation in cattail marshes tends to be dominated by cattails (*Typha* spp.) and species of shrubs. Standing water is present throughout most or all of the year. Cattail marshes provide suitable nesting and foraging habitat for a variety of birds species (Gawler & Cutko, 2018). Alder thicket wetlands occur in saturated, basin wetlands, often on muck or peat soil. Dense coverage by speckled alder (*Alnus incana*) is common in this wetland type. Alder thickets are a common wetland type and noted as providing habitat for common bird species (Gawler & Cutko, 2018).

Further details on the types, classification, and overall function of wetlands in the Project Area are provided in Section 9.2.

Anthropogenic

The vegetation community classification guides used during field assessments focus on “natural” communities and do not describe human-disturbed landscapes, as they are often dynamic and unpredictable. Several cutover areas and overgrown access trails/roads were observed, particularly throughout the northern portion of the Project Area (visible in Drawing 10.4). The extent of field-observed disturbance was greater than reflected in the land cover model developed in the desktop review (visible in Drawing 10.1B). Young, regenerating softwood tree species were common in these areas.

Summary of Vegetation Types

The Project Area is comprised of several vegetation types within the MW, SH, TH, FP, and WD forest groups, as well as wetlands and cutover/disturbed areas. The vegetative communities identified within the Project Area are common in the surrounding landscape and the province. Of the forest groups identified in the Project Area, the FP, TH and SH forest groups are the most likely to host elevated species diversity and/or rare species. Wetlands, which are known to support rare flora and fauna, are considered in Section 9.2.

Flora Surveys

A total of 119 vascular plant and one lichen species were identified during field surveys (including targeted flora surveys and incidental observations). Of these, one vascular plant SOCI (American beech; S3S4), one vascular plant SAR (black ash; COSEWIC and ESA Threatened, S1S2) and one lichen SOCI (appressed jellyskin lichen; *Scytinium subtile*; S3S4) were identified in the Project Area (Table 10.5 and Drawing 10.4). A complete list of field-observed vascular plant species is provided in Appendix H.

Table 10.5: Flora SAR and SOCI Observed in Project Area

Scientific Name	Common Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank[1]	Occurrences (Individuals) Observed
Vascular Plants						
Fagus grandifolia	American beech	-	-	-	S3S4	4 (> 20)
Fraxinus nigra	Black ash	Threatened	-	Threatened	S1S2	1 (4)
Lichens						
Scytinium subtile	Appressed jellyskin lichen	-	-	-	S3S4	2 (Several thalli)

[1](ACCDC, 2025b)

American beech

American beech was assigned a NS S-Rank of S3S4 in Marsh 2022. Although historically a common tree species in the province, the health of American beech trees has been affected by beech bark disease in NS. Beech bark disease has reduced the potential for the species to mature into an overstory tree, and its ecological role has thus shifted to that of an understory or intermediate species (NSNR, 2021c). Juvenile American beech are locally abundant and were observed in four locations within the Project Area (over 20 individuals observed; Drawing 10.3).

Black ash

Black ash is a broadleaved hardwood that can reach heights of 15 to 27 m and typically does not exceed more than 50 cm in circumference (COSEWIC, 2018a). Branches are stout, oppositely arranged, and form a narrow, open crown. The leaves of this species possess 7 to 11 stalkless leaflets arising from stems possessing a gap between the terminal and lateral buds (COSEWIC, 2018a). A distinguishing feature of black ash from other ash species is its rounded-, as opposed to comma-shaped leaf scar. The bark of the tree, a defining characteristic especially in younger stems, develops from a rounded, soft, and corky to easily flaked off scaly strips at maturity (COSEWIC, 2018a).

With 51% of the species global range located within Canada, the distribution of black ash extends from western Newfoundland to southeastern Manitoba and North Dakota (COSEWIC, 2018a). In NS, the species is primarily found in poorly drained areas, such as swampy woodlands, or in seepages along the banks of moving water, such as streams and rivers (Roland et al., 1998). The primary threats to the species in NS include habitat loss and alteration, and the invasive emerald ash borer beetle (NSNR, 2015). Core Habitat for black ash, which includes all known occurrences of black ash and their surrounding habitat (plus a buffer) has been described in NS (NSNR, 2021b). One occurrence of black ash, a group of four individuals, was identified in the northeastern portion of the Project Area (not shown on Drawing 10.3 due to location sensitivity). While the specific location of these observations is not published within the EARD/IPD, the occurrence data will be shared with NSECC, NSNR, and ECCC-CWS on submission of this document.

Appressed Jellyskin Lichen

Appressed jellyskin lichen is a minutely foliose lichen, 0.5 to 1.5 cm wide, with coalescing lobes. Apothecia are common and form orange-brown to black concave discs. This species occurs on rotting bark, wood, or detritus, and is known to be present throughout temperate Europe and North America. Two occurrences of appressed jellyskin lichen were observed in the Project Area, with several thalli observed on two white ash host trees (Drawing 10.3).

Invasive Flora

Eight species considered to be invasive in NS (NSECC, 2012) were identified during vascular flora surveys:

- Black knapweed (*Centaurea nigra*)
- Colt's foot (*Tussilago farfara*)
- Creeping buttercup (*Ranunculus repens*)
- Field bindweed (*Convolvus arvensis*)
- Field sow thistle (*Sonchus arvensis*)
- Glossy buckthorn (*Frangula alnus*)
- Multiflora rose (*Rosa multiflora*)
- Reed canary grass (*Phalaris arundinacea*)

10.2.6 Effects Assessment

Project-Terrestrial Vegetation Communities and Flora Interactions

Project activities, primarily those that involve vegetation clearing or earth moving, have the potential to impact terrestrial vegetation communities and flora (Table 10.6). These activities will result in the loss of vegetation communities and flora individuals, and/or impacts relating to the creation of edge habitat (i.e., edge effects).

Table 10.6: Potential Project-Terrestrial Vegetation Communities and Flora Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Site Preparation	X
Placement of Sedimentation and Erosion Control Measures	-
Clearing and Grubbing	X

Project Phase	Potential for Interaction
Civil Site Construction	-
Equipment Installation	-
Interconnections for Services	-
Removal of Temporary Works and Site Restoration	X
Commissioning	-
Operations and Maintenance	
Facility Operation and Maintenance	-
Site Management	X
Decommissioning and Rehabilitation	
Infrastructure Removal	-
Site Reclamation	X

Assessment Boundaries
The LAA for terrestrial vegetation and flora includes the Project Area and a 5 km buffer (Drawing 10.4). This distance was selected to investigate the potential impacts of vegetation clearing within the broader landscape in consideration of edge effects and dispersal distances of flora species. The RAA is not applicable.

Assessment Criteria
The VC-specific definition for magnitude is as follows:

- Negligible: No loss of vegetation communities and/or flora.
- Low: Small loss of vegetation communities and/or flora.
- Moderate: Moderate loss of vegetation communities, moderate loss of flora, and/or loss of SOCI flora.
- High: High loss of vegetation communities and/or the loss of SAR flora.

Effects

Loss of Vegetation Communities
Vegetation communities will be impacted by land clearing and ground disturbance for the Project. The major landcover types within the Project Footprint, Project Area, and LAA are described in Table 10.4. Overall, it is expected that approximately 12.55 ha of land will be cleared for the Project Footprint, with much of this area observed to have been previously disturbed by forest harvesting (including access roads and trails). The main cover type that will be cleared within the Project Footprint is mixedwood forest, which is relatively common within the LAA (approximately 2,245.55 ha were classified as mixedwood forest in the LAA, or 23.72%).

To assist in quantifying the impacts of the Project on terrestrial vegetation communities and rare flora habitat, areas of potential sensitive flora habitat were modelled for the Project

Footprint, Project Area, and LAA. The model inputs include the interpreted locations of mature forest stands (based on interpreted canopy height), land with a southwest, south, or southeast aspect, slopes > 10°, and/or riparian areas such as floodplains. The final model layer depicts areas greater than 1,000 m^2 where one or more of these conditions exist.

Although the potential sensitive flora habitat model was not formally validated using field observations, all field-observed flora SOCI (but not flora SAR) occurred within or directly next to classified areas. A total of 2.12 ha of modelled potential sensitive flora habitat was identified within the Project Footprint, with 10.86 ha and 2,398.28 ha available within the Project Area and LAA, respectively (Table 10.7 and Drawing 10.5). The potential sensitive flora habitat within the Project Footprint represents 19.52% of the amount within the Project Area, and < 1% of the amount modelled within the LAA.

Table 10.7: Potential Sensitive Flora Habitat Within and Near the Project Area

Project Footprint		Project Area		LAA	
ha	%	ha	%	ha	%
2.12	16.89	10.86	19.41	2,398.28	25.33

Direct loss of vegetation due to the Project will be limited to the Project Footprint (12.55 ha) and impacts to intact and sensitive flora habitat will be minimized by the placement of the Project within an area that has been previously disturbed by recent forest harvesting. No land clearing is expected to occur in the southeastern portion of the Project Area where mature, intact forest stands were identified. The vegetation expected to be cleared for the Project consists of vegetation communities that are common to the surrounding environment.

Loss of Flora Individuals

A loss of flora individuals due to the Project will mainly occur during activities requiring ground disturbance and vegetation clearing. The results of the desktop review and subsequent field surveys were used to select the location of Project Footprint to maximize avoidance of field-observed priority flora species. The flora SAR observed in the Project Area includes black ash, and flora SOCI include American beech and appressed jellyskin lichen. Direct loss of all known occurrences of flora SAR and most occurrences of flora SOCI have been avoided through placement of the Project Footprint.

One of the two occurrences of appressed jellyskin lichen is located within the Project Footprint (near WL3) and is expected to be lost due to vegetation clearing for the Project. The second occurrence is located at the edge of the Project Area (over 300 m from the Project Footprint) and will not be impacted by the Project.

The four field-observed occurrences of American beech are in the southern portion of the Project Area and > 40 m from the Project Footprint. All of these occurrences will be avoided by the Project.

An occurrence of black ash (a flora SAR) consisting of four individual trees was observed in a field delineated wetland in the northern portion of the Project Area. The trees were observed to have several dead branches and be in moderate health. Individual black ash and their host wetland (plus a buffer) will be avoided by the Project. Black ash is tolerant of short-term seasonal or annual hydrological fluctuations, and its habitat represents a specific, narrow niche where individuals will not be out-competed by either more flood-tolerant species [e.g., alders (*Alnus* spp.)] or upland species (e.g., red maple) (COSEWIC, 2018a; Tardif & Bergeron, 1992, 1999).

Habitat requirements for black ash are thus defined by a stable hydrological regime averaged over years that provides adequate soil moisture and conditions where competition is limited. The wetland containing black ash is a shrub swamp characterized by a high water table and the presence of surface water. No impacts to surface water flows are expected to result from the Project, and, as direct impacts to the wetland containing black ash will be avoided (plus a buffer), it is expected that the existing hydrological regime will largely be maintained. Water withdrawal and effluent release associated with the Project will be designed to prevent impacts to this black ash and its associated habitat.

While direct impacts to flora SAR and most flora SOCI are being avoided through placement of Project Infrastructure, vegetation clearing within the Project Footprint will result in the loss of non-priority flora individuals, including (but not limited to) those described in Appendix G. Aside from flora SAR and SOCI, the range of flora encountered within the Project Area are common to the region and can be expected to occur in areas of similar habitat within the LAA.

Edge Effects

Vegetation clearing for the Project will create new edge habitat which will alter the environmental conditions experienced by vegetation communities and flora individuals near the Project Footprint. Effects associated with the creation of edge habitat (i.e., edge effects) can include changes in microclimate conditions such as light, moisture, and temperature (Braithwaite & Mallik, 2012; Hamberg et al., 2009). These factors can cause shifts in vegetation community composition as species better adapted to new conditions may outcompete those suited to interior forests (Hamberg et al., 2008). Similarly, the creation of edge habitat may create opportunities for the introduction and spread of invasive species and dust, and/or accidental compaction by vehicles and equipment. These effects also have the potential to result in altered vegetation community composition and to impact the growth of flora individuals.

The degree to which flora and vegetation communities are impacted by edge effects varies depending on the species and specific site conditions. Edge effects from activities such as forest harvesting can have a negative impact on lichens that extends up to 50 m into the forest (Rheult et al., 2002). Lichens and non-vascular plants are particularly sensitive to edge effects and air quality due to being unable to regulate and maintain their water content (Boudreault et al., 2008; Nash, 2008). Effects on forest species can also include altered species composition and increased susceptibility to disturbances such as wind throw (Boudreault et al., 2008).

Multiple studies have shown that edge effects relating to drying of plant material can be observed from 15 m to 70 m (Gauslaa et al., 2019).

To estimate the extent of new edge habitat created by the Project, a 100 m buffer was added to the Project Footprint. The area within 100 m of White Hill Road, on the western side of the Project Area, was removed from the resulting buffer, as this area already experiences edge effects due to the existing road. The amount of new edge habitat is estimated to be 10.70 ha and includes the eastern side of the Project Footprint, extending partially to the LAA (Drawing 10.6). This area includes clearcuts and access trails which themselves create, and do not experience edge effects; the delineated area in Drawing 10.6 is thus expected to be a conservative estimate. Vegetation communities and flora individuals within this area may experience the indirect effects described in the following sections. Field-observed flora SOCI within this buffer include three occurrences of American beech.

Altered Habitat Conditions

Forest edges, generally adjacent to clearings or disturbances, are exposed to stronger winds, more light exposure, and drier conditions than interior forest areas. These areas are often vulnerable to both natural and anthropogenic disturbances and may have altered vegetative structure and composition compared to forest interiors. For instance, tree mortality is higher along a forest edge due to windthrow, and edges are more directly exposed to pollutants, changes in humidity, light, and sound (Boudreault et al., 2008). Changes in the composition of understory plants are also possible due to altered microclimate and soil properties (Hamberg et al., 2008).

Lichens and non-vascular plants are especially sensitive to edge effects and changes in air quality due to being unable to regulate and maintain their water content (Boudreault et al., 2008; Nash, 2008). In some cases, this can result in the death of individual lichens. No occurrences of lichen SAR or SOCI were observed within the edge habitat expected to be created by the Project.

Invasive Species

The introduction and/or spread of invasive species may also occur as a result of Project Activities, with potential impacts for native vegetation communities. Non-native species, often accidentally introduced into a landscape by humans, can become invasive when they cause harm to the environment, economy, or human health through rapid reproduction and out-competing native species (Rutledge et al., 2024). Industrial projects can lead to the introduction of invasive species in two main ways:

- Increased access to remote areas with equipment carrying seeds, spores, or other reproductive materials from non-native species.
- Revegetation of cleared land with non-native seed mixes.

Seeds and roots from invasive species may be brought into the Project Area on construction vehicles, equipment, or clothing of on-site personnel. Research has shown that following the creation of edge habitat, invasive species have the potential to spread into interior forests (McDonald & Urban, 2006). A total of eight species considered to be invasive in NS have been documented in the Project Area, and these and/or other non-native species could spread beyond the Project Footprint by wind dispersal or runoff.

Dust Deposition

Dust deposition may impact flora within and near the Project Footprint when fugitive dust is generated by road traffic on unpaved areas, crushing material, and blasting (if required for the Project). Dust from unpaved areas has been found to change the pH of lichen substrates (i.e., the tree bark they are attached to) and impact individual health and species richness (Degtjarenko, 2016). The effects of dust on flora may depend on the duration of exposure; one study found that lichens along a gravel road were unaffected within two years, but significant changes to the communities were observed after 10 years (Farmer, 1993). Vascular plants may be impacted by dust through reductions in photosynthesis and leaf diffusion (Thompson et al., 1984).

It is expected that impacts to vegetation communities and flora relating to dust deposition will be greatest during the construction phase (short-term duration), particularly during prolonged periods of dry weather.

Mitigation

To minimize potential effects to terrestrial vegetation communities and flora, the following mitigation measures will be implemented.

Loss of Vegetation Communities

- Continue to maximize the use of previously disturbed areas during the detailed design phase, including previously harvested forests and existing roads/trails.

Loss of Plant Species

- Avoid direct impacts to flora SAR and supporting habitat.
- Maximize avoidance of flora SOCI to the extent possible.
- Educate Project personnel about flora SAR and SOCI in the Project Area, particularly black ash, including the locations of known occurrences.
- Consult with NSNR and NSECC if an unexpected flora SAR is encountered during construction activities.

Edge Effects

- Revegetate disturbed areas and exposed soils using native seed mixes, where feasible.
- Implement an ESCP to help limit the spread of invasive species.
- Mitigate for dust creation using best management practices such as reduced speed limits and dust suppression (e.g., road watering).
- Inspect and clean equipment of debris to prevent the introduction and spread of non-native species.
- Minimize the use of herbicides as much as possible.

Monitoring

No monitoring programs specific to terrestrial vegetation communities or flora are recommended.

Conclusion

After mitigations, predicted residual effects on terrestrial vegetation communities and flora are characterized in Table 10.8.

Table 10.8: Terrestrial Vegetation Communities and Flora Residual Effects

VC Interaction	Mitigations	Nature of Effect	Geographic Extent	Magnitude of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
Loss of vegetation communities	Continue to maximize the use of previously disturbed areas.	**Adverse**	**LAA**	**Low** A small loss of vegetation communities and/or flora	**Single Event** Effects may occur during initial construction	**Long Term** Effects are expected to extend beyond the decommissioning phase	**Partially Reversible** Reversal of vegetation loss is not expected to be possible, but areas will be allowed to revegetate following decommissioning.	Not Significant
Loss of flora individuals	Avoid loss of all flora SAR and reduce indirect impacts to the extent possible.	**Adverse**	**LAA**	**Moderate** Moderate loss of vegetation communities, moderate loss of flora, and/or loss of SOCI flora	**Single Event** Effects may occur during initial construction	**Long Term** Effects are expected to extend beyond the decommissioning phase	**Irreversible** Reversal of flora individuals is not expected to be possible.	Not Significant
Edge effects	Use native seed mix when revegetating cleared areas Inspect and clean equipment if	**Adverse**	**LAA**	**Low** A small loss of vegetation communities and/or flora	**Single Event** Effects may occur during initial construction	**Long Term** Effects are expected to extend beyond the decommissioning phase	**Irreversible** Reversal of habitat alteration is not expected to be possible	Not Significant

VC Interaction	Mitigations	Nature of Effect	Geographic Extent	Magnitude of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
	required to reduce the introduction/spread of non-native species. Implement ESCP. Mitigate for dust.							

Effects Assessment Ratings (Refer to Table 4.2 for definitions)
Nature of Effect: Adverse, Positive
Magnitude: Negligible, Low, Moderate, High
Geographic Extent: LAA, RAA
Frequency: Single Event, Intermittent, Continuous
Duration: Short Term, Medium Term, Long Term
Reversibility: Reversible, Irreversible, Partially Reversible

10.3 Terrestrial Fauna

10.3.1 Overview

The terrestrial fauna assessment was completed using a combination of a combination of desktop resources and field studies to achieve the following objectives:

- Gain an understanding of the potential terrestrial fauna and fauna habitat types present within and near the Project Area using desktop resources.
- Identify fauna SAR and SOCI with elevated potential to occur in the Project Area.
- Undertake surveys for different taxa of terrestrial fauna to document the species present within the Project Area, particularly SAR and SOCI.
- Use the information collected through field studies to update the Project design to avoid or minimize interactions between Project infrastructure components and terrestrial fauna and their supporting habitat, particularly SAR and SOCI.
- Apply mitigation, construction, and operational management practices to minimize effects to terrestrial fauna.

10.3.2 Regulatory Context

Several laws and regulations provide protection for terrestrial fauna and their habitats in NS. Fauna species that are listed as Endangered or Threatened receive individual protection from harm and destruction under SARA and/or ESA (including their "habitually occupied spaces"). Protection of SAR habitat is granted through the designation of Critical Habitat and/or Core Habitat. Critical Habitat under SARA refers to specific geographic areas that are identified as essential for the survival or recovery of a species. It is designated for federally Endangered and Threatened species and, for most fauna, is enforceable on federal lands (designation of Critical Habitat differs for migratory birds and aquatic species). Core Habitat under ESA refers to areas of habitat essential for the long-term survival and recovery of a species. It may be designated on public land (and/or private land where it is deemed that insufficient habitat is available on public land) for provincially Endangered and Threatened species. Development restrictions are imposed in areas designated as Core and/or Critical Habitat. Best management practices are described in federal and provincial species recovery documents, including recovery strategies and plans, action plans, and management plans, as applicable.

Federal and provincial recovery strategies/plans are planning documents intended to identify what is required to stop or reverse the decline of a species, outlined through a series of recovery goals and objectives (ECCC, 2025d; Nova Scotia, 1998). Action plans, developed for species that are federally listed as Endangered, Threatened, or Extirpated, outline activities that are needed to meet the recovery goals and objectives included in species recovery strategies (ECCC, 2025d). Species management plans outline the needs and actions required to keep sensitive species (or a group of species; including those listed as Vulnerable and/or Special Concern) from becoming at greater risk of extinction (ECCC, 2025d; Nova Scotia, 1998).

The *Canada Wildlife Act* (Canada, 1985) provides a framework for the creation of protected wildlife areas, and the *Wildlife Act* (Nova Scotia, 1989b) provides policies and programs to maintain the diversity of wildlife species at levels of abundance required to meet specific management objectives. The *Wildlife Act* (Nova Scotia, 1989b) includes a clause for the protection of den/habitation of a furbearer [48(3)].

The *Biodiversity Act* (Nova Scotia, 2021) provides a framework for the creation of Biodiversity Management Zones used for conservation and sustainable biodiversity values. Finally, the *Canadian Environmental Protection Act*, 1999 (Canada, 1999) and the *Environment Act,* S.N.S. 1994-95, c. 1 both provide measures for the protection of the environment and pollution prevention.

10.3.3 Desktop Review

The desktop review included referencing the following sources:

- ACCDC data report (2025a)
- Provincial Landscape Viewer (NSNR, 2024d)
- NS Special Management Practice (SMP) Zones
- Locations of Known Bat Hibernacula in NS (Moseley, 2007)
- NS Geoscience Atlas – Abandoned Mine Openings (NSNR, 2024a)
- Priority Species List (Appendix G)

An ACCDC data report (2025a) was prepared for the Project to identify known occurrences of SAR and SOCI within and near the Project Area. Data included in the reports are from the combined 5 km areas around two locations considered for development early in the Project planning stage, which includes an area > 5 km from the Project center.

The ACCDC data report (2025a) indicates that no occurrences of terrestrial fauna SAR or SOCI have been recorded within the Project Area. The report includes a record of a “bat hibernaculum or bat species occurrence”, and confirmation that this record is related to a bat SAR occurrence > 1 km from the Project Area was provided by an NSNR representative (S. Spencer, personal communication, February 5, 2025; precise location details pertaining to bat species are not provided directly by ACCDC due to their location sensitivity).

Two records relating to two turtle SAR, eastern painted turtle (*Chrysemys picta picta*), and snapping turtle (*Chelydra serpentina*), are included in the ACCDC data report (2025a) (Table 10.9). These records are related to occurrences approximately 1 to 2.5 km from the Project Area boundary (Drawing 10.2). Records of wood turtle (*Glyptemys insculpta*) and their Critical Habitat have also been documented within 1 km of the Project Area (S. Spencer, personal communication, February 5, 2025; wood turtle is a location sensitive species).

Finally, the ACCDC data report (2025a) also indicates that occurrences of two terrestrial invertebrate SOCI (three records) and one invertebrate SAR [yellow-banded bumble bee (*Bombus tericola*); two records] have been recorded within 5 km of Project Area (Table 10.9

and Drawing 10.2). The complete ACCDC data report for the Project, which contains species occurrence records within approximately 100 km of the Project Area, is provided in Appendix E.

Table 10.9: ACCDC Terrestrial Fauna SAR and SOCI Recorded Near the Project Area

Scientific Name	Common Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
Mammals					
Myotis sp.	Bat species occurrence	Endangered[1]	Endangered[1]	Endangered[1]	S1[1]
Herpetofauna					
Chelydra serpentina	Snapping turtle	Special Concern	Special Concern	Vulnerable	S3
Chrysemys picta picta	Eastern painted turtle	Special Concern	Special Concern	-	S4
Glyptemys insculpta	Wood turtle	Threatened	Threatened	Threatened	S2
Invertebrates					
Bombus terricola	Yellow-banded bumblebee	Special Concern	Special Concern	Vulnerable	S3
Cecropterus pylades	Northern cloudywing	-	-	-	S3S4
Polygonia interrogationis	Question mark butterfly	-	-	-	S3B

[1]Location sensitive "bat occurrence" records represent observations of little brown myotis/little brown bat (*Myotis lucifugus*), northern myotis/long-eared myotis (*Myotis septentrionalis*) or tri-colored bat/eastern pipistrelle (*Perimyotis subflavus*), which share the same COSEWIC assessment status, SARA and ESA listings, and provincial S-Rank.
Source: (ACCDC, 2025a)

The review of SMP zones for terrestrial fauna using the Provincial Landscape Viewer (NSNR, 2024d) indicates that the Project Area is not within 5 km of any SMP zones for terrestrial fauna (e.g., lynx buffer, marten range patches, mainland moose concentration areas). The Significant Habitat layer (NSNR, 2024d) indicates that the Project Area is within 5 km of several watercourses relating to "Species at Risk" (no other habitat features identified), and these features are described in further detail below in relation to wood turtles.

In addition to the review of observational datasets, an additional review of desktop resources was conducted for a subset of priority fauna species with potential to occur in the Project Area.

Mammals

Mainland Moose

Mainland moose is a terrestrial fauna SAR listed as Endangered under ESA with an estimated population between 700 and 1,000 individuals (NSNR, 2021g). The primary threats to mainland moose include habitat loss, conversion, and degradation, and loss of habitat connectivity (NSNR, 2021g). A representative from NSNR confirmed that the Project Area is located approximately 2 km north of Core Habitat for mainland moose (S. Spencer, personal communication, February 5, 2025). Core Habitat represents areas that meet specific habitat and landscape connectivity requirements, and that are essential for the long-term survival and recovery of the species (NSNR, 2021g). Approximately 22,300 km^2 of Core Habitat for mainland moose has been identified in NS; these lands have yet to receive legal protection under ESA. Based on mapping included in the species' recovery plan, the habitat suitability index (HSI)/roads criteria of the Core Habitat nearest the Project is classified as "4, 5, or 6" (NSNR, 2021g). Areas with high HSI scores (4 to 9) and low road density within Core Habitat are considered priority areas for species protection and management

No records relating to mainland moose wintering were identified within 5 km of the Project Area in the Significant Habitats database (NSNR, 2024d).

Bat Species

Seven bat species have been documented in NS (Broders et al., 2003). Of these, four are resident species that reside in the province year-round, and three are migratory species that overwinter in the southern United States. Resident species consist of the little brown myotis [also known as little brown bat (*Myotis lucifugus*)], northern myotis [also known as northern long-eared bat (*M. septentrionalis*)], tri-colored bat [also known as eastern pipistrelle (*Perimyotis subflavus*)], and big brown bat (*Eptesicus fuscus*). Migratory species consist of the eastern red bat (*Lasiurus borealis*), hoary bat (*L. cinereus),* and silver-haired bat (*Lasionycteris noctivagans*). Three resident species (the little brown myotis, northern myotis, and tri-colored bat) are protected federally and provincially under SARA and ESA. The designation of these species was driven by the emergence of white-nose syndrome (a disease caused by the fungus *Geomyces destructans*), which was first detected in Canada in 2010 and led to a 90% population decline in NS by 2013 (COSEWIC, 2013).

To determine the likelihood of encountering bat species or suitable bat habitat in the Project Area, the locations of known bat hibernacula and AMOs were reviewed, and terrestrial habitat modelling was conducted.

Locations of Known Bat Hibernacula

An overview of known and recorded bat hibernacula in NS (dating to the end 2005) is available from Moseley (2007). No hibernacula from this curatorial database are present within 5 km of the Project Area.

Abandoned Mine Openings

According to the British Columbia Ministry of Environment and Climate Change Strategy, Ecosystems Branch (2019), AMOs may serve as overwintering bat habitat if they have a depth greater than 30 m, are of a suitable type (i.e., shafts, slopes, or adits), and remain accessible (i.e., not flooded or ponded and not having an intact fill, cap, or plug). Based on a review of the provincial AMO Database (NSNR, 2024a), there is one AMO within 5 km of the Project Area, approximately 425 m northeast of the Project Area boundary (Drawing 10.2). Although the type of AMO is suitable (shaft), it is classified as flooded and is an insufficient depth to support overwintering bats (6.5 m depth).

Terrestrial Habitat Modelling

A terrestrial habitat modelling exercise was conducted to estimate the amount of potential suitable maternity roosting and foraging habitat for bat species within the Project Area and surroundings. Potential habitat areas were identified using publicly available data, including a LiDAR derived canopy height model (Fisher et al., 2006; Rijal et al., 2012), crown land harvest archives (NSNR, 2025a), provincial landcover mapping (NSNR, 2025b), and provincial old growth mapping (NSNR, 2025c). Suitable maternity roosting habitat consists of mixedwood or hardwood stands with a height of at least 15 m [indicating a diameter at breast height of ≥ 30 cm (Rijal et al., 2012)] which have a potential old growth rank of 8 or higher (as high ranking stands tend to have attributes that align with suitable maternity roosting habitat). Suitable foraging habitat consists of a 30 m buffer of edge habitat, open areas, including wetland edges, lake edges, roads, barrens, brush, and harvest edges (COSEWIC, 2013; Jantzen & Fenton, 2013).

A limitation of this model is that harvesting may have taken place within and near the Project Area in recent years which is not reflected in datasets incorporated into this model. For this reason, the terrestrial habitat model developed is considered to overestimate suitable maternity roosting habitat, as some habitat is likely to have been harvested and thus is no longer suitable to support maternity roosting.

A comparison of potential suitable habitat within the Project Footprint, Project Area, and surrounding 5 km is provided in Table 10.10.

Table 10.10: Availability of Suitable Habitat Within and Surrounding the Project Area

Potential Suitable Habitat Type	Project Footprint (ha)	Project Area (ha)	5 km around the Project Area (ha)
Maternity Roosting Habitat	1.10	5.47	396.23
Foraging Habitat	1.37	3.27	3,520.35
Roosting and Foraging	0.00	0.75	50.87

A limited amount of suitable roosting, foraging, and combined habitat was identified within the Project Area. Potential maternity roosting habitat was primarily located in the southern portion of the Project Area where vegetation was observed to be more intact and mature during vegetation community assessments (described in Section 10.1.5). An observation of potential suitable roosting habitat was also recorded in this area during biophysical field surveys (described in further detail below). Potential suitable foraging areas were identified along existing edge habitat associated with roads. A limited amount of combined suitable habitat for both maternity roosting and foraging was identified in the Project Area. Overall, suitable habitat for bat species appears to be relatively abundant throughout the 5 km surrounding the Project Area (Table 10.10).

Herpetofauna

Of the herpetofauna SAR and SOCI that occur in NS, wood turtles were identified as having potential to occur in the Project Area. Eastern painted turtles and snapping turtles (both listed as SARA Special Concern) may also occur within the Project Area.

Wood Turtles

Wood turtles are a SAR (Threatened) under SARA and ESA with a provincial S-Rank of S2. Wood turtles are a habitat generalist but are associated with perennially flowing watercourses within forested habitat and require specific conditions for nesting (gravel beaches or bars) and overwintering (pools). The most significant threats to the species include road development and land use practices (NSNR, 2020c). Core and Critical Habitat has been identified for wood turtles in NS (NSNR, 2020c), and SMPs have been established that include activity and development limitations in the area (up to 200 m) surrounding wood turtle occurrences (NSNR, 2012b).

The review of the Significant Habitat Database on the Provincial Landscape Viewer (NSNR, 2024d) identified several watercourses relating to “Species at Risk” within 5 km of the Project Area (no records located within the Project Area). Subsequently, a Significant Species and Habitat Database layer provided by NSNR (2024e) was reviewed to determine if these records were relating to occurrences of wood turtle. A total of 48 records associated with wood turtle were identified within 5 km of the Project Area (Drawing 10.2).

During the NS SMP Zone review a wood turtle SMP buffered stream was identified to the south of the Project Area. The 200 m buffer around this stream coincides with the southern portion of the Project Area and may be connected to field identified watercourses (described further in Section 9.1).

10.3.4 Field Assessment Methods

Direct observations of terrestrial fauna or signs thereof within the Project Area were recorded and photographed, when feasible, during all biophysical field surveys, with particular emphasis on terrestrial fauna SAR. For example, surveyors conducting flora surveys were instructed to note features that may serve as suitable habitat for bat species (e.g., large, hollowed trees and snags that may serve as maternity roosting habitat) and record any observations of milkweed (which serves as breeding habitat and is an important food source for monarchs). Opportunistic observations relating to wood turtle, including identification of suitable nesting (gravels beaches or bars) and overwintering habitat (pools), were recorded during watercourse assessments, if encountered. Surveyors conducting spring migration surveys for avifauna were instructed to also complete meandering, non-standardized area searches for pellet group inventories. Signs of terrestrial fauna may include features such as dens, nests, eggs/shell fragments, scat, tracks, and evidence of foraging.

In addition to recording observations relating to fauna during biophysical surveys, two trail cameras were also placed within the Project Area to record the presence of terrestrial fauna in the absence of human observers. The cameras were placed near existing, overgrown trails in the northwestern (TC73) and southeastern (TC78) portions of the Project Area. The trail cameras were deployed on April 11, 2025, and last offloaded October 11, 2025 (data collection on-going).

10.3.5 Field Assessment Results

The Project Area consists of a mix of disturbed and intact forest cover and contains field delineated watercourses and wetlands (described in further detail in Sections 10.1, 9.1, and 9.2, respectively). The mix of disturbed and intact forested habitat (including mature hardwood forest) within the Project Area suggests the site may be suitable for a range of terrestrial fauna.

Terrestrial fauna observations and signs recorded during biophysical assessments included: an observation of coyote (*Canis latrans*) scat; two observations of red squirrel (*Tamiasciurus hudsonicus*), and one observation of white-tailed deer. In addition to coyotes and white-tailed deer, images captured by trail cameras indicate that the Project Area is also frequented by black bears (*Ursus americanus*) and bobcats (*Lynx rufus*) (Table 10.11; Appendix I).

Table 10.11: Summary of Trail Camera Observations

Trail Camera Location	Animals Observed	Number of Observations*
TC-73	White-tailed deer	5
TC-78	White-tailed deer	35
	Coyote	2
	Bobcat	1
	Black bear	7

*A general rule of one-hour between observations was used to separate individual observations.

The wildlife observations recorded by trail cameras suggests that wildlife were more active in the area around TC-78, in the southeastern portion of the Project Area, than at TC-73 in the northwest (Drawing 10.3). Although both trail cameras were placed near overgrown trails, land cover surrounding TC-78 is more intact, consisting of hardwood forest. White-tailed deer were the most commonly observed mammal species at TC-78, and the only species observed at TC-73 (Table 10.10). Black bear were the next most common species at TC-78, where two observations of coyote and one observation of bobcat were also recorded.

Mainland Moose

Mainland moose use wetlands for thermal refuge in summer, and aquatic plants such as pondweed (*Potamogeton* spp.) and yellow pond lily (*Nuphar lutea*) provide important nutritional foraging options. Wetlands, particularly isolated areas surrounded by water, are also important calving areas as they provide protection and nutrients for calves and cows.

Seven wetland features were delineated within the Project Area during wetland assessments in 2025 (Section 9.2), consisting of treed and shrub swamps. All of these are located near road features and/or disturbed areas and are not expected to be suitable calving habitat (no isolated areas or wetlands surrounding by open water were identified during field assessments). No evidence of mainland moose was observed during any biophysical assessments.

Bat Species
During flora surveys, a large, hollowed tree (American beech) in the southern portion of the Project Area was as noted having potential to serve as bat roosting habitat (vegetation point VP14 on Drawing 10.3). The tree was visually inspected to the extent possible, and no bats or bat signs were observed.

Wood Turtles
Wood turtles require deep, clear, pooling water for their overwintering habitat and sand or gravel banks of rivers or streams (with intense sun exposure) for their nesting habitat. No herpetofauna species or signs thereof (e.g., nests, eggs, shell fragments) were observed in the Project Area during biophysical surveys, and no suitable areas of overwintering or nesting habitat for wood turtles were observed.

Invertebrates
There were no observations of invertebrate SAR or SOCI recorded during the field assessments and no milkweed plants were observed during botany surveys.

10.3.6 Effects Assessment

Project-Terrestrial Fauna Interactions
Project activities, primarily those that involve earth moving or vegetation removal, have the potential to impact terrestrial fauna and their habitat (Table 10.12). Impacts to terrestrial fauna due to the Project are expected to include a loss and alteration of fauna habitat, sensory disturbance (e.g., due noise, light), and increased human-wildlife interactions.

Table 10.12: Potential Project-Terrestrial Fauna Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Site Preparation	X
Placement of Sedimentation and Erosion Control Measures	X
Clearing and Grubbing	X
Civil Site Construction	X
Equipment Installation	X
Interconnections for Services	X
Removal of Temporary Works and Site Restoration	X
Commissioning	X
Operations and Maintenance	
Facility Operation and Maintenance	X
Site Management	X

Project Phase	Potential for Interaction
Decommissioning and Rehabilitation	
Infrastructure Removal	X
Site Reclamation	X

Assessment Boundaries

The LAA for fauna includes the Project Area and a 5 km buffer (Drawing 10.4). This distance was selected as it captures the home ranges and short distance migrations of terrestrial fauna between habitat types. The RAA is not applicable.

Assessment Criteria

The VC-specific definition for magnitude is as follows:

- Negligible: No loss of fauna habitat or impacts to fauna through sensory disturbance.
- Low: Small loss of fauna habitat or small sensory disturbance to fauna.
- Moderate: Moderate loss of fauna habitat and/or moderate impacts to fauna through sensory disturbance. Impacts do not occur in sensitive habitats or during sensitive life history stages.
- High: High loss of fauna habitat or high impacts to fauna through sensory disturbance and/or alteration occurs in sensitive habitats or during sensitive life history stages.

Effects

Loss or Alteration of Fauna Habitat

During the site preparation and construction phase, impacts to habitat used by terrestrial fauna will result from vegetation clearing and ground disturbance within the Project Footprint. It is expected that 12.55 ha of land will be cleared for infrastructure placement, which will alter or reduce the overall availability of habitat for terrestrial fauna within the Project Area. Vegetation clearing has the potential to remove habitat used by wildlife for various life history stages such as nesting, breeding, calving, amongst others. Some species will be more tolerant of these changes. For example, bears, which have been observed in the Project Area, are tolerant of some human activity but will avoid features when frequency of human use is too high (Jalkotzy et al., 1997).

Wildlife populations may leave an area during construction and return once it is complete (Buckmaster et al., 1999). It is likely that fauna individuals that currently use habitat within the Project Footprint will be displaced by the Project into the surrounding environment. The review of landcover types and vegetation communities described in Section 10.1 indicates that the overall composition of cover types within the Project Footprint is similar to the types and amounts available in the LAA. This suggests that vegetation clearing for the Project will result in a low level of habitat loss relative to the LAA. The results of the desktop review, field assessments, and potential habitat modelling also suggest that the Project Area does not contain a large amount of suitable habitat for terrestrial fauna SAR (e.g., mainland moose, bat species, or wood turtles).

The Project is likely to result in an increase in forest edges and decreased forest quality for species that rely on interior forest conditions. It is expected that approximately 10.70 ha of new edge habitat will be created by the Project (described in Section 10.1.6). The creation of edge habitat may lead to increased predation of young terrestrial fauna species as these areas provide low quality cover. Edge habitat is already present throughout the Project Area and surroundings in the form of roads, pipelines, and harvested areas, such that new edge habitat due to the Project is expected to represent a small increase within the LAA.

Sensory Disturbance

Terrestrial fauna will likely experience sensory disturbance due to the Project. Potential sources of disturbance include anthropogenic noise and lighting, which may occur during all Project phases (but to varying degrees). The effects of sensory disturbance on fauna may include increased stress, avoidance, and other changes in fauna behaviour.

Noise

Noise will be generated during all phases of the Project. During site preparation and construction, and decommissioning and rehabilitation, noise will be generated by heavy equipment and may be generated blasting (if required). During operations and maintenance, noise will be generated by stationary equipment at the Facility as well as by site traffic.

Anthropogenic noise can induce a variety of responses in wildlife, including avoidance behaviour (Ware et al., 2015), stress (Kight & Swaddle, 2011), and altered communication (Duquette et al., 2021). For instance, sound levels above 55 dBA during the day and 45 dBA at night-time have been shown to cause physiological stress and behavioural changes to wildlife (Environment Canada, 2009). Similarly, a literature review conducted by Shannon et al. (2016) found that an increase in stress and decrease in reproductive success in terrestrial mammals has the potential to occur at noise levels ranging from 52 to 68 dBA. For bat species, a threshold of 88 dB has been identified for road traffic, beyond which bats are likely to avoid flying over roads, thus limiting both their habitat availability and overall range (Fensome & Mathews, 2016).

An assessment of construction noise and operational noise modelling for the Project (described in Section 7.3) suggests that sound levels in the Project Area during construction will range from 77 to 115 dBA. A Community Noise Impact Assessment, completed by Hatch (2025a), found that unmitigated operational noise may exceed 45 dBA within an area ranging from 15 m to 500 m from the Project Footprint. Project-related noise will be reduced in the LAA (with increasing distance from the Project Footprint) such that the greatest potential for noise-related to disturbance to terrestrial fauna will occur near the Project.

Based on the sound levels expected to be generated by the Project, sensory disturbance to terrestrial fauna within the Project Area due to noise is likely, particularly during the construction phase when sound levels will be highest. During the operations and maintenance phase, avoidance by terrestrial fauna due to noise may still occur but will have a lower impact due the reduced overall sound levels produced. There may be localized avoidance by fauna within the Project Area, however, the LAA will continue to provide suitable and accessible terrestrial habitat.

Light

Artificial lighting has the potential to cause sensory disturbance in terrestrial fauna. The response of fauna species to artificial lighting is variable and can include disorientation, attraction or avoidance to lights (Longcore & Rich, 2004). Fauna behavioural changes can affect the success of foraging, reproduction, and communication between individuals (Longcore & Rich, 2004). During the site preparation and construction phase, the use of lighting (e.g., floodlights) will be limited as construction will occur during daytime hours. Once the facility is operational, the use of nighttime lighting will be limited to the amount required to ensure safe access and operation of the Facility.

Exhaust

Uniquely among terrestrial fauna species, bats have the potential to interact with the 30 m, non-flaring exhaust stack that is planned for the Facility. Exhaust stacks are known to cause injury and mortality to avifauna (Avery, 1979; ECCC, 2015; Erickson et al., 2005; Riley et al., 2012), and bat species could be similarly affected. The temperature of the exhaust emitted from the stack will reach 452ºC, which would be lethal to bats if they were to fly through or near the exhaust. The risks of the exhaust stack to bats can be reduced by covering the stack with a screen or exclosure to prevent bats from entering, nesting, or perching on the stack. Mitigations to reduce the risks of the stack for avifauna, which also apply to bat species, are described in Section 10.3.7.

Human-Wildlife Interactions

It is likely that the Project will result in increased potential for human-wildlife interactions as an increase in Project personnel and vehicle traffic will occur during site preparation and construction, as well as operations and maintenance. In particular, human-wildlife interactions (including injury or mortality) may result from the development of new roads and other graded/gravel areas as some species may be attracted to these areas for travel, nesting, or foraging.

During the construction phase, an increase in vehicle and equipment traffic will occur within the Project Footprint, with vehicle traffic also increasing slightly within the LAA (as construction personnel travel to and from the Facility). An estimated 100 to 125 personnel will be on-site during the site preparation and construction phase. During the operations and maintenance phase, traffic volumes and the presence of Project personnel will both decrease but remain elevated compared to current site use (approximately 10 to 15 personnel will be present on-site during operations). Although the presence of humans and vehicles/equipment will be highest during construction, some fauna may be particularly avoidant of the Project Footprint during this phase as noise from machinery and equipment will be highest. Opportunistic scavengers that have been observed in the Project Area, such as coyotes and black bears, may be drawn to the elevated activities.

Developed areas that remain active during the operations and maintenance phase, such as roads and parking areas, pose an elevated risk for human-wildlife interactions. Road construction for the Project is expected to include a new road leading to the Facility from White Hill Road, a short road segment leading to the substation, and a circular road around the permitter of the Facility. A parking area for Project personnel will also be located in the Project Footprint. Roads may have a negative impact on animals attracted to these areas, including turtles which may use gravel shoulders for nesting. No individuals or signs of turtles were observed during field assessments.

Road development and use also pose a risk to bats. Low-flying species, such as *Myotis* spp., account for the majority of recorded vehicle-related mortality events, with juveniles being particularly vulnerable due to their reduced maneuverability and preference to forage in low-clutter habitats (Fensome & Mathews, 2016; Lesiński, 2007). Mortality is likely to be higher in areas where roads intersect suitable habitat, such as watercourses or forest edges (Fensome & Mathews, 2016; Lesiński, 2007; Medinas et al., 2013). Traffic volumes on roads within the Project Area are not expected to be high at night, thus roads are unlikely to pose a high risk to bats.

Mitigation

To address the abovementioned effects to terrestrial fauna, the following mitigation measures will be implemented:

Loss or Alteration of Fauna Habitat

- Maintain existing vegetation cover whenever possible and minimize overall areas of disturbance.
- Implement spill prevention and ERP Plans to protect fauna and their habitat from accidental spills.
- Store hazardous and non-hazardous waste in designated areas, in appropriate containers to reduce potential for spills and to prevent attracting wildlife.
- Revegetate or allow for natural revegetation of cleared areas to the extent possible.
- Target clearing activities outside the active bat window if possible (May 1 to October 31).

Sensory Disturbance

- Use noise controls (e.g., mufflers) on machinery, equipment, etc. during the site preparation and construction phase.
- Limit use of lighting to the amount necessary to ensure safe operation within the Project Area, with the recognition that excessive lighting can be disruptive to wildlife.
- Maximize the use of motion activated lighting, where possible.

Human-Wildlife Interactions

- Install traffic signs to alert site users of project speed limit (20 km/hr) and the potential for wildlife in the area.

- Provide wildlife awareness training to site personnel to reduce interactions between personnel and wildlife.
- Prohibit harassment and feeding of wildlife by Project personnel.

Monitoring

No monitoring programs specific to terrestrial fauna are recommended.

Conclusion

After mitigations, predicted residual effect on terrestrial fauna are characterized in Table 10.13.

Table 10.13: Terrestrial Fauna Residual Effects

VC Interaction	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
Loss or Alteration of Fauna Habitat	Maintain existing vegetation cover and minimize overall areas of disturbance. Implement spill prevention and ERP plans. Ensure safe handling of waste to prevent attracting wildlife. Revegetation or allow for natural revegetation of cleared areas. Target clearing activities outside the active bat window.	**Adverse**	**Low** Small loss of fauna habitat or small sensory disturbance to fauna	**LAA**	**Single Event** Impacts to fauna habitat will occur during the construction phase	**Long Term** Habitat loss and alteration will extend until after decommissioning	**Partially Reversible** Some habitat loss or alteration may be reversed by site rehabilitation	Not Significant
Sensory Disturbance	Use noise controls on equipment/machinery. Limit use of lighting to the amount necessary	**Adverse**	**Low** Small loss of fauna habitat or small sensory	**LAA**	**Intermittent and Continuous** Varies depending on	**Medium Term** Sensory disturbance due to noise and light will end after decommissioning	**Reversible**	Not Significant

VC Interaction	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
	to ensure safe operation.		disturbance to fauna		source and Project phase			
Human-wildlife Interactions	Install traffic signs to alert site users of speed limits and the potential for wildlife in the area. Provide wildlife awareness training to site personnel. Prohibit harassment and feeding of wildlife by Project personnel.	**Adverse**	**Low** Small loss of fauna habitat or small sensory disturbance to fauna	**LAA**	**Intermittent** Interactions may occur during all phases, but only intermittently	**Medium Term** Human-wildlife interactions will end after decommissioning	**Reversible**	Not Significant

<u>Effects Assessment Ratings (Refer to Table 4.2 for definitions)</u>
Nature of Effect: Adverse, Positive
Magnitude: Negligible, Low, Moderate, High
Geographic Extent: LAA, RAA
Frequency: Single Event, Intermittent, Continuous
Duration: Short Term, Medium Term, Long Term
Reversibility: Reversible, Irreversible, Partially Reversible

10.4 Avifauna

10.4.1 Overview

A desktop review was completed to gather information on avian species and associated habitat in the LAA. Objectives were as follows:

- Assess and characterize the potential for avian species and important habitat.
- Use the information collected to inform mitigation and management practices.

10.4.2 Regulatory Context

Applicable federal and provincial laws and regulations relating to the protection of avian species include:

- Federal Legislation:
  - SARA
  - MBCA (Canada, 1994)
  - Migratory Birds Regulations, 2022

- Provincial Legislation:
  - NS *Wildlife Act* (Nova Scotia, 1989b)
  - *ESA* (Nova Scotia, 1998)

The MBCA protects all migratory birds while they are present in Canadian jurisdiction, including on land, in the air, and on the water. The Migratory Birds Regulations, 2022, protect nests of species listed under Schedule 1 for a set period. Detected nests lists under Schedule 1 can be registered under the Abandoned Nest Registry to begin the waiting period. Under the provincial *Wildlife Act*, it is illegal to destroy or disturb bird nests or eggs without a permit. The *ESA* and SARA prohibit harm to listed SAR along with their habitually occupied spaces and core/critical habitat.

The Project is also driven by policies, guidelines, and standards that provide guidance on the development of the Project and the survey design. These guidance documents and policies include:

- ECCC-CWS(Atlantic Region) – Wind Energy & Birds EA Guidance Update (ECCC-CWS, 2022).
- Wind Turbines and Birds - Updated Guidance for EA and Monitoring (ECCC, 2018).
- Wind Turbines and Birds - A Guidance Document for EA (ECCC-CWS, 2007b).
- Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds (ECCC-CWS, 2007a).
- NSE Wetland Conservation Policy (NSECC, 2019b).
- The Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSECC, 2009a).
- Various NSNR SMP and ECCC SAR Management Plans.

SAR are species listed under SARA and/or ESA. SOCI are species not listed under provincial or federal legislation [i.e., listed only by COSEWIC and/or ranked by ACCDC as S1, S2, or S3, or any combination thereof (e.g., S2S3)].

Status ranks (S-Ranks) from ACCDC (2025b) were used to determine whether a species is a SOCI, based on the time of year in which the species was observed. Species ranks may differ depending on whether a species is observed in the breeding season (B), the non-breeding season (N), or during migration (M). For example, American robin (*Turdus migratorius*) is ranked S5B, S3N, indicating that this species is considered a SOCI in NS during its non-breeding (wintering) season but not during its breeding season.

10.4.3 Desktop Review

Desktop information was used to gain insight into protected avifauna habitats, species utilization of the area, and to identify SAR/SOCI potentially occurring at or within the LAA, which is a 5 km boundary around the Project Area (Drawing 10.7). ACCDC data are shown on Drawing 10.2. The desktop review focused primarily on SAR and species with nests protected year-round under the Migratory Bird Regulations. The following sources were consulted during the review:

- NS Parks and Protected Areas (NSNR, 2009c, 2013)
- Important Bird Areas (IBAs)
- Canadian Wildlife Service Migratory Bird Sanctuaries (MBS)
- Maritimes Breeding Bird Atlas (MBBA, 2008)
- ACCDC (ACCDC, 2025a)
- CWS Waterbird Colony Database (Atlantic Region; Wilhelm & Mahoney, 2021)
- SARA Critical Habitat Layers
- Birds Canada NatureCounts open database
- Citizen Science: eBird and iNaturalist

Nova Scotia Parks and Protected Areas

NS parks and protected areas identified within approximately 5 km of the Project Area include:

- Hopewell Conservation Lands
- Drug Brook Nature Reserve

The Hopewell Conservation Lands is located about 4.6 km northwest of the Project Area boundary (Drawing 10.7). This area spans approximately 5 ha in Pictou County, NS (NSNR, 2013).There was no citizen science data (i.e. iNaturalist, eBird) found for SAR and SOCI in this park within the last five years.

The Drug Brook Nature Reserve is located just beyond 5 km southwest of the Project Area boundary (Drawing 10.7). The reserve spans approximately 34 ha in Pictou County, NS (NSNR, 2009c). The reserve contain mature red spruce and hardwood forest (NSNR, 2009c).

There was no citizen science data (i.e. iNaturalist, eBird) found on SAR and SOCI in this park within the last five years.

Important Bird Areas

There are no IBAs within 5 km of the Project Area.

Migratory Bird Sanctuaries

There are no MBSs within 5 km of the Project Area.

Maritimes Breeding Bird Atlas

The PA is contained within the MBBA 10 x 10 km map squares 20NR13 and 20NR23 (Birds Canada, 2013) (Appendix J). In the most recent edition of the MBBA (2006-2010), 93 and 102 species were identified in 20NR13 and 20NR23, respectively. Of those species, 11 are SOCI and nine are SAR. The SAR identified in these squares include:

- Bank swallow (*Riparia riparia*): "Threatened" (*SARA*), "Threatened" (COSEWIC), "Endangered" (*ESA*), "S2B" (ACCDC)
- Barn swallow (*Hirundo rustica*): "Threatened" (*SARA*), "Special Concern" (COSEWIC), "Endangered" (*ESA*), "S3B" (ACCDC)
- Bobolink (*Dolichonyx oryzivorus*): "Threatened" (*SARA*), "Special Concern" (COSEWIC), "Vulnerable" (*ESA*), "S3B" (ACCDC)
- Canada warbler (*Cardellina canadensis*): "Threatened" (*SARA*), "Special Concern" (COSEWIC), "Endangered" (*ESA*), "S3B" (ACCDC)
- Chimney swift (*Chaetura pelagica*): "Threatened" (*SARA*), "Threatened" (COSEWIC), "Endangered" (*ESA*), "S2S3B, S1M" (ACCDC)
- Common nighthawk (*Chordeiles minor*): "Threatened" (*SARA*), "Special Concern" (COSEWIC), "Threatened" (*ESA*), S3B (ACCDC)
- Eastern wood-pewee (*Contopus virens*): "Special Concern" (*SARA*), "Special Concern" (COSEWIC), "Vulnerable" (*ESA*), "S3S4B" (ACCDC)
- Evening grosbeak (*Coccothraustes vespertinus*): "Special Concern" (*SARA*), "Special Concern" (COSEWIC), "Vulnerable" (*ESA*), "S3B, S3N, S3M" (ACCDC)
- Olive-sided flycatcher (*Contopus cooperi*): "Special Concern" (*SARA*), "Special Concern" (COSEWIC), "Threatened" (*ESA*), "S3B" (ACCDC)

Of the SAR identified, confirmed breeding evidence (as per the MBBA breeding evidence codes) was observed for Canada warbler, bobolink, and barn swallow. Probable breeding evidence (as per the MBBA breeding evidence codes) was observed for chimney swift. It should be noted that pileated woodpecker (*Dryocopus pileatus*), which is a species listed under Schedule 1 of the Migratory Bird Regulations and whose nests are protected for at least 36 months, was also detected.

Atlantic Canada Conservation Data Centre

The ACCDC (2025a) data report for the Project identified 34 records of avian SAR and 52 records of avian SOCI within 5 km of the Project Area (Appendix E). The SAR records included:

- Bank swallow: Three records (one within 1.6 km, and two within 5.1 km)
- Barn swallow: Four records (one within 3.2 km, and three within 3.3 km) with two records of confirmed breeding evidence (nest with eggs and adult leaving or entering nest)
- Bobolink: Six records (one within 3.2 km, four within 3.3 km, and one within 4.9 km) with two records of probable breeding evidence (pair and registration of territorial song) and one record of confirmed breeding evidence (adult carrying food to nestlings)
- Canada warbler: One record within 3.3 km with confirmed breeding evidence (adult carrying food to nestlings)
- Chimney swift: Three records (two within 3.3 km and one within 4.9 km) with two records of probable breeding evidence (courtship or display and territorial song)
- Common nighthawk: Five records (two within 3.2 km, two within 3.3 km, and one within 4.1 km) with four records of probable breeding evidence (agitated behaviour or anxiety calls, pair, and courtship or display)
- Eastern wood-pewee: Three records (two within 3.3 km, and one within 3.1 km) with one record of probable breeding evidence (territorial song)
- Evening grosbeak: Four records (one within 3.2 km, and four within 3.3 km) with one record of confirmed breeding evidence (nest building or carrying nest material)
- Rusty blackbird (*Euphagus carolinus*): One record within 3.3 km with probable breeding evidence (agitated behaviour or anxiety calls)
- Olive-sided flycatcher: Three records (two within 4.3 km, one within 4.4 km) with one record of probable breeding (territorial song)

The ACCDC report did not identify any location-sensitive avian species.

The bank swallow records within 5 km of the Project Area were observed in mixedwood forest and a fen (ACCDC, 2025a). Neither of these areas appear to be near bank swallow's preferred nesting habitat of excavated burrows in riverbanks, coastal bluffs, and manmade features such as sand pits for nesting (ECCC, 2022f); however, these habitat features on a small-scale are difficult to ascertain from the desktop review. It is more likely the ACCDC records are foraging or travelling individuals, which is further supported by the lack of probable and confirmed breeding evidence for this species' records (ACCDC, 2025a). The Project Area contains similar mixedwood habitat, but no nesting habitat features for this species.

The barn swallow records were all located in mixedwood forest roughly 350 m away from visibly open areas (ACCDC, 2025a). Barn swallows prefer natural cliffs and banks or man-made structures for nesting, and open landscapes such as open woodlands, fields, parklands, and shorelines for foraging insect prey (ECCC, 2022d). The Project Area contains sections of open woodlands and small meadows and is approximately 250 m from agricultural fields with man-made structures.

Bobolink records were located in mixedwood forest roughly 350 m away from visibly open areas, and in agricultural fields (ACCDC, 2025a). This species prefers open fields such as prairies, meadows, and agricultural fields for foraging and breeding (ECCC, 2022a). As noted for barn swallow, such features occur within and 250 m from the Project Area.

The Canada warbler record was located in mixedwood forest (ACCDC, 2025a). This species prefers moist forests and wetlands with an understory dominated by cinnamon fern, alder, and other deciduous shrubs in NS as its breeding habitat (ECCC, 2016a). The Project Area contains similar wetlands and forest habitats that may provide suitable breeding habitat.

Two chimney swift records were located in mixedwood forest and one in an agricultural field near the East Pictou River (ACCDC, 2025a). Chimney swifts either nest in large hollow trees (> 50 cm in diameter at breast height) or man-made structures like chimneys, wells, silos, vent pipes, and abandoned buildings (ECCC, 2023b). Foraging habitat is dependent on insect prey availability but can include urban, rural, and agricultural areas; waterbodies and wetlands; and forests. The Project Area contains some large hollow snags and is 600 m away from manmade structures for chimney swift nesting potential. Additionally, the Project Area may include suitable foraging habitat given the presence of wetlands and different forest types that may support flying insect prey populations for this species.

Four of the common nighthawk records were located in mixedwood forest surrounded by forestry and agricultural activity, and one on a road within 100 m of a bog (ACCDC, 2025a) Common nighthawk preferred nesting habitat includes open areas like clearcuts, fields, forest openings, burned area, and gravel roads; whereas their foraging habitat includes a wide range of open areas, with open water and areas near manmade light sources that attract insects (e.g., floodlights, streetlights) being particularly favourable for congregations of large foraging flocks (ECCC, 2016b). The Project Area contains open features such as man-made and natural clearings from previous forestry activity.

Eastern wood-pewee were recorded in mixedwood and hardwood forests (ACCDC, 2025a) . This species is noted to prefer mixedwood and hardwood forest of intermediate to mature ages with open understory for its breeding habitat (NSNR, 2022b) The open understory conditions preferred by the species for foraging tend to occur at forest edges. Similar forest habitats with edge and clearing features are found within the Project Area.

All evening grosbeak records were located in mixedwood forest surrounded by forestry and agricultural activity (ACCDC, 2025a). This species' prefers breeding and foraging habitat of softwood-dominant forest with some mixedwood features (ECCC, 2022b). This species is also highly irruptive, meaning it is prone to ranging far in search of preferred breeding and foraging habitat (ECCC, 2022b); hence, there is a small likelihood of it occurring within the Project Area given that the Project Area contains some areas of softwoods.

The one rusty blackbird record was located in mixedwood surrounded by forestry and agricultural activity (ACCDC, 2025a). Rusty blackbird prefer wetlands with open-water features that are bordered by softwood trees or shrubs for breeding (ECCC, 2015b). All wetland habitat within the Project Area lacks open-water coverage; hence, making it unlikely that this species occurs within the Project Area.

Two of the olive-sided flycatchers were reported in mixedwood-dominant forest, one in hardwood-dominant forest, and two in a swamp-fen complex (ACCDC, 2025a). This species tends to prefer open areas with large snags for breeding (COSEWIC, 2018c), which can be found in wetland or forest habitat. Whilst similar forest habitat exists in the Project Area, there is limited areas with large snags and large open areas; hence, there is a low likelihood of finding this species breeding within the Project Area.

CWS Atlantic Waterbird Colony Database

The CWS Atlantic Waterbird Colony Database identified no waterbird colonies within 5 km of the Project Area.

Species at Risk Act Critical Habitat Layers

There is no SARA Critical Habitat within 5 km of the Project Area.

Birds Canada NatureCounts Open Database

Birds Canada NatureCounts open database identified dozens of migratory bird species within approximately 5 km of the Project Area over the last five years. Observations of both SOCI and SAR birds have been identified within approximately 5 km of the Project Area between 2020 and 2025. The SAR birds that were detected include Eastern wood-pewee, bobolink, olive-sided flycatcher, Canada warbler, evening grosbeak, and barn swallow (Birds Canada, 2025b). Pileated woodpecker, which is a species listed under Schedule 1 of the Migratory Bird Regulations, were also identified within 5 km of the LAA. Confirmed breeding evidence was noted for Eastern wood-pewee and probable breeding evidence for bobolink.

Citizen Science

Within the last five years, iNaturalist had no recordings SAR within 5 km of the PA. Pileated woodpecker, however, was identified. There were no eBird hotspots within 5 km of the Project Area within the last five years.

10.4.4 Field Survey Methodology

Several survey methods were employed to assess avian abundance, species diversity, and SAR habitat availability within the Project Area throughout the year. Prior to conducting field surveys, a preliminary desktop survey design (i.e., using provincial aerial imagery, forestry, wetland/watercourse, depth-to-water, and topography databases/GIS layers from Google Earth, NSECC, and NSNR) was developed to target suitable habitat for avifauna species or groups of interest (e.g., migratory birds, breeding birds, shorebirds, waterfowl, raptors, and nightjars).

Survey methods followed the protocols recommended in CWS's Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds (2018) and Wind Energy and Birds EA Guidance Update (2022), unless otherwise stated. These documents are the most recent guidelines for bird survey design in Canada and provided guidance in the following areas: survey site selection, survey location spacing, number and duration of surveys, and season selection. Based on the guidelines listed above and the results of the desktop review, the following survey types were selected:

- Spring and fall migration point count (PC) surveys
- Breeding bird PC surveys and area searches
- Nightjar surveys

Survey dates were selected to provide representative coverage of important stages of avian phenology. Survey rounds were spaced apart by a minimum of 10 days to assist with capturing bird phenology as it changes throughout the seasons (e.g., early versus late migrants, early versus later breeders, etc.). The guidelines mentioned above were used to select survey dates with ideal weather conditions. A breakdown of survey type, dates, and survey rationale is provided in Table 10.14.

Table 10.14: Avian Surveys Completed within the Project Area

Survey Type	Survey Rounds	Survey Locations	Dates	Rationale	Reference for Survey Dates and Methods
Spring migration	2	4 PC	Round 1: April 11, 2025 Round 2: May 14, 2025	Most migratory birds return to Canada to breed between late-March and mid-May. Surveys were completed between April and May to capture both early and late season migrants, as well as early breeding activity.	Wind Turbines and Birds - A Guidance Document for EA (ECCC-CWS, 2018)
Breeding bird	2	4 PC and 3.5 km of non-standardized area searches	Round 1: June 6, 2025 Round 2: July 3, 2025	June is peak breeding season in NS. Surveys were completed in early-June and in early-July to capture the peak season and late season breeders.	Maritimes Breeding Bird Atlas (Birds Canada, 2025a)

Survey Type	Survey Rounds	Survey Locations	Dates	Rationale	Reference for Survey Dates and Methods
Nightjar	2	2 PC	Round 1: June 4, 2025 Round 2: July 2, 2025	The goal of these surveys was to understand the use of the land within the PA by common nighthawk and Eastern whip-poor-will (the two nightjar species commonly found in NS). Surveys were completed in June and July. Suitable habitat for common nighthawk is thought to be present within the PA based on desktop review.	Canadian Nightjar Survey Protocol (Knight et al., 2019)
Fall migration	3	4 PC	Round 1: August 21, 2024 Round 2: September 17, 2024 Round 3: October 23, 2024	Most migratory birds begin to migrate south for the winter months between August and September. Surveys began in mid-August and extended into late-October to capture both early and late season migrants.	Wind Turbines and Birds - A Guidance Document for EA (ECCC-CWS, 2018)

Survey methods varied for each survey type and are described in detail below.

Spring and Fall Migration Point Count Surveys

PC surveys were used as the primary means of assessing avian abundance and species diversity within the Project Area during spring and fall. Four PC locations were surveyed in spring and fall. Two rounds of spring migration surveys were completed between early-April and mid-May 2025, and three rounds of fall migration surveys were completed between late-August and late-October 2025.

PC locations were spaced a minimum of 500 m apart to reduce the likelihood of double-counting individuals, as outlined in the document Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds (ECCC-CWS, 2018). PC locations were selected in a variety of habitats within the Project Area, with a goal of achieving representative coverage of all major habitat types. Habitat types included hardwood, softwood, and mixedwood forest stands; cleared, disturbed, or edge habitat areas; and wetlands (Drawing 10.1A and 1B; Table 1, Appendix J).

Point count surveys were 10 minutes in duration, with the survey period beginning at or within half an hour of sunrise. Effort was made to complete surveys by 10 am to observe the most active time of day for passerine species. All visual and auditory observations of birds were recorded during each survey, along with relevant behavioural information such as breeding evidence and flyover activity. The estimated distance to target, cardinal direction, and number of individuals were recorded for each bird identified. Survey opportunities were maximized for clear weather (i.e., low or no precipitation) and minimal wind within the appropriate timeframe. Habitat descriptions were collected at each PC location during the first visit to each PC. Incidental observations were recorded when notable species or behaviours were observed outside of the allotted PC survey duration or away from designated PC locations (e.g. while travelling through site, while completing other fieldwork on site, etc.).

Breeding Bird Surveys

Breeding bird surveys consisted of a combination of standardized PC surveys and non-standardized area searches. PC survey methods for breeding bird surveys mirrored spring and fall migration surveys, described in the previous section above.

The objective of these surveys was to assess breeding activity and habitat utilization of birds within the Project Area during the breeding season, with a focus on SAR. In NS, the core breeding season for migratory species runs from early June to late July for most species (Birds Canada, 2025a). Two rounds of breeding bird PC surveys were completed in early June and early July 2025.

Breeding bird area searches were conducted following the completion of PC surveys. The area searches were meandering, non-standardized transects that focused on notable habitat features (e.g. wetlands, watercourses, potential SAR habitat, or areas where SAR were previously identified) or areas that could benefit from additional survey coverage (i.e., lacking PCs). All bird observations were recorded in the same manner as in PC surveys, but with a focus on identifying novel species, SAR/SOCI, and breeding evidence. Area searches were completed for approximately one to two hours, depending on bird activity and complexity of habitats.

During PC surveys and area searches, signs of breeding behaviour (e.g. agitated behaviour, carrying food, nest building, the presence of a pair of birds in suitable nesting habitat, etc.) were documented. Breeding evidence codes from the MBBA (Birds Canada, n.d.) were used to determine breeding status based on field observations. Breeding evidence was described using the following four categories:

- Observed: The species was observed in its breeding season, but no breeding evidence was observed.

- Possible: Breeding is possible based on species' presence in suitable nesting habitat during its breeding season or based on the presence of a male singing in suitable nesting habitat in its breeding season.
- Probable: Breeding is probable based on strong indicators of breeding behaviour (e.g. nest building, agitated behaviour, the presence of a pair in suitable nesting habitat during the breeding season, etc.)
- Confirmed: Breeding is confirmed based on the observation of behaviour which indicates the presence of an active nest (e.g. recently fledged young, a nest containing eggs or young, nest building behaviour, an adult carrying food, distraction display, etc.

Nightjar Surveys

Common nighthawk and Eastern whip-poor-will (*Antrostomus vociferus*) are aerial insectivores belonging to the nightjar family and are considered SAR under SARA and NS ESA. Both species are known to utilize a wide range of open to semi-open habitats for nesting, including forest openings, logged areas, fields, barrens, bogs, and burned-over areas (COSEWIC, 2018b; ECCC, 2018a). Common nighthawk may be present in the Project Area based on the desktop review (see Section 10.1.3); however, there are no records of Eastern whip-poor-will within or near the Project Area.

Two rounds of targeted nightjar surveys were completed in June and July 2025. Survey methodology was based on the Canadian Nightjar Survey Protocol (Knight et al., 2019). Two survey locations were selected in habitats suitable for nightjar nesting and/or foraging, or that provided unobstructive views of the sky for observing nightjars (Drawing 10.8). As per Knight et al. (2019), survey locations were spaced a minimum of 1.6 km apart to avoid overlapping observations. Surveys were completed between one hour before sunset and two hours after sunset, when nightjars are most active. Survey dates were optimized for good weather conditions (i.e. low wind and no precipitation) and moon phase (within seven days before or after a full moon).

Surveys were six minutes in duration and were passive, meaning no playback or other techniques to illicit a response from birds was used. During the survey period, surveyors recorded the number of nightjars observed as well as the behaviour of each (i.e., calling, wing-boom display). Surveyors recorded wind strength level, noise level, cloud cover, precipitation, number of passing cars, and visibility of the moon. Any other bird species observed (particularly novel species or SAR/SOCI) were recorded as incidentals to assist with providing breeding bird diversity and abundance information.

10.4.5 Results

10.4.5.1 Spring Migration Point Count Surveys

Two rounds of spring migration point count surveys were completed at four PC locations within the SA on April 11 and May 14, 2025. A total of 161 birds were observed across all survey rounds representing 30 species, including one bird unidentified to the species level (Table 2 and 3, Appendix J).

The most observed species were black-capped chickadee (*Poecile atricapillus;* 11.18% of all birds observed), American robin (8.70%), blue jay (*Cyanocitta cristata*; 6.83%), American goldfinch (*Spinus tristus*; 6.21%), and dark-eyed junco (*Junco hyemalis;* 5.59%). No SOCI or SAR were observed. A notable observation was a small migrating flock of Canada geese near PC3.

The first round of spring migration surveys observed 90 birds representing 21 species. Most of these species were year-round residents (e.g., black-capped chickadee) or early spring migrators (e.g., palm warbler [*Setophaga palmarum*]). The most observed species were black-capped chickadee (17.78%), American robin (14.44%), and blue jay (8.89%).

The second round of spring migration observed 71 birds representing 31 species. Late spring migrant species (e.g., black-throated green warbler [*Setophaga virens*]) had arrived at site by this time; thus, increasing the species count by ten. The most observed species were white-throated sparrow (*Zonotrichia albicollis*; 11.43%), ovenbird (*Seiurus aurocapilla*; 10%), and American goldfinch (8.57%).

10.4.5.2 2025 Spring Migration Surveys - Probable and Confirmed Breeding Evidence

Probable breeding evidence was observed for two species during the 2025 spring migration surveys at PC1 and PC4.

- Blue-headed vireo (*Vireo solitarius*): One record of probable breeding evidence (pair seen together) at PC4.
- Ruffed grouse (*Bonasa umbellus*): One record of probable breeding evidence (courtship or display) over 100 m East of PC1

10.4.5.3 Breeding Bird Surveys

Two rounds of breeding bird surveys were completed during the 2025 breeding bird season at the four PC locations on June 6 and July 3, 2025. In addition to the PC surveys, 3.5 km of breeding bird area searches were also completed in the Project Area. A total of 233 birds were observed representing 37 species across all rounds (Table 4 and 5, Appendix J).

The most observed species were ovenbird (11.15%), black-throated green warbler (8.15%), American robin (7.73%), white-throated sparrow (7.73%), and red-eyed vireo (*Vireo olivaceus*; 7.30%). The only SOCI observed was Cape May warbler (*Setophaga tigrine*; 0.43% or one bird). SAR observed were two Canada warbler (0.85% or two birds) and one Eastern wood-pewee (0.43% or one bird).

The first round of breeding bird surveys observed 113 birds representing 27 species. The most observed species were ovenbird (12.39%), black-throated green warbler (11.5%), and red-eyed vireo (8.85%). The SOCI observation of the Cape May warbler and one of the Canada warbler observations were made during this round.

The second round of breeding bird surveys observed 120 birds representing 30 species. Similarly to the first round, the most observed species were ovenbird (10%), followed by American robin (8.33%), and hermit thrush (*Catharus guttatus*, 8.33%). The other Canada warbler sighting and the Eastern wood-pewee observation were made during this round.

The two Canada warbler were observed singing multiple times within suitable breeding habitat found within the Project Area. The Eastern wood-pewee was observed multiple times singing as it moved throughout the site near similar suitable breeding habitat (Drawing 10.9). Exact locations of both SAR will be shared with NSECC, NSNR, and ECCC-CWS on submission of this EARD/IPD.

10.4.5.4 Breeding Bird Surveys - Probable and Confirmed Breeding Evidence

Probable and confirmed breeding evidence was observed for nine species during the 2025 breeding bird surveys.

- American robin: One record of probable breeding evidence (agitated behaviour or anxiety calls) observed during area search in mixed-aged mixedwood stand towards the South border of site.
- Black-capped chickadee: Two records of probable breeding evidence (agitated behaviour or anxiety calls) observed at PC2 and during area search in mixedwood treed swamps towards the West border of site.
- Canada warbler: Two records of probable breeding evidence (agitated behaviour or anxiety calls and registration of territorial song).
- Hermit thrush: One record of confirmed breeding evidence (recently fledged young) observed during area search in mixed mixed-aged mixedwood stand towards the South border of site.
- Least flycatcher (*Empidonax minimus*): One record of probable breeding evidence (agitated behaviour or anxiety calls) observed during area search in mixed mixed-aged mixedwood stand and alder-dominated swamps towards the South border of site.
- Pileated woodpecker: One record of probable breeding evidence (territorial song/ display through drumming on tree) 100 m East of PC4.
- Red-eyed vireo: One record of probable breeding evidence (pair) observed during area search in mixedwood treed swamps towards West border of site and one record of confirmed breeding evidence (distraction display or injury feigning by a pair) observed during area search in mixed mixed-aged mixedwood stand and alder-dominated swamps towards the South border of site.
- White-throated sparrow: One record of probable breeding evidence (pair displaying agitated behaviour or anxiety calls) observed at PC2.

10.4.5.5 Nightjar Surveys

Two rounds of nightjar surveys were completed on June 4 and July 2, 2025, at two nightjar-specific PCs. No nightjar species were observed, but other bird species were recorded incidentally. In total, 12 birds were observed representing six species (Table 6 and 7, Appendix J).

The most observed species were American goldfinch (25%), hermit thrush (25%), and tree swallow (*Tachycineta bicolor*; 16.67%). A notable observation was a barred owl (*Strix varia*).

No breeding evidence was observed for any birds during the 2025 nightjar surveys.

10.4.5.6 Fall Migration Point Count Surveys

Three rounds of fall migration PC surveys were completed at the four PC locations within the PA between August 21 and October 23, 2025. A total of 180 birds were observed across all survey rounds representing 33 species (Table 8 and 9, Appendix J).

The most observed species were American robin (28.33% of all birds observed), blue jay (8.89%), black-capped chickadee (8.33%), and golden-crowned kinglet (*Regulus satrapa*; 7.22%). No SOCI were observed, and the only SAR was Canada warbler (0.56% or one bird).

The first round of fall migration surveys mainly observed year-round and summer breeding species. A total of 42 birds were observed, representing 18 species. The most observed species were black-capped chickadee (19.05% of birds observed in the first round), Northern parula (*Setophaga americana*, 14.29%), and black-throated green warbler (9.52%). The only observation of SAR, Canada warbler, was made during this round.

The second round of fall migration surveys had both a greater number of birds observed and number of species, at 61 birds and 23 species. The most observed species were blue jay (16.39%), red-eyed vireo (11.48%), American crow (6.56%), black-capped chickadee (6.56%), dark-eyed junco (6.56%), and yellow-rumped warbler (*Setophaga coronata*, 6.56%). No SOCI or SAR were observed this round. Notable observations were one pileated woodpecker and two barred owls.

The final round of fall migration observed 76 birds representing 16 species, which was the lowest species count out of all the fall migration rounds. All species but two (palm warbler and yellow-rumped warbler) were year-round residents. The most observed species were American robin (63.16%) and golden-crowned kinglet (11.84%). The large number of observations of American robin was due to a migrating flock of 51 birds in groups of seven, 11, and 33 flying westwards. Other notable observations were two pileated woodpeckers and migratory movement of 21 blue jays in flocks of five, six, and ten flying westwards.

10.4.5.7 2025 Fall Migration Surveys - Probable and Confirmed Breeding Evidence

Probable breeding evidence was observed for one species during the 2025 fall migration bird surveys near PC1.

- <u>Barred owl</u>: One record of probable breeding evidence (pair in suitable breeding habitat) on entrance roadway to the West of PC1.

10.4.5.8 Avian Incidental Results

Incidental bird observations were recorded during non-avian related surveys (e.g., wetland/watercourse delineation, botany, lichens, etc.), or outside of the designated survey observation period for avian surveys (i.e., travelling between PCs), throughout 2025. These observations were not included in the field survey results analysis and sections above.

Incidental observations within the months of April, May, and early June can either be considered as spring migrants or year-round resident species. Incidental observations from June to early August can be described as the breeding bird season. Finally, incidentals from late August to October can be considered as fall migrants or year-round resident species.

A total of 66 incidental observations were made, representing 20 species, with one bird being unidentified to the species level (Table 10, Appendix J). Of those observations, 65 were made during the spring migration season and one during the fall migration season. One SOCI, a pine grosbeak (*Pinicola enucleator*), was observed during the spring migration season. No SAR were observed as incidentals.

Other notable observations were a flyover bald eagle, a barred owl hooting during the spring migration season, and a sighting of an adult broad-winged hawk during the fall migration season.

10.4.5.9 Habitat Trends with Avian Abundances and Species Diversity

Understanding bird diversity and abundances allows for the evaluation of the amount of habitat requirements that the Project Area provides for bird species. Species diversity is a metric of the number of species and number of individuals observed for each species. Avian abundance is the total number of birds observed. Species diversity accounts for the evenness of species distributions across habitat types, reflecting if a habitat supports only high abundances of a few species, or similar abundances of many species. This also allows for an evaluation of diversity across habitat types despite differences in the number of PCs representing each habitat type (Table 1, Appendix J).

The Project Area supports a variety of avian species and features several different habitat types that were targeted by PCs and area searches. Habitat types included anthropogenically disturbed areas (PC1); edge habitat (PC2); hardwood-dominant forest (breeding bird area search); softwood-dominant forest (PC4); mixedwood-dominant forest (PC3); and treed and shrub swamps (breeding bird area search). The abundances and diversity of bird species varied across different habitat types captured by the survey design and reflected different habitat usages according to the season (i.e. breeding habitat vs. migratory stopover habitat) (Table 1, Appendix J).

The habitat types with the highest bird diversity during the 2025 spring migration surveys were anthropogenically disturbed areas, followed by softwood-dominant forest. Anthropogenically disturbed areas did not have the greatest species evenness or abundances (n = 43); softwood-dominant forest had greater species evenness and abundance (n = 55). All other habitat types had the same species evenness as the softwood-dominant forest despite differences in species diversity and avian abundances.

The 2025 breeding bird surveys found that mixedwood-dominant forest, closely followed by edge habitat and softwood-dominant forest, had the greatest species diversity and avian abundances (mixedwood= 96; edge = 35; softwood = 31) compared to all other habitat types. This likely reflects the return of late-season migrants, increased detectability of birds performing breeding-related behaviour, and increased effort to target more habitats via the breeding bird area searches.

Softwood-dominant forest had the greatest avian diversity out of all habitat types during the 2025 fall migration surveys, closely followed by edge habitat; however, mixedwood-dominant forest had the highest avian abundances at 66 observations compared to 40 in softwoods and 38 in edge habitat.

In summary, softwood and mixedwood forests and edge habitat were found to be the key habitat types for supporting avian diversity throughout the year. Anthropogenically cleared areas play a key role in the spring migration season but otherwise do no support as many birds or variety of species as the other habitat types.

It is also important to consider species that have specialized habitat requirements, as habitats with greatest diversity and abundances often reflect habitats that can support a wide arrange of both generalist and more niche-specific birds. Looking at specialist species presences can reveal if the Project Area contains highly unique features that attract specialist species. For this report, the following species were used as indices for their listed unique habitat requirements:

- Blackburnian warbler (*Setophaga fusca*): Mature hardwood and mixedwood forests during the breeding season (Morse, 2020).
- Canada jay (*Perisoreus canadensis*): Year-round resident that requires intact tracts of softwood-dominant, mature forest away from coast (Strickland & Ouellet, 2020).
- Cape May warbler: Prefers medium to mature-aged softwood forests, especially with trees > 10 m tall (Baltz & Latta, 2020).
- Pileated woodpecker: Year-round resident with preference for old-growth and mature hardwood forest, or younger forest with scattered mature hardwood or softwood trees (with diameter at breast height of > 30 cm; Bull & Jackson, 2020).
- Nashville warbler (*Leiothlypis ruficapilla*): Open-canopy secondary-growth hardwoods or softwood-bordered bogs for breeding (Lowther & Williams, 2020).
- Veery (*Catharus fuscescens*): Riparian hardwood forests, especially secondary-growth or successional forests with denser shrub layers, for breeding (Heckscher et al., 2020)

None of these species were detected during the 2025 spring migration surveys (Table 3, Appendix J). Blackburnian warbler, Cape May warbler, pileated woodpecker, and veery were all observed during the 2025 breeding bird surveys. Blackburnian warbler was observed at PC2, PC3, and PC4; Cape May warbler at PC2; pileated woodpecker at PC4; and veery at

PC1 (Table 5, Appendix J). The observations of blackburnian warbler at multiple PCs is likely explained by the extensive coverage of mixedwood forest on-site, which covers 28.14% of the Project Area. The presence of Cape May warbler at PC2 may be explained by the mature forest cover in this area, which would provide this species with its preferred tree canopy height for singing to defend territory and attract mates (Baltz & Latta, 2020). The pileated woodpecker observation at PC4 suggests that the mature trees noted at this PC may support the breeding, roosting, and foraging requirements of this species (Bull & Jackson, 2020). Finally, veery was observed at PC1 likely because of the shrubby regeneration in this area providing the dense shrub layer conditions that this species prefers for nesting.

Pileated woodpecker was the only habitat-specialist indices species observed during the 2025 fall migration surveys (Table 9, Appendix J). Pileated woodpeckers were observed at PC1, PC2, and PC3. These observations further support that there may be an adequate number of mature trees on-site to support the roosting needs of this species.

Overall, the presence of these indices species suggests that the mature forest stands and secondary-growth habitat on the site support the migratory and breeding needs of multiple specialist species. Unique features of these habitats include snags, tall canopy heights, and dense shrubbery. There is a lack of adequate softwood habitat on site for species that prefer large tracts of softwood forests for breeding, as demonstrated by the lack of observations of softwood specialist such as Canada jay and boreal chickadee (*Poecile hudsonicus*).

10.4.5.10 SAR Detected in the Project Area

Two SAR were detected near or within the Project Area during the 2025 field surveys (Table 10.15). Due to the sensitive nature of avian SAR observations, location data has been provided to regulators under separate cover (Drawing 10.9 provided to regulators, and excluded herein).

Table 10.15: SAR Detected Near or Within the Project Area

Common Name	SAR Status	2025 Season
Canada warbler	*SARA*: Threatened *ESA*: Endangered S-Rank: S3B	Summer Fall
Eastern wood-pewee	*SARA*: Special Concern *ESA*: Vulnerable S-Rank: S3S4B	Summer

Wetlands in and around the Project Area may provide breeding, foraging, and/or migratory habitat for Canada warbler and Eastern wood-pewee, which were both observed in the breeding season. Notably, Canada warbler was observed during summer and fall, suggesting that the species is actively using habitats within the Project Area for breeding, foraging, and migration.

As SAR are location sensitive, avian SAR associated with delineated wetlands (e.g., observed within the wetland and displaying breeding evidence) within the Project Area, including SAR observations from incidental data are discussed generally in Section 7.3.2. Official WSS designation will be determined by NSECC.

It should be noted that pileated woodpeckers were identified in the Project Area during breeding and fall migration surveys. Probable breeding behaviour was documented for pileated woodpecker during the breeding season. Pileated woodpeckers are a species listed under Schedule 1 of the Migratory Bird Regulations and their nests are protected for at least 36 months in accordance with those regulations.

10.4.6 Effects Assessment

Project-Avifauna Interactions

Project activities, primarily those that involve earth moving or vegetation removal, sensory disturbances, or infrastructure interactions with avifauna in the airspace have the potential to impact avifauna (Table 10.16). These activities could result in the following potential effects:

- Habitat loss and alteration
- Sensory disturbances
- Injury and mortality risk

Table 10.16: Potential Project-Avifauna Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Placement of Sedimentation and Erosion Control Measures	-
Clearing and Grubbing	X
Civil Site Construction	X
Equipment Installation	X
Interconnections for Services	X
Removal of Temporary Works and Site Restoration	X
Commissioning	-
Operations and Maintenance	
Facility Operation and Maintenance	X
Site Management	X
Decommissioning	
Infrastructure Removal	X
Site Reclamation	X

Assessment Boundaries

For the purposes of this assessment, the spatial boundary for avifauna is the LAA which includes a 5 km buffer on the Project Area (Drawing 10.7). The Project Area is the area surveyed for birds and the Project Footprint is the physical footprint of the Project such as buildings, ponds, and roads. The RAA is not applicable to this assessment.

Temporal boundaries for avifauna include Project construction, operation, and decommissioning. There are no administrative or technical boundaries.

Assessment Criteria
The VC-specific definition for magnitude is as follows:

- Negligible: No loss of avifauna habitat, no sensory disturbance impacts, and injuries or mortalities to avifauna are not expected.
- Low: Small loss of habitat supporting SAR and habitat sensitive avifauna, low sensory disturbances, and low risk of injuries and mortalities.
- Moderate: Moderate loss of habitat supporting SAR and habitat sensitive avifauna, moderate sensory disturbances, and moderate risk of injuries and mortalities.
- High: High loss of habitat supporting SAR and habitat sensitive avifauna, high sensory disturbances, and high risk of injuries and mortalities.

Effects

Habitat Loss and Alteration
The Marshdale Fast Acting Natural Gas Power Generation Facility will cause direct impacts to bird habitat, including that of SAR, within the Project Footprint and Project Area. This will include upland forested habitat, edge habitat, cleared areas, and wetlands (Drawing 10.1B). The construction, operations, and decommissioning of the power generating facility will introduce higher levels of human disturbance than what currently exists to the Project Area, although there were signs of human activity throughout the Project Area (e.g., ATV trails, small-scale forestry activities). Habitat will be eliminated gradually over the power generation facility development timeframe. Site preparation through clearing and grubbing will remove vegetation; thus, reducing the quantity and quality of avifauna habitat that currently exists in and around the Project Area. The power generation facility will directly impact an estimated 12.5 ha within the Project Footprintand directly or indirectly the remaining 43.45 ha in the Project Area (0.13% and 0.59% of the LAA, respectively; Drawing 10.1B).

Desktop modelling and biophysical surveys found the most predominant habitat types were mixedwood forest (50.29%), softwood forest (26.84% of Project Area), open areas (10.7%), and hardwood forest (7.94%) within the Project Area. Softwood forests within the Project Area represents 1.06%, mixedwood forest 1.25%, open areas 0.42%, and hardwood forest 1.06% % of those habitat types found in the LAA.

Within the PA, habitat removal and increased edge areas may have the following effects:

- Increase in the number of habitat generalist species.
- Decrease in the number of habitat specialist species.

- Increase in aerial insectivores.
- Increase in transitional and microhabitats.
- Increase in suitable habitat for common nighthawk, Eastern wood-pewee, and olive-sided flycatcher (SAR).
- Decrease in suitable habitat for Canada warbler, evening grosbeak, and rusty blackbird (SAR).
- Increased avian depredation from raccoons, snakes, small mammals, and other birds (e.g., corvids).
- Decrease in reproductive success for some species.

Biophysical surveys found that avian diversity and abundances were highest for softwood and mixedwood forests, and edge habitat. These habitats were found to contain unique features that supported species with specialized habitat requirements (e.g., Blackburnian warbler, pileated woodpecker). Furthermore, the Project Area contains critical SAR habitat such as swamps for breeding Canada warbler and open canopy areas for Eastern wood-pewee that will be directly impacted by project development and activities.

Bird species that currently use the habitat within the Project Area will be displaced during the initial stages of construction, will experience changes in habitat availability, and may experience associated sensory disturbances. This could potentially cause direct mortality of species if individuals are unable to relocate to alternate suitable habitat, as they may face competition from other bird species to access new habitat and resources. However, there are areas of suitable nesting habitat in adjacent lands and the regional area in general, especially considering that the Project Area is 0.59% of the land in the LAA. Furthermore, key habitat types within the Project Area such as forests, treed swamps, and open areas are present in the LAA; hence, providing diverse relocation options for displaced species.

Canada warbler was found with breeding evidence in two wetlands identified within the Project Area (Table 4 and 5, Appendix J). One of the aforementioned wetlands will be destroyed during the construction and operation of project infrastructure in the current Project Footprintresulting in the direct loss of breeding habitat. Habitat modelling and biophysical surveys suggest that Canada warblers displaced from this wetland will have sufficient habitat to relocate to but may face competition from other individuals in the process, potentially negatively impacting reproductive success.

Eastern wood-pewee habitat included mixedwood and softwood forests, some of which is located within the Project Footprint. Habitat modelling and biophysical surveys identified suitable habitat within the Project Area and LAA that can support this species habitat requirements; however, habitat for this species may be limited in the LAA due to competition as habitat modelling did not identify Eastern wood-pewee habitat within the Project Area despite there being several observations of this species throughout the breeding bird season (Table 4 and 5, Appendix J). This suggests that loss to this species' habitat within the Project Footprint may have negative effects by upscaling competition over local resources.

SAR habitat risks are further discussed below in Habitat Modelling.

The Project will alter habitat within the Project Area; alterations will have both negative and positive effects depending on the bird species. Not all alteration will be permanent, for example, some alterations may be revegetated after initial construction. Additionally, alterations will not have a significantly negative impact on core habitat and similar habitat for avifauna present in the surrounding landscape. Alterations include the addition of wastewater management ponds. As there are currently no sources of open water on the site, this will add open-water to the Project Area. Novel bird species may be attracted to the site to utilize these habitats (Meeker, 2023), which could result in exposure to contaminants if not managed properly (see Injury and Mortality Risk).

An estimate of 10.7 ha of edge habitat will be created because of Project activities, introducing more edge effects to the Project Area. Edge effect refers to changes to abiotic properties, species distributions, species interactions, and other ecological parameters from the creation of a boundary or transition zone between habitats (Porensky & Young, 2012). In term of the Project Footprint, edge effect will be introduced along mixedwood and softwood forests and treed wetlands (i.e., WL3 and WL4). Edge effect is favourable to some species, such as common yellowthroat, song sparrow, and rose-breasted grosbeak (King et al., 2009). Other species, especially those that rely on large, intact tracts of forest habitat, will be negatively impacted by the creation of edge habitat. This includes species found in Strum survey efforts such as Blackburnian warbler and hermit thrush (Akresh et al., 2024). Edge habitat creation may increase the risks of nest depredation, brood parasitism, or nest abandonment in some species, whilst increasing availability of food and nesting habitat for others (Akresh et al., 2024; Kalukapuge et al., 2024).

Habitat fragmentation through increased creation of edge habitat has been shown to increase the number of habitat generalist species (e.g., American robin, common yellowthroat) while also decreasing the number of habitat specialists (e.g., Blackburnian warbler, pileated woodpecker). Habitat generalists have a higher likelihood of surviving in smaller habitat patches in a mosaic landscape (e.g., a road network associated with a wind project) due to their ability to utilize various habitat patch types (Andrén, 1994).

Bird species with different characteristics, such as habitat specialization, reproductive rates, and trophic guilds, may respond differently to edge effects and habitat fragmentation. For example, interior-forest birds, such as thrushes and warblers, that prefer larger tracts of undisturbed forest or habitat specialists can be impacted by habitat fragmentation due to the lack of habitat connectivity (Andrén, 1994). This may be especially pertinent for pileated woodpeckers, who were observed within the Project Footprint and are likely utilizing mature, hollowed out trees in this area for nesting and foraging.

Pileated woodpecker nest cavities are protected under the *Migratory Birds Act,* as per the 2022 updates to the Canadian Migratory Bird Regulations, since they provide nesting habitat for secondary cavity-nesting species who are incapable of excavating their own cavities (e.g., nuthatches, owls, bluebirds). Hence, the removal of mature trees and snags within the Project Footprint may have negative impacts on secondary cavity-nesting species' reproductive success. The chimney swift habitat model can be used as a proxy for estimating the availability of pileated woodpecker in the Project Footprint, Project Area, and LAA since the two species show similar preferences for large mature trees and snags. Habitat modelling failed to identify stands of dead wood or snags in the Project Area; however, it did identify substantial tracts of forest with mature trees (Drawing 10.10). Biophysical surveys also noted several large snags and hollow trees near the south boundary of the Project Area. It can be concluded that potential pileated woodpecker nesting and roosting habitat is likely adequate on site and that precautions should be taken to avoid removing said habitat.

Alongside cavity-dependent species, species that prefer low-light habitats (e.g., larger eyed birds like owls and thrushes) may be more sensitive to fragmentation. Species that these effects can apply to that were observed on-site included barred owl and hermit thrush (Table 3, 5, 7, 9, and 10, Appendix J).

By contrast, other bird species such as insectivores (e.g., flycatchers, swallows, and nightjars) and understory foragers may thrive in fragmentated habitats (Andrén, 1994; Tittler et al., 2001). These species have been shown to return in years subsequent to the creation of additional edge habitat due to the increased availability of foraging opportunities and other niche habitats (Tittler et al., 2001). Species that were found on site that this may apply to include Eastern wood-pewee and least flycatcher (Table 5, Appendix J).

Other forest species that benefit from increased edge habitat in fragmented landscapes (such as the LAA) includes understory gleaners (e.g., dark-eyed junco, white-throated sparrow; González-Salazar et al., 2014), cavity nesters (e.g., downy woodpecker), and long-distance migrators (Terraube et al., 2016). Hence, edge habitat can be valuable for some species during a portion of the year.

Additionally, some species (e.g., blackbirds), can also tolerate forestry activities if their habitat of coniferous dominant trees of varied heights near waterbodies is maintained (C. Stacier, avian biologist and professor at Dalhousie University, personal communication 2018). Consequently, cleared areas create open spaces and edges within the forested environment, which may benefit certain bird species that favour edge or transitional habitats. These changes could potentially create favorable microhabitats within Project Area cleared areas, particularly for generalist bird species or those that readily adapt to disturbed environments.

Increased edge areas may lead to increased depredation on birds and their nests. A study by Manolis, et al. (2002) found that distance to the nearest clear-cut was the best predictor of nest predation in multiple ground laying birds. For example, ground-nesting hermit thrush are particularly vulnerable to nest depredation because of edge effects (Akresh et al., 2024); however, the effect is highly variable and dependent on predator species in the area (Cox et al., 2012; Zanette & Jenkins, 2000).

Overall, edge effect from the clearing of habitats has complex effects on avifauna. Some species will benefit from the creation of cleared areas and edges, whilst others will be displaced or suffer reduced breeding success if they remain in the Project Area. Forest-dependent species will be most negatively impacted. A metanalysis on the impacts of edge effect on nesting success of forest birds in Eastern North America found that nest survival does not increase past 250 m from edge habitat (Akresh et al., 2024); suggesting maintaining core areas that contain habitat removed from edges by 250 m can help maintain nesting success for forest-specialist birds. Nest sweeps and monitoring during the construction phases will aid with the identification and preservation of key breeding bird habitat.

In conclusion, habitat loss and alteration within the Project Area are anticipated to be low and will primarily impact softwood and mixedwood forests, and treed swamps. Alterations will contribute to the addition of open-water habitat, through the creation of storm- and wastewater management ponds, and edge habitat. Proper management of storm- and wastewater ponds can reduce impacts to birds. Edge effects will likely have low impact on bird species as it will not alter large tracts of intact forest habitat within the LAA; however, may impact species found within the Project Areaboth positively and negatively.

Habitat Modelling

Methods

SAR habitat modelling was completed to understand how SAR habitat availability varies within the Project Footprint, Project Area, and LAA. This assisted with evaluating impact levels to SAR based on local and landscape-scale habitat availability. From the 100 km ACCDC data records, avifauna species were further constrained to a 5 km radius to account for species with a greater potential for interaction within the Project Area and filtered for SAR. The following nine species were considered for habitat modelling:

- Bank swallow
- Barn swallow
- Bobolink
- Canada warbler
- Chimney swift
- Common nighthawk
- Eastern wood-pewee
- Evening grosbeak
- Rusty blackbird

Habitat modelling utilized geospatial data representative of each SAR's breeding habitat filtered through the point density method to determine the amount of potential breeding habitat within the Project Area. The point density method creates a potential habitat layer that can be constrained accordingly to delineated clusters of larger continuous habitat at the landscape scale. This method filters high resolution data to match habitat criteria and results in non-contiguous areas or small isolated areas. These areas were then subjected to manual post-processing to identify if they were ecologically meaningful habitat that could adequately support a breeding individual through providing adequate resources and lacking adverse risks (Wang et al., 2025). This was best represented by areas that had higher densities of SAR habitat requirements within the Project Footprint, Project Area, and LAA.

Each of the SAR habitat criteria was reclassified to a binary scale, either as potential habitat or not potential habitat, in raster format. A point was generated for each raster cell to represent the spatial extent and distribution of the habitat criteria by point geometries. Converting the raster data to points allows for density calculations to determine the density of suitable habitat within the Project Footprint, Project Area, and LAA.

A search radius was set to eliminate small irrelevant patches of habitat while identifying those that are less fragmented, since fragmentation generally decreases habitat usage by decreasing the availability of quality habitat (Smith et al., 2011). A search radius of 50 m was used to identify areas of low point density, remove slivers of edge habitat that had been buffered but lacked adjacent habitat, and remove single isolated habitat cells. This resulted in a continuous raster surface of relative density values, where low-density areas corresponded to isolated or fragmented small patches of habitat, and the areas of higher density indicated clusters of suitable habitats where contiguous clusters are more likely to function as ecological cores. These high-density areas are more likely to support stable populations with breeding, foraging, and nesting, due to increased resource availability and lower predation risk (Wang et al., 2025).

The habitat requirements utilized as inputs for each SAR habitat model are described in detail below.

Bank swallow habitat mapping used surficial geology, slope, and excavation features to identify potential breeding habitat. These swallows nest in excavated burrows within steeply sloped banks composed of loose clay, silt, sand, or gravel (ECCC, 2022f). This may include natural features such as cliffs and riverbanks, or anthropogenic features such as excavation soil piles and quarries. The surficial geology of the LAA was overlain with areas with slopes greater than 45 degrees, as this is a more accurate slope percentage captured by LiDAR aerial sensors and can serve as a proxy for where there may be steep slopes (Esri, 2021). Soil pits/quarries were included where excavation may have caused the formation of ideal slope and substrate conditions.

Barn swallow forage over a wide range of open and semi-open habitats including natural and anthropogenic environments (NSNR, 2020b). They nest on anthropogenic structures such as buildings (e.g., houses, camps, sheds, garages, barns) and bridges. These features were identified from aerial imagery and buffered by 600 m to encompass the foraging range of this species.

Bobolink prefer open field features such as natural grasslands or agricultural pastures for breeding (ECCC, 2022a). Areas containing agricultural land cover and a combination of trees and tall shrubs over 1 m occupying less than 60% of landcover were used to map potential bobolink habitat.

Chimney swift rely on hollow structures, either anthropogenic (e.g., grain silos, chimneys) or natural (e.g., large hollow trees with > 20 cm DBH), for roosting and nesting (ECCC, 2023b). These may be found in urban and rural areas or stands of dead trees, such as within forested areas susceptible to windthrow. Chimney swift also demonstrates a preference for live trees with > 50 cm DBH. We replicated Rijal et al. (2012), who used tree canopy height to model trees with large DBH by averaging maximum height within one standard value and taking the lowest value as the height threshold to extrapolate trees with the appropriate DBH. Hence, areas of dead stands and trees with canopy heights over 18.83 m were mapped to determine potential chimney swift habitat.

Canada warbler prefer moist forests with dense, deciduous shrub layers and complex understory composition for breeding (ECCC, 2016a). An in-house wet areas model was developed and filtered to include areas with up to 50 cm of potential surface water coverage to account for moist areas. The Canadian Wetland Inventory (CNWI) was also included to account for wetland features and their respective edge habitats. Forest data was then queried to determine where these moist areas and wetlands included stands where alders (*Alnus spp.*) composed 75% or more of the crown closure and where primary tree species included tamarack (*Larix laricina*), red maple, balsam fir, and black spruce. Typically, Canada warbler habitat models limit tree heights to 12 m to account for the higher density of shrub and softwood coverage that is preferred by this species for concealing its nest (Dufour-Pelletier et al., 2025); however, this parameter was removed from the final habitat model as its inclusion resulted in significant loss of any potential Canada warbler habitat within the LAA.

Common nighthawk use a wide range of open habitats for breeding (ECCC, 2016b); hence, ‘Urban, Landfill, Quarry, Transport Corridor’, ‘Utility Corridor’, and ‘Blueberries or Barren’ landcover types were queried from the Nova Scotia Interpreted Forest Inventory to determine potential nesting areas. Road networks and unpaved forestry roads were buffered by 10 m to account for rubble from past road construction, which is often left several meters from the road shoulder, and exclude these features from the final output. The CNWI was also used to locate open wetlands (e.g., bogs, fens, open-water marshes) for the model.

Eastern wood-pewee have broad habitat preferences for tracts of intact medium-aged to mature forest and are loosely associated with riparian areas (NSNR, 2022b). In Nova Scotia, the species is most often associated with hardwood or mixedwood treed swamps, and mature upland forest, with adequate open-canopy areas nearby for foraging (e.g., woodlands, open wetlands, waterbodies, fields, floodplains). The Nova Scotia Interpreted Forest Inventory was used to locate hardwood-dominant stands and filter for stands where crown closure was less than 30. CNWI wetlands and waterbodies were included to represent riparian areas wherever they may intersect or connect with appropriate forestry features. CNWI wetlands received a

50 m internal and external buffer to include edge habitat, and waterbodies a 50 m buffer around the immediate edge of lakes. Only edges that interconnected with the appropriate forestry features were retained in the final model output.

Evening grosbeak nest in large mature mixedwood stands that are mainly composed of fir (*Abies spp.*), spruce (*Picea spp.*), tamarack, pine (*Pinus spp.*), and aspen (*Populus spp.*; ECCC, 2022). The Nova Scotia Interpreted Forestry Industry was used to locate forest stands where the primary species was aspen and wherever greater or equal to 50% but less than 70% of the stand was composed of pine, fir, spruce, and tamarack. Each layer was then converted to its respective percentage values for tree composition, summed, and queried for wherever softwood composition in total was greater than or equal to 50% but less than 70% for the final model output.

Olive-sided flycatcher prefer open areas containing snags and that are adjacent to mature softwood and mixedwood stands for their breeding habitat (NSNR, 2021h). These open areas may include wetlands and disturbed forests (e.g., windthrow, wildfire, forestry). The Nova Scotia Interpreted Forestry Industry was used to locate forest stands that primarily included softwood species such as black spruce, red spruce, white spruce (*Picea glauca*), Scot's pine (*Pinus sylvestris*), red pine, jack pine, and Eastern hemlock. Archived Crown harvest plans and harvest land cover classes were buffered by 20 m to represent disturbed forests and capture their bordering edge habitats that may be used by olive-sided flycatchers for nesting. Open wetlands from CNWI and burned areas from historical burn data were also included in the model.

Rusty blackbird have specific nesting requirements of young regenerating softwoods or tall shrubbery adjacent to open or semi-open wetland habitat that contain shallow water and emergent vegetation (Baker & Thomas, 2015). The Nova Scotia Interpreted Forestry Industry was used to locate potential softwood forests, which included fir and all species of spruce. These stands were then intersected with wet area mapping of potential surface water coverage of 50 cm or less or CNWI wetlands to produce areas of wet softwood forest habitat.

The model was cross validated after the avifauna field survey results were obtained to assist with increasing model accuracy for identifying SAR habitat. SAR habitat models were adjusted accordingly to better reflect the habitat preferences of SAR found through field surveys, and these final model outputs were used to evaluate habitat availability within the Project Footprint, Project Area, and LAA.

Habitat Modelling Results

Habitat modelling identified several features with suitable geology for bank swallow nesting; however, none of these features were present within the Project Area (Drawing 10.11). There is a small likelihood of bank swallows being attracted to waste rubble and soil piles created during the construction of the Project (ECCC, 2022f), but proper management of these features (e.g., covering with tarps, prompt removal from site, etc.) should mitigate any nesting possibilities. There is a low likelihood of this species foraging over cleared areas created by the

Project's development considering few observation records of the species from the desktop review and no observations from field surveys.

Barn swallow and chimney swift primarily nest in anthropogenic structures, and, in the case of the chimney swift, large diameter snags (>25 cm DBH(ECCC, 2022d, 2023b). Both species utilize a wide range of landscapes for foraging insects (NSNR, 2020b, 2023b). Habitat modelling identified 6,265.25 ha of suitable foraging and breeding habitat for barn swallow with the LAA, of which 0.02% occurs within the Project Area (Drawing 10.12). No existing barn swallow habitat was identified in the Project Footprint. Based on the lack of suitable nesting areas and small amount of foraging habitat, there is a low likelihood of this species breeding and foraging within the Project Area, especially considering few observation records of barn swallow from desktop review and no observations from field surveys.

Potential chimney swift breeding habitat exists in the form of large snags within the Project Area, as identified during biophysical surveys (see Section 10.3.5). Habitat also identified substantial tracts of forest with mature trees (Drawing 10.10). It was difficult to identify chimney swift habitat in the GIS habitat modelling due to the specificity of this species breeding habitat and the coarseness of available geospatial information (Drawing 10.10); furthermore, there were no sightings of chimney swift made during the avian field surveys. Potential breeding habitat for the species exists within the Project Area and precaution should be taken to avoid felling large mature trees, hollow trees, and snags wherever possible.

Barn swallow, chimney swift, and other aerial insectivores may be attracted to feeding over cleared areas or wastewater management ponds introduced from the Project's construction (Msaki et al., 2023), but this will contribute a very small addition to suitable habitat within the LAA.

No bobolink breeding habitat was identified within the Project Area, although 1,008.68 ha of breeding habitat exists within the LAA (Drawing 10.13). There is a low likelihood of this species occurring within the Project Area given the lack of suitable breeding habitat and lack of observations in the Project Area.

Canada warbler was found in multiple wetlands on-site during the avian field surveys. Habitat modelling predicted 5.84 ha of Canada warbler breeding habitat within the Project Area with 0.84 ha (8.24%) being within the Project Footprint (Drawing 10.14). Some of the habitat identified by the model matched with areas where Canada warbler was observed during avian field surveys (Table 5, Appendix J).

Habitat modelling for common nighthawk identified 1,071.36 ha of suitable common nighthawk habitat within the LAA (Drawing 10.15). Of this suitable habitat, 0.05% occurs within the Project Area, of which 8.23% will be directly impacted by the Project Footprint. It is likely that whatever habitat exist within the Project Footprint will retain its foraging value for the common nighthawk as the Project will install bright lights that may attract aerial insect prey (ECCC, 2016b); however, this may lead to increased injury and mortality risk to birds (see Lighting and Injury and Mortality Risk). The likelihood of these interactions is low considering the low percentage of suitable habitat within the Project Area and the lack of common nighthawk observations made during the avian field surveys.

Eastern wood-pewee have broad habitat preferences for tracts of intact medium-aged to mature hardwood or mixedwood forest and riparian areas (NSNR, 2022b). Habitat modelling identified 342.85 ha of suitable breeding habitat within the LAA, none of which occurred within the Project Area (Drawing 10.16). This was the lowest amount of habitat identified for any SAR. It is possible that the Eastern wood-pewees observed during the avian field surveys were prospecting individuals searching for available habitat, especially given that intact tracts of habitat seem to be lacking within the LAA (Table 5, Appendix J).

Evening grosbeak habitat modelling identified 6.23 ha of potential breeding habitat within the Project Area with 3.89 ha (62.36%) of this in the Project Footprint (Drawing 10.17). No observations of evening grosbeak during the avian field surveys occurred within this breeding habitat, so it is possible that the species is primarily using habitat outside the Project Area. Indeed, the breeding habitat within the Project Area represents 0.81% of the 764.83 ha of available habitat in the LAA. Hence, there is a low likelihood of this species being impacted by Project activities.

Habitat modelling for the olive-sided flycatcher identified 2.38 ha of suitable breeding habitat within the PA, which represents 0.16% of the 1,528.62 ha of breeding habitat available within the LAA (Drawing 10.18). Furthermore, no olive-sided flycatchers were observed during the avian field surveys and the desktop review found few records for this species. As such, there is a low likelihood of this species occurring within the Project Area and being impacted by Project activities.

Finally, habitat modelling identified 1.09 ha of potential rusty blackbird breeding habitat within the Project Area with 0.48 ha (44.08%) of this being within the Project Footprint (Drawing 10.19). This habitat occurs in low quantity within the LAA with the habitat model detecting 358.04 ha. There is a low likelihood of this species breeding and foraging within the Project Area, especially considering few observation records of the species from desktop review and no observations from field surveys.

Sensory Disturbance

Sensory disturbance may occur during all Project phases, though will be more prevalent during construction (limited to daylight hours during construction), with limited disturbance through operations. Noise and light will be concentrated in the Project Area but could also extend into the portions of the LAA that are closer to the Project Footprint. Identified sensory disturbances associated with the construction, operation and decommissioning phases of the Project include:

- Noise
- Lighting

Noise

Increased noise levels are expected during the Project construction, operations, and decommissioning phases. Sound sources include increased local traffic to the area, heavy machinery during construction and decommissioning, and facility sounds during operations. Facility noise during operations will not be continuous but will peak based on power demand. On certain days, higher power demand may result in more continuous facility noise. The days of higher facility noise may occur more frequently in the winter months, rather than the summer.

An assessment of construction noise and operational noise modelling for the Project (described in Section 7.3) suggests that sound levels in the Project Area during construction will range from 77 to 115 dBA. Noise from heavy machinery and equipment can disrupt normal avian behaviours such as foraging, communication, and reproduction. The decibel range for heavy machinery on construction sites can vary between 80 to 120 dBA (Lee et al., 2019). Birds are expected to be most sensitive to noise disturbances in the Project Area during the ECCC defined nesting period for area, which extends from mid-April to late August (ECCC, 2025e). A literature review conducted by Shannon et al., (2016), found that birds have the potential to exhibit changes in song characteristics, reproduction, abundance, stress levels, and species richness at levels greater than 45 dBA. Studies have shown that biological responses commenced at 40 to 45 dBA, with a decline in species diversity (i.e. avoidance by sensitive species) and reproductive success at 43 to 58 dBA. The sounds associated with construction, while temporary, may lead some birds to avoid areas near active construction zones, possibly altering their habitat use patterns during critical breeding or migration periods. Similarly, the noise generated from increased traffic could lead to short-term displacement of birds, particularly ground-nesting or low-flying species within proximity to access routes. On the contrary, some bird species may not be impacted by sensory disturbances. A study of the impact of logging truck traffic on bird reported no observed effects on nesting at noise levels of 53 dBA (Grubb et al., 1998). It was also found that noise tolerant species had increased nesting success through decreasing nest predation through higher awareness and less flushing (Francis et al., 2009).

Halfwerk et al. (2011) reported that traffic noise reduced reproductive success in birds. Decreased reproductive success was attributed to disrupted acoustic communication, elevated stress associated with increased energy expenditure during foraging and predator avoidance, and the avoidance of noisy habitat. Furthermore, Sieving et al. (2024) found that Eastern bluebirds (*Sialia sialis*) would choose to nest near noisy areas; however, exposure to longer periods of irregular construction noise and traffic noise caused a reduction in hatching success. This study suggests that birds may choose to nest near noise generated from high traffic or construction areas, but the nesting success may be negatively impacted as the noise can cause stress, impacting daily activities. Alternatively, if noise commences after nest selection, birds may abandon their nests (Mulholland et al., 2018; Ortega, 2012).

Direct physiological damage causing a temporary decrease in auditory sensitivity can occur at acute noise levels above 93 dBA, while permanent damage to avian auditory systems may not occur until 125 dBA to 140 dBA (Blickley & Patricelli, 2010). Birds can exhibit greater susceptibility to physical hearing damage caused by noise, as most species rely on vocal communication (Blickley & Patricelli, 2010). Impacts can also differ between acute and chronic noise sources.

Chronic exposure may degrade auditory cues, feedback, and vocal development over time, which are important for predator/prey detection, communication, breeding, and orientation (Blickley & Patricelli, 2010; Marler et al., 1973; Shannon et al., 2016). The noise level produced by construction equipment at 15 m from point source can range between 62.6 dBA (concrete mixer) to 85.5 dBA (crushers; Lee et al., 2019). At the same distance the noise level of a pick-up truck is measured at 83 dBA (Grant Visual Technology & Cardno ENTRIX, 2013), which is an existing source of noise on public roads within the LAA. Although hearing damage can occur from exposure to higher decibels, research has demonstrated that birds can recover from exposure to damaging noise levels. In one study, chicks exposed to 111 dBA for 48 hours were found to completely recover from hearing damage within 10 days (Saunders & Tilney, 1982). Ryals et al. (1999) found that birds lose hearing from hair cell loss and that these hairs can recover via regeneration, allowing birds to regain hearing.

Overall, while construction-related disturbances are temporary, the noise generated may cause temporary changes in bird distribution, breeding behaviour, and reproductive success during the active phases of the Project. Acute impacts from high noise levels are expected on a short term and intermittent frequency during the construction phase, but birds exposed to these levels are expected to recover from hearing damage.

A Community Noise Impact Assessment, completed by Hatch (2025a), found that unmitigated operational noise may exceed 45 dBA within an area ranging from 15 m to 500 m from the Project Footprint. Operation noise generated from the facility and local traffic are expected to meet guidelines at nearby residential receptors (Babic, 2017; ECCC, 2018b); however, there could still be some minor impacts to birds. During operations, noise will be generated from the facility intermittently throughout the life of the Project. Long term noise from natural gas compressors can have impacts on birds nesting near them such as reduced hatching success and incubation time (Williams et al., 2021). A study on Eastern bluebirds and tree swallows found that natural gas compressor noise did not cause the species to avoid nesting nearby nor did the noise cause nest abandonment of these species. However, nests adjacent to the compressor were found to have less incubation time on the eggs, less hatchlings, and less fledglings, suggesting that noise caused by the natural gas compressors may reduce the overall fitness of some species (Williams et al., 2021). Project-related noise will be reduced in the LAA beyond 500 m from the Project Footprint. The greatest potential for noise-related to disturbance to terrestrial fauna will occur up to a 500 m radius from the PF which includes both the Project Area and portions of the LAA.

Lighting

Light is a source of sensory disturbance that can impact birds by potentially causing disorientation, avoidance, attraction (Longcore & Rich, 2004), mortality; as well as influencing habitat selection (Adams et al., 2021). Artificial lighting is not expected during the construction and decommissioning phases of the Project as these activities are not expected to occur at night. During the operations phase, artificial lighting will be present long term at the facility and along the associated access roads. Therefore, this discussion focuses on artificial lighting at night during operations.

Birds are expected to be most sensitive to artificial lighting at night during spring and fall migration periods. Artificial light at night on buildings can cause migrating birds to react by changing fight directions either horizontally or vertically (Cabrera-Cruz et al., 2021). These subtle changes in flight can increase the energy expended by groups of migrating birds. Research has demonstrated that birds attracted to or congregating around lights often become disorientated and loose their sense of direction, ultimately disrupting migration (Adams et al., 2021). Lights that are known to increase disorientation include consistent white or red lights (Poot et al., 2008); whereas green and blue lighting has little to no effect on bird orientation during migration. Strobe lights or intermittent/flashing lights have been shown to decrease avian mortality as it interrupts the zone of influence that lighting on birds can have (Longcore et al., 2008). While continuous lighting can attract or disorient birds, especially nocturnal migrants, the brief and low-frequency nature of intermittent flashing lights reduces the risk of such disruptions. Although avian collisions can occur due to artificial lights resulting in mortality, Adams et al. (2021) speculated that reviewing literature on weather conditions and lunar cycles during such collisions could help identify nights when lighting could be adjusted to avoid collisions.

A pair of barred owls were observed in suitable breeding habitat during one of the fall migration surveys, which suggests that these owls might be breeding in or near the Project Area. Artificial lighting can interfere with owl predator-prey relationships (Sordello et al., 2025). A literature review conducted by Sordello et al. (2025) found that rodents tend to avoid lighting which in turn would impact owl hunting success. Long term harsh lighting can also negatively impact owl vision by permanently damaging their photoreceptors (Ambrose, 2020, p. 20). In contrast to migrating birds, owls are most sensitive to blue, green, and ultraviolet lighting. Softer lighting should lesson the effects on owl vision (Ambrose, 2020).

During the operational phase, the lighting on the site will be minimized and localized to the facility and access road. Mitigation measures are recommended to be implemented to reduce the impacts of lights on birds in the Project Area (e.g., motion-activated lighting, lasers, shielding, LEDs, shades of light, etc.; Adams et al., 2021).

Injury and Mortality Risk

Injury and mortality are expected during the Project construction, operations, and decommissioning phases. The main sources of injury and mortality would be vehicle strikes, exposure to contaminants, interactions with Project infrastructure, and direct mortality during vegetation clearing and grubbing.

Direct mortality of eggs and unfledged nestlings is possible during the construction, operations/maintenance, and decommissioning phases of the Project. Probable or confirmed breeding evidence was observed in the Project Area for 11 avian species including Canada warbler, a SAR, and pileated woodpecker, which is a species listed under Schedule 1 of the Migratory Bird Regulations. As a result, there is an increased risk of direct mortality of eggs and unfledged nestlings during vegetation clearing and grubbing (construction), vegetation management (maintenance), and site reclamation (decommissioning). Direct mortality to eggs and unfledged nestlings could occur if avifauna species choose to nest in anthropogenic habitat created during the construction phase of the Project. For example, soil stockpiles generated during construction can create anthropogenic habitat suitable for avian species such as bank swallows (NSNR, 2020a). In addition, cleared and grubbed areas can create habitat for common nighthawk and killdeer. Although direct mortality to eggs and young birds is possible, the risk can be reduced with the implementation of mitigation measures.
Direct mortality or injury may also result from vehicle strikes associated with increased traffic within the PA during all Project phases. Traffic in the Project Area is expected to be higher during construction and decommissioning phases of the Project and lower during operation phases of the Project. Species at increased risk are grouse, pheasants and similar species, as these species are known to use roadways for travel, territory establishment, and foraging (Madden & Perkins, 2017; Whitaker et al., 2010). It should be noted that there is existing local traffic in the LAA. The additional risk of increased traffics caused by the Project can be reduced with the implementation of road traffic mitigations in the Project Area.

Indirect mortality, injury, or sublethal effects may result from avian interactions with stormwater and wastewater ponds if poorly managed or if mitigation measures are not in place (Beck et al., 2015; Wren et al., 1997). Birds can mistake wastewater and stormwater ponds as their natural habitat (Meeker, 2023). If these ponds are not properly managed, birds may subsequently expose themselves to contaminants (e.g., metals, petroleum products; Beck et al., 2015; Wren et al., 1997). Furthermore, such ponds may create an environment which increases invertebrate abundance and may attract avifauna to forage. Birds selecting to nest in poorly managed man-made ponds are at greatest risk of exposing eggs and young to contaminants (Thongcharoen et al., 2018). Although poorly managed stormwater and wastewater ponds present a risk to avifauna; proper management and mitigation measures should reduce this risk. Netting covering the ponds is an effective mitigation measure for deterring birds from facilities with these types of ponds (Riley et al., 2012).

Direct and indirect mortality could result from short or long-term exposure to varying levels of contaminants from accidental spills and leaks from industrial equipment during the construction phase or from the facility during operations. Accidents could include equipment fuel or lubricant leaks and oil and gas spills. Risks from these situations can be reduced with the implementation of well-established environmental standards and mitigation measures for construction projects and equipment.

A 30 m tall non-flaring exhaust stack is planned as a component to the facility. The temperature of the exhaust will be 452ºC, which would pose a lethal risk to birds if they were too close. Exhaust stacks are known to cause avian mortality and injury (Avery, 1979; ECCC, 2015a; Erickson et al., 2005; Riley et al., 2012). Birds can be impacted by directly flying into the stack or the exhaust can cause injures or mortalities. The main concern would be if birds perch or fly close to the stack exhaust (Keeping Company with Kestrels, Inc. & EDM International, Inc., 2013).

According to the (Bjorge, 1987) exhaust emissions and not collisions or flame incineration were thought to be the primary cause of death of 3,000 migratory birds at an oil industry site in Alberta. Observed edema and pulmonary congestions in the birds' suggested emissions as the probable cause of injury and mortality. The incident occurred during cloud cover, fog, rain, and cold temperatures. An avian mortality event occurred at the Canaport LNG facility in Saint John New Brunswick on September 13 and 14, 2013 from a flare stack which was burning natural gas. More than 7,500 fatalities were attributed to direct and indirect impacts from the burning gas emitting from the flare stack. Deaths of 26 species of migratory birds were recorded including Canada warblers. As a result of the incident, the company monitors migratory bird activities weekly using the Cornell Lab of Ornithology's regional migration forecasts and implements mitigation measure to minimize the risks of the event re-occurring (ECCC, 2015a). A custom fitted spike collar may deter birds from perching on the stack (Keeping Company with Kestrels, Inc. & EDM International, Inc., 2013). In addition, removing suitable perching areas – such as trees and poles – within a 120 m radius, and avoiding placing the stack between perching areas, may reduce the impacts of collisions and emission impacts. Adding lighting such as strobe lights on the stacks that blink briefly could reduce avian mortality from collisions with the stacks (Avery, 1979).

Chimney swifts could be attracted to the exhaust stack since this species often chooses to nest or roost in anthropogenic structures such as chimneys, vent pipes, wells, and silos (NSNR, 2023b). They prefer structures with openings >28.5 cm and internal temperatures between 13ºC (NSNR, 2023b) and 42.2ºC (ECCC, 2019c). Temperatures, exceeding 43ºC are possibly fatal to eggs and hatchlings (ECCC, 2019c). The opening of the stack will be 3.5 m, and the temperature of the exhaust will be 452ºC which would be fatal to chimney swifts if they tried to enter the stack while it wasn't running and it suddenly turned on. To prevent injury and possible mortality, screening the opening of the stack should deter any swifts from investigating the exhaust stack for roosting or nesting habitat (ECCC - CWS, 2021). Adding a metal liner on the inside of the stack could discourage chimney swifts from nesting (Fitzgerald et al., 2014).

Overall, there is a low potential for direct or indirect mortality and injuries to birds from Project activities with the implementation of mitigation measures. The potential for direct mortality is expected to be low and infrequent.

10.4.7 Mitigation

The primary mitigation for avifauna is avoidance in the siting of infrastructure, including:

- Minimizing impacts to the terrestrial environment (e.g., limiting infrastructure impact).

- Avoidance, to the extent possible, of important bird habitats, such as wetlands, mature forest stands, coastlines, etc. to reduce the impact of habitat changes. This includes siting Project infrastructure within areas with existing disturbances, such as existing roads and historically cleared areas.
- Minimize, as much as possible, removal of large diameter decaying trees (>40 cm DBH).

Mitigations to reduce effects on avifauna include:

Habitat Loss and Alteration

- Allow disturbed areas to naturally revegetate, where vegetation maintenance is not required during operations.
- Minimize use of herbicides for vegetation management during operations.
- Maintain compatible vegetation in vegetation management during operations [i.e., native successional species like maples (*Acer spp.)*, birches (*Betula spp.)*, aspen (*Populus spp.)*, etc.]
- Minimize, as much as possible, removal of large diameter decaying trees (>40 cm diameter at breast height).
    - Consider instalment of nest boxes to replace removal of snags and decaying trees. This can be an effective mitigation measure if placed on large trees that remain on-site after construction (Le Roux et al., 2016).
    - Consider restoration of natural breeding cavity sites through mechanically created tree hollows (Ellis et al., 2022; Griffiths et al., 2022; Rueegger, 2017).
- Minimize wetland alterations to the extent practicable.
- Conduct a pileated woodpecker nesting cavity survey as part of nest sweep surveys in the Project Footprint and the Project Area prior to clearing. During active construction, implement set back distances from known and identified avifauna nests within the Project Area such as pileated woodpecker and raptors. Set back distances should be agreed upon in conjunction with NSNR and/or ECCC/CWS.

Sensory Disturbance

- Minimize lighting, to the extent possible during operations. Where possible, implement the use of LED lights, strobe lights, lasers, shielding to prevent light escaping above the horizontal plane, and motion-activated lighting when applicable (i.e., for employee safety).
- Turn off high intensity lights, including floodlights, at night outside of working hours, if possible, especially during the spring and fall migration period. Low intensity lighting would be used to the extent possible rather than high intensity lighting.
- Avoid the operation of exterior decorative lights such as spotlights and floodlights, whose function are to highlight features of buildings or to illuminate an entire building, unless safety is a factor.
- Install mufflers on construction equipment and vehicles to limit noise.
- Noises generated from the facility during operations such as the gas compressor need to meet provincial guidelines.

Injury and Mortality

- Adhere to ECCC guidelines on clearing windows for nesting migratory birds (i.e., outside of the April 15 to August 31 nesting window), where possible. If vegetation and tree clearing activities during the nesting/breeding season cannot be avoided, nest sweeps and area searches will be conducted by a qualified avian biologist to search for any confirmed breeding bird evidence which must be avoided (i.e., active nests and recently fledged juveniles).
- When vegetation and tree clearing activities take place during the non-nesting/breeding season, crew must be aware and look out for nests protected year-round under the 2022 update to the Migratory Bird Regulations (under the *MBCA*), which includes pileated woodpecker nests. Inactive and unoccupied pileated woodpecker nests are protected for 36 months and cannot be removed or destroyed without following specific ECCC-CWS procedures such as registration and notification under the ECCC Abandoned Nest Registry.
- Manage borrow pits, stockpiles, and exposed sedimentation banks to reduce the attraction of ground and burrow-nesters such as bank swallows. To discourage bank swallows, slopes should be gradual and not vertical (e.g., less than a 70 degree-slope; NSNR, 2020)
- Avoid disturbance of any ground- or burrow-nesting species should they initiate breeding activities within stockpiles or exposed areas during construction or operations, until chicks can fly, and the nesting areas are no longer being used. Exposed stockpiles will be limited or covered as much as possible during construction and operation phases.
- Minimize soil compaction along with the removal of hummocks, root masses, moss cover, ferns, and other ground vegetation that may provide good concealment of ground nests.
- Equip the exhaust stack with a custom fitted spike collar to deter birds from perching on the stack.
- Eliminate suitable perching areas within a 120 m radius of the exhaust stack.
- Screen the opening of the stack to deter chimney swifts from investigating the stack for roosting or nesting habitat.
- Design the stack interior with metal material or a metal liner to prevent birds from nesting.
- Implement bird deterrent measures on site ponds if necessary
- Establish speed limits within construction areas for vehicles to mitigate the effect of vehicle-avifauna collisions. Traffic signs will be installed to alert road users of speed limits and the presence of wildlife in the area.
- Maintain all equipment and machinery on site to reduce leaks and spills and noise and vibration emissions associated with malfunctions.
- Equip site machinery with spill kits and instruct site personnel on their use.
- Have designated garbage cans and pack out all waste to avoid attracting avifauna to the construction site. Maintain good housekeeping practices during construction to avoid indirectly feeding birds and potentially attracting nuisance wildlife.

Plans

- Develop a site reclamation plan in accordance with engineering standards and in consultation with NSECC and NSNR.
- Develop and implement a Wildlife Management Plan.
- Develop a spill response plan (within the Contingency Plan) and equip site machinery with spill kits and instruct site personnel on their use.
- Develop a fire and explosion response plan in accordance with provincial standards.
- Implement an air quality management plan based on best management practices for construction equipment, material, and standard operating procedures. Air emissions will be reduced during operations. Scrubbers and pollution control devices will be used to treat air emissions and comply with regulatory air emission thresholds.
- Incorporate a lighting plan for construction-related activities into the Wildlife Management Plan.

10.4.8 Monitoring

A site-specific post-construction Wildlife Management Plan will be developed in consultation with government regulators and all other relevant parties. This plan will include mitigation measures, monitoring, and adaptive management frameworks for minimizing impacts to avifauna.

10.4.9 Conclusion

With the implementation of mitigation measures, the residual impacts that may remain for avifauna include:

- Habitat loss and alteration
- Sensory disruption
- Mortality and injury

Habitat Loss and Alteration

Residual impacts of habitat loss and alteration are limited to the construction phase. The total loss of habitat for avifauna that will be removed by the Project Footprint is 125,000 m^2. Altered habitat is expected to account for 434,500 m^2. Forests and open areas support the most avian diversity within the Project Area and will be the most impacted habitats by Project construction. Although habitat will be removed and altered, similar suitable habitat for SAR and sensitive species was identified in the LAA during a desktop review and SAR habitat modelling. If these alternative suitable habitats are unoccupied, the affected species may choose those alternate habitat areas in lieu of the removed area. However, this may increase competition for territory, nesting areas, and foraging for the affected species' in the LAA (Chen & Wang, 2024). In addition to increased competition, habitat loss could alter migration patterns via reduction of stopover areas and negatively affect food availability and abundance (Chen & Wang, 2024). Additionally, altered habitat may favour some bird species whilst harming others, leading to a decrease in location-sensitive species, many of which are declining across their ranges in Canada (Akresh et al., 2024).

After the implementation of mitigation measures, the magnitude of effects on habitat loss and alteration during the construction phase is expected to be low. The initial effects of vegetation clearing and removal will be localized within the Project Area and aim to occur outside of breeding season to lesson stress on birds during their nesting period. The impacts are partially reversible as some areas cleared for laydown areas and stream crossings will be re-vegetated and rehabilitated. The residual effects of habitat loss and alteration are not anticipated to be significant as they are localized and would impact a low number of birds.

Sensory Disruption

Even with the implementation of mitigation measures and best management practices, some species may experience residual negative impacts to noise in the Project Area. Recent research on the impacts of noise from increased traffic, construction activities, and natural gas compressors has demonstrated that some bird species may choose to nest near noisy areas. Consequently the studies species have displayed reduced incubation time and hatching success (Sieving et al., 2024; Williams et al., 2021). On the other hand, if the noise begins after some species have selected their nests, some species may abandon them altogether (Ortega, 2012). Furthermore, birds nesting near higher levels of noise may experience damaged hearing; however, research has shown that birds can recover and heal from the damage (Ryals et al., 1999; Saunders & Tilney, 1982).

After the implementation of mitigation measures, the magnitude of effects on noise during the construction and decommissioning phases are expected to have a moderate impact to a small number of birds in the Project Area and the LAA. Noise generated by heavy machinery is expected to occur frequently during the active construction and decommissioning phases but will be intermittent. The impacts are reversible as birds can heal from hearing damage and since the potential impacts to reproduction success would be short term (i.e. limited to the active construction and decommissioning phases). The noise generated from the facility during operations is proposed to be intermittent and remain within guidelines but could still have moderate residual impacts on birds up to 500 m from the Project Footprint. During operations, the residual impacts of noise in the LAA beyond 500 m from the Project Footprint are expected to be low (Drawing 7.5).

Some species of birds may still experience minor negative impacts to lighting during operations even after the implementation of best management practices and mitigation measures. The primary impacts are expected to occur among owls in the Project Area and during spring and fall migration.

The residual effects of sensory disturbance are not anticipated to be significant as the effects would be localized and would impact a small number of birds.

Injury and Mortality

Following the implementation of mitigation measures, the death of birds will be minimized but not completely avoided due to accidental collisions with Project infrastructure (i.e., exhaust stack), vehicles, and heavy machinery during the life of the Project. Injuries and deaths from the exhaust emissions may also occur following the implementation of mitigation measures. Quantifying the potential death of birds from these impacts is not practical, as it requires information that difficult to predict or does not currently exist within the scientific community. The true abundance of each species would need to be known; all species in the community; and understand completely lethal and sub-lethal effects of construction activities – short-term and long-term – on each species. This is information beyond the ability of current science to establish.

After the implementation of mitigation measures, the magnitude of effects on mortality and injury throughout the life of the Project is expected to have a moderate impact to a small number of birds in the Project Area and low impact to birds in the LAA. The impacts of mortality are not reversible, but injury impacts are reversible. The residual effects of mortality and injury are not anticipated to be significant as the direct impacts are localized to the Project Area and would impact a low number of birds.

Summary

A summary of avifauna residual effects is presented in Table 10.17.

Table 10.17: Avifauna Residual Effects

VC Interaction	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
Habitat Loss and Alteration	See Section 10.1.8	**Adverse**	**Low** Small loss of fauna habitat or small sensory disturbance to fauna.	**LAA**	**Single Event** Impacts to avifauna habitat will occur during the construction phase	**Short Term** Habitat loss and alteration occur in the construction phase	**Partially Reversible** Some habitat loss or alteration may be reversed by site rehabilitation	Not Significant
Sensory Disturbance	See Section 10.1.8	**Adverse**	**Moderate** **I**mpact on a small number of birds in the PA and LAA up to a 500 m radius from the PF **Low** **I**mpact to birds in the LAA beyond 500 m from the PF.	**PA and LAA**	**Intermittent**	**Medium Term** Residual impacts of sensory disturbance due to noise and light will end after decommissioning	**Reversible**	Not Significant
Injury and Mortality	See Section 10.1.8	**Adverse**	**Moderate** Impact on a small number	**PA and LAA**	**Intermittent**	**Medium Term** Mortality and injury will end	Mortality is **irreversible**, injury is **reversible**	Not Significant

VC Interaction	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
			of birds in the PA **Low** Impact to birds in the LAA.			after decommissioning		

<u>Effects Assessment Ratings (Refer to Table 4.2 for definitions)</u>
Nature of Effect: Adverse, Positive
Magnitude: Negligible, Low, Moderate, High
Geographic Extent: PF, PA, LAA, RAA
Frequency: Single Event, Intermittent, Continuous
Duration: Short Term, Medium Term, Long Term
Reversibility: Reversible, Irreversible, Partially Reversible

11.0 SOCIO-ECONOMIC ENVIRONMENT

11.1 Economy

11.1.1 Overview and Assessment Methodology

The assessment of the economy included consideration of local demographics, income, and businesses, as well as the economic contributions of the Project to the local economy through a review of the following resources:

- Census of Population – Statistics Canada (Statistics Canada, 2023)
- Taxation legislation
- Public mapping resources
- Economic data from the Proponent

11.1.2 Existing Environment

The Project is in MOPC within the community of Marshdale. Communities near the Project include (Drawing 11.1):

- Lorne (approximately 3.2 km southeast of the Project center)
- Hopewell (3.6 km north)
- Concord (4.3 km west)
- White Hill (4.5 km north)
- Eureka (6.8 km north)
- Glengarry Station (7 km south)

The Project is also approximately 12 km from New Glasgow, which is the largest metropolitan area within MOPC. The Project is in the Pictou Subdivision B census subdivision (Pictou Subd. B) and this census subdivision was used to summarize statistics throughout this chapter (Table 11.1). Notably, Pictou Subd. B does not include New Glasgow, which was considered when summarizing the subdivision (Drawing 11.1).

The population of the largely rural Pictou Subd. B has decreased slightly between 2016 and 2021, contrary to the large increase seen in the provincial trend. As most population growth occurred in larger economic centres, it is expected that New Glasgow received most of the MOPC's population growth. Pictou Subd. B has a much lower population density than the provincial population.

Table 11.1: Population Characteristics from 2016-2021 for Nova Scotia and Pictou Subd. B.

Population Statistics	Nova Scotia	Pictou Subd. B
Population in 2021	969,383	6,137
Population in 2016	923,598	6,174
Population changes from 2016-2021	+5.0%	-0.6
Total private dwellings in 2021	476,007	2,817

Population Statistics	Nova Scotia	Pictou Subd. B
Land area	52,824.71 km^2	770.57 km^2
Population density	18.4/km^2	8.0/km^2

Source: (Statistics Canada, 2023)

The median age distribution in Pictou Subd. B reveals a median age of 51.6, which is 6 years higher than the provincial median age (45.6) (Statistics Canada, 2023). Further statistics on age distribution in 2021 were compared for the province and Pictou Subd. B (Table 11.2), revealing that Pictou Subd. B has proportionally fewer people in both 0 to 14 and 15 to 64 years age groups, indicating fewer eligible people of working age or who will join the workforce within the next one to two decades.

Table 11.2: Age Distribution in 2021 in Nova Scotia and Pictou Subd. B

Age Statistics	Nova Scotia	Pictou Subd. B
0 - 14 years	136,710 (14.1%)	830 (13.5%)
15 - 64 years	617,345 (63.7%)	3,640 (59.3%)
65+ years	215,325 (22.2%)	1,665 (27.1%)
Total Population	**969,380 (100%)**	**6,135 (100%)**

Source: (Statistics Canada, 2023)

Median housing costs and median household total incomes in 2020 for Pictou Subd. B were compared to the provincial, and national values (Table 11.3). The median total income for Pictou Subd. B is $36,400, $1,600 less than the provincial median income and $4,600 less than the national median income. Similarly, the median dwelling value of Pictou Subd. B was $80,000 less than the provincial value, which itself is less than half the national median.

Examining the relative value of median total income and median dwelling value across the jurisdictions demonstrates that housing is more affordable for those on a median income in Pictou Subd. B than in Nova Scotia or Canada as a whole. This is corroborated by the percent of provincial and national owner and tenant households spending over 30% of their income on shelter costs, although this figure may be skewed by legacy homeowners or renters in Pictou Subd. B who either own their property outright or have longstanding leases lower than regional averages.

Table 11.3: Housing Costs and Average Individual Income in 2020 for Canada, Nova Scotia, and Pictou Subd. B

Housing and Income Statistics	Canada	Nova Scotia	Pictou Subd. B
Median total income	$41,200	$38,000	$36,400
Median dwelling value	$618,500	$250,000	$170,000
Median total income as a % of median dwelling value	6.7%	15.2%	21.4%
Median monthly shelter costs for owned dwellings	$1,498	$870	$675

Housing and Income Statistics	Canada	Nova Scotia	Pictou Subd. B
% of owner households spending 30% or more of its income on shelter costs	14.8%	9.7%	8.4%
Median monthly shelter costs for rented dwellings	$1,209	$1,000	$900

Source: (Statistics Canada, 2023)

Most residents in Pictou Subd. B (99.3%) use English as their first official language spoken (Statistics Canada, 2023). Because of this, all public outreach and communication for the Project has been and will continue to be in English. There is some knowledge of other languages, though no communication has been requested in other languages.

The nearest fire station to the Project Area is the Eureka Fire Department, approximately 7.2 km north of the Project Area on Stellarton Trafalgar Road. East River Valley Fire Department is also nearby, approximately 9.9 km east of the Project Area on East River East Side Road (Drawing 11.1).

Health and emergency services also exist in the area and are accessible to Project workers if the need should arise. The closest location is the Aberdeen Hospital in New Glasgow, approximately 15.6 km north of the Project on East River Road (Drawing 11.1).

Statistics indicate that the unemployment rate in 2021 for Pictou Subd. B was 12.3%, which is slightly lower than the provincial rate of 12.7% (Statistics Canada, 2023). The employment rate for Pictou Subd. B was 49.5%, which is also slightly lower than the provincial employment rate of 51.9% (Statistics Canada, 2023).

Table 11.4: Employment Statistics for Canada, Nova Scotia, and Pictou Subd. B

Unemployment Statistics	Canada	Nova Scotia	Pictou Subd.B
Employment rate	57.1%	51.9%	49.5%
Unemployment rate	10.3%	12.7%	12.3%

Source: (Statistics Canada, 2023)

The top five industries in the province in 2017 were compared with the top industries in Pictou Subd. B (Table 11.5), as categorized under the North American Industry Classification System (Statistics Canada, 2023). The highest proportion of workers in Pictou Subd. B fall into the “retail trade” and “health care and social assistance” categories (17.8% and 16.7%, respectively). Other significant industries include “manufacturing” and “construction” (Statistics Canada, 2023).

Table 11.5: Top Industries for the Employed Labour Force in 2017 in Pictou Subd. B Compared to the Province of Nova Scotia

Industry	Pictou Subd. B	Nova Scotia
Accommodation and food services	175 (6.4%)	30,010 (6.2%)
Agriculture, forestry, fishing and hunting	145 (5.3%)	17,880 (3.7%)
Construction	305 (11.1%)	35,720 (7.3%)
Educational services	140 (5.1%)	38,425 (7.9%)
Health care and social assistance	460 (16.7%)	70,595 (14.5%)
Manufacturing	310 (11.3%)	31,210 (6.4%)
Mining, quarrying, and oil and gas extraction	45 (1.6%)	3,065 (0.6%)
Retail trade	490 (17.8%)	58,985 (12.1%)
Transportation and Warehousing	120 (4.4%)	19,930 (4.1%)
Others	560 (20.3%)	181,440 (37.2%)
Total Employed Labour Force 15 Years +	**2,750**	**487,260**

Source: (Statistics Canada, 2023)

New Glasgow is the closest economic centre, located approximately 12 km north of the Project and offered a range of business services. A review of some of the businesses located near the Project was completed and is shown in Table 11.6.

Table 11.6: Local Businesses and Proximity to Study Area

Business	Distance and Direction to the Project[(1)]
Marshdale Farm	1.1 km North
Dogs on Point	1.5 km Southwest
South Hill Designs by Angela C	4 km Northeast
G & S Aikens Auto	4.1 km Southeast
Hopewell Links Golf Course	4.3 km Northeast
Dusty Dog K9Care	5.1 km Northeast
Gail's Zesty Epicure	6.3 km North
Sea Level Sound	6.3 km Northeast
Eureka Farm	6.7 km Northeast
Fitzpatrick Masonry Ltd	6.7 km Northeast
Mystical Scents Soy Candles n More	7 km Northeast
Hodgson Kitchen & Woodworking	7.6 km Northeast
MacGregor Dairy Farm Limited	8.3 km Northeast
MacGibbons Contracting Ltd.	13.7 km North
N.R. Kenney Contracting Ltd.	14.7 km North
Balodis Incorporated	15.2 km North

Business	Distance and Direction to the Project[1]
MacGregors Industrial Group	16.0 km Northeast

[1] All distances were measured from the centre of the Study Area by a straight line.

Aside from the immediate New Glasgow area, the communities of Stellarton, Trenton, Plymouth, Pictou, and others surrounding New Glasgow are also dependent upon for a variety of shops and services. All surrounding areas near the Project all generally dependent on New Glasgow for health care facilities, including emergency services and inpatient care. Many residents of the communities surrounding the Project Area would commute daily to New Glasgow or the greater New Glasgow area for employment purposes.

11.1.3 Effects Assessment

Project-Economy Interactions

Project activities have the potential to interact with the economy during all phases of the Project (Table 11.7).

Table 11.7: Potential Project-Economy Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	X
Site Preparation	X
Placement of Sedimentation and Erosion Control Measures	X
Clearing and Grubbing	X
Civil Site Construction	X
Equipment Installation	X
Interconnections for Services	X
Removal of Temporary Works and Site Restoration	X
Commissioning	X
Operations and Maintenance	
Facility Operation and Maintenance	X
Site Management	X
Decommissioning and Rehabilitation	
Infrastructure Removal	X
Site Reclamation	X

Assessment Boundaries

The LAA for economy is Pictou Subd. B.

Assessment Criteria

The VC-specific definition for magnitude is as follows:

- Positive: Project is expected to have a positive effect on the economy.
- Negative: Project is expected to have a negative effect on the economy.

Effects

The valuation of economy incorporates the employment rate, income of residents, industry characteristics and services offered with a given area.
As a result of construction and operations activities, the following effects to the economy are anticipated:

- An increase in employment opportunities for the local community, Mi'kmaq of Nova Scotia and equity-seeking groups.
- An increase in economic prosperity within Mi'kmaq of Nova Scotia communities.
- Local businesses may experience increased sales and/or patronage.
- An increased demand for short-term accommodations.
- An increased demand in the food services, construction, health care and social assistance, and retail trade industries.
- An increase in essential services to meet demand.
- An increase in employment opportunities, especially in the areas of accommodation and food services, education, health care, and social assistance sectors.

The Proponent is committed to sharing economic opportunities with the local community throughout the development and lifespan of the Project via the use of local skills and labour where possible (e.g. jobs, training), and via municipal tax revenue. While the specific municipal tax revenue amount has not yet been determined, the amount will be based on facility size, road upgrades, commercial rate, and comparable local and provincial facilities.

The Project Team has and will continue to engage the community, local businesses, business groups (e.g. Pictou County Chamber of Commerce, Pictou County Partnership), and municipal staff and leaders to help identify Project-related opportunities and benefits for the local community. Further, the Proponent will compile a local business directory to identify local skilled people and businesses that can contribute to Project construction and operations activities. The directory will then be shared with the independent project development team who will design, build, own, and operate the facility to facilitate the use of local resources to the extent possible.

The Proponent understands the importance of finding a suitable project development team to execute the final design and construction of the Project to the values as indicated by the Proponent, through the Request for Proposal (RFP) Process to be initiated in January 2026. This RFP process offers the opportunity for an independent project development team to design, build, own, and operate this facility, with the permitting process already underway. Project design conducted by the project development team will be committed to adhering to all permitting conditions that follow from this EARD/IPD submission. Elements of project design and job creation throughout the lifespan of the Project may include the following:

- Project Development: During the development phase of the Project, Nova Scotian professionals have and will continue to deliver services in a variety of areas, including civil and electrical engineering, geotechnical engineering, legal, environmental, and biological surveys, archaeological, land and community relations, and many others. Dozens of professionals within Nova Scotia will render their services as part of the development of the Project.
- Construction: Throughout the construction phase of the Project, a workforce will be required that will fluctuate throughout the construction period. Much of the construction employment will come through contracting and subcontracting of Canadian, and where possible, Nova Scotian construction firms and specialized service providers. It is estimated that the Project will require approximately 100 to 125 short-term jobs for varying scope and duration throughout the construction period. The largest construction scopes of work are anticipated to be:
  - Civil installation, that is, land clearing, grubbing, road construction, and foundation installation, which includes:
    - Excavating
    - Rebar supply and installation
    - Forming
    - Concrete supply and pouring
    - Grouting
  - Electrical installation, that is connection to the NS Power grid and/or other power supplies, which includes:
    - Underground and overhead installation
    - Cable terminations
    - Electrical testing
    - Instrument installation and testing
- Operations and Maintenance: The operational Facility will require long-term operations and maintenance technicians to be located either on-site or within short driving distance of the Project. It is generally anticipated that an on-site operations manager will be required to run the day-to-day operations. This individual will work closely with local service providers who will carry out maintenance work. In all, it is anticipated that there will be 10 to 15 long-term positions and additional casual employment opportunities associated with the Project, including the maintenance technicians described above. The employment associated with operations and maintenance is long-term, local, stable, and well-paying jobs requiring skillsets such as experience managing facilities.
- In addition to operations and maintenance of the Project, there will be a variety of facility activities that will require on-going resources such as snow removal and road surface maintenance, administrative support, inventory/materials management, shipping, scheduling, and coordination of maintenance inspections to accommodate

the facility's operation (i.e., power collection system, electrical substation inspections, etc.).

In addition to the direct investments that the Project would bring to Nova Scotia's economy, the Project will result in indirect and induced economic benefits that will be realized by governments, local businesses, communities, and residents. Workers that are directly involved with the development, construction, and operations would contribute to the local economy by redistributing wealth to a variety of goods and services such as hotels, restaurants, and grocery stores (NREL, 2016).

Mitigation
The economic impact to the LAA is positive; therefore, no mitigation is proposed.

Monitoring
A specific monitoring program for the economy is not recommended.

Conclusion
The impacts to economy are characterized in Table 11.8.

Table 11.8: Economy Effect Assessment Table

VC Interaction	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
Economy	No mitigations	**Positive**	**Positive** Expected to have a positive impact on the economy	**LAA**	**Continuous** Occur continuously during the Project lifespan	**Long Term** Effects are expected throughout operations and into decommissioning	**Irreversible** Effects are unlikely to be reversed	No significant negative impacts. Positive impacts are expected due to economic stimulus.

Effects Assessment Ratings (Refer to Table 4.2 for definitions)
Nature of Effect: Adverse, Positive
Magnitude: Negligible, Low, Moderate, High
Geographic Extent: LAA, RAA
Frequency: Single Event, Intermittent, Continuous
Duration: Short Term, Medium Term, Long Term
Reversibility: Reversible, Irreversible, Partially Reversible

11.2 Land Use and Land Value

11.2.1 Overview and Assessment Methodology

The assessment of land use and land value was completed through a review of desktop resources to evaluate how the Project may interact with this VC. Recreation and tourism will also be discussed as there are instances of such usage near the vicinity of the Project Area and the relatively proximity to New Glasgow. The following resources were reviewed:

- Nova Scotia property records
- Public mapping resources
- Nova Scotia Visitor Exit Survey (TNS, 2024)
- Review of local governments' tourism and recreation websites:
  - Town of New Glasgow (New Glasgow, 2025)
  - Town of Stellarton (Stellarton, 2025)
  - Municipality of Pictou County (MOPC, n.d.)

11.2.2 Existing Land Use

The Project is within the MOPC and consists entirely of one private PID (PID 00910307) owned by the Proponent. It is located near a natural gas pipeline corridor in Marshdale, along White Hill Road and Lorne Station Road, and consists of treed forests, clear-cuts, old harvester trails, and some patches of wetlands (Drawing 11.1). Residential properties are located nearby, with the closest residence (MR02) approximately 833 m north of the closest edge of the Project Footprint. It is assumed that property values for these residential properties fall under similar values as listed in table 11.3 in section 11.1.2, but inflation may have increased actual land values.

While there are no proposed or approved developments within 5 km of the Project (following the NSECC EA process), there are several projects near the Marshdale and southern New Glasgow area. The McLellans Brook Wind Energy Project is a six-megawatt community-owned wind development that received EA approval in 2013 (NSECC, 2013) and construction was completed in 2014. There is also the MacLellans Mountain Quarry Expansion Project, which is a 32.5 ha quarry expansion project in McLellans Brook that received EA approval in 2019 (NSECC, 2019a).

Evidence of recent human usage was identified throughout the Project Area. There is one driveway intersecting from White Hill Road into the Project Area, with signs of overgrown harvester trails intersecting the driveway. A modern structure was found at the end of the driveway/road, and some modern utilities were spotted throughout the Project Area. This structure is constructed of plywood and plastic tarps, and while its purpose is uncertain (it may have been a platform or bit of decking), it is not a residence and is not considered a receptor. These findings support assumptions that the Project Area demonstrated signs of past and current land use.

Several public protected lands and parks are also located in the vicinity (Drawing 3.3) including (all distances measured from the centre of the Project Area, as indicated):

- Hopewell Conservation Land, approximately 4.8 km north of the Project Area
- Drug Brook Nature Reserve, approximately 5.7 km southeast of the Project Area
- Upper Stewiacke Wilderness Area, approximately 8.2 km southwest of the Project Area

The closest Mi'kmaq reserve to the Project is the Boat Harbour West Indian Reserve No. 37, approximately 23.5 km west of the Project Area (Drawing 3.2). Further discussion on the interactions with the Mi'kmaq of Nova Scotia can be found in Section 13.0.

Based on a review of Nova Scotia's Mineral Resource Land Use Atlas (2021d), there are no identified active licenses for mineral exploration within the Project Area. Further consideration of the Project's geophysical environment is included in Section 8.1.4.

11.2.3 Outdoor and Cultural Land Use

The communities of Marshdale, Hopewell, as well as other communities near New Glasgow, are home to a variety of primarily outdoor recreational activities. Outdoor recreation opportunities involved the use of trails, beaches, and other unstructured recreation venues. Within the Project Area, there is one trail providing access into the property (and old driveway) area, with signs of ATV and hunting uses. While outdoor activities are popular, indoor community or recreation centres are also available, with some including outdoor infrastructure, in the nearby communities of Plymouth, Stellarton, Westville, and New Glasgow.

The region is also known for its recreational offerings such as hiking, camping, biking, and going to the beach. There are several notable outdoor recreation areas near the Project Area, including the Hopewell Heritage Foot Bridge Nature trail, Riverside Park West Branch East River trail, and the Concord Bridge.

Pictou County has a rich history and offers a variety of museums and historical and cultural attractions, including the Pictou County Historical Society and Pictou County Sport Heritage Hall in New Glasgow. Other forms of cultural entertainment include the Glasgow Square Theatre, situated on the East River of Pictou and hosted year-round music and entertainment shows (New Glasgow, 2025; Stellarton, 2025). While these attractions are outside of the Project Area's vicinity, it is expected that the region will receive an influx of visitors and traffic that may result in spillovers to the surrounding attractions, including areas near the Project Area.

11.2.4 Effects Assessment

Project-Land Use and Recreation Interactions

Project activities have the potential to interact with land use during all phases of the Project (Table 11.9).

Table 11.9: Potential Project-Land Use and Recreation Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	X
Site Preparation	X
Placement of Sedimentation and Erosion Control Measures	X
Clearing and Grubbing	X
Civil Site Construction	X
Equipment Installation	X
Interconnections for Services	X
Removal of Temporary Works and Site Restoration	X
Commissioning	X
Operations and Maintenance	
Facility Operation and Maintenance	X
Site Management	X
Decommissioning and Rehabilitation	
Infrastructure Removal	X
Site Reclamation	X

Assessment Boundaries

The LAA for land use includes Pictou Subd. B, which does not include the town of New Glasgow.

Assessment Criteria

The VC-specific definition for magnitude is as follows:

- Negligible: No change to surrounding land and recreational use can largely continue as is.
- Low: Minor limitations to surrounding land use and land value.
- Moderate: Moderate limitations to surrounding land use, land value, and recreational use.
- High: High change in recreation and/or widespread limitation to surrounding land use, land value, and recreational use.

Effects

Land Value

Land value assesses the existing property that the Project will reside within, and the impacts Project development may have on neighbouring properties and/or surrounding environment. As a result of construction and operational activities, the following effects to land use and values are anticipated.

- An increase in development opportunities because of the influx of employment opportunities and people relocating to the area for Project work.
- Changes in housing values based on demand.
- As a result of construction activities, an increase in short-term rental and commercial space leases is anticipated.

Due to the lack of empirical evidence regarding the impact of this type of facility on property value, the extent of the Project's impact on adjacent land use and housing values remains inconclusive. While some studies found potential impacts from industrial facility proximity to residential areas, these impacts are often constrained by the spatial extent of a facility's presumed impact and the facility's size (de Vor & de Groot, 2009; Farber, 1998; Wang & Levinson, 2023).

The Facility site has been carefully selected to align with existing land uses and minimize potential impacts on nearby properties. The Proponent has focused on locations appropriately zoned and set back from residential areas where possible. Modern design standards, environmental safeguards, compliance with environmental constraints, and mitigation measures – such as noise and visual buffers – will help ensure the facility operates safely and unobtrusively, as well as minimize impacts on nearby property values. Considering the presence of proposed mitigations for noise, dust, groundwater wells, and other factors (see Section 7.2.6 and Section 7.2.8) that will be implemented during Project's phases, along with the Project's limited size and contained footprint, it is expected that the Project is unlikely to significantly influence residential housing values.

Outdoor and Recreation Use

Tourism Nova Scotia (TNS) published a visitor exit survey, based on data collected from April 1, 2022 to March 31, 2023 (TNS, 2024). The report provides information about domestic, Canadian, and international visitors to Nova Scotia, but does not include information about activities undertaken by visitors travelling for pleasure. The previous visitor exit survey completed in 2019 did collect information on the reason for people's visits and activities that visitors undertook while in Nova Scotia (TNS, 2021). The top five main reasons for visiting Nova Scotia in 2019 among pleasure visitors were:

- For the scenery/natural landscape (22%)
- To visit a specific area or location in Nova Scotia (18%)
- For the seacoast and ocean (14%)
- To do a specific activity (8%)
- To experience Nova Scotia's culture (8%)

Of those who participated in outdoor activities, the most common were coastal sightseeing, visiting a beach, and hiking (TNS, 2021). No spatial data are available from this or other research products of TNS regarding the places visited within province, limiting the understanding of the impact that tourism has on the communities that surround the Project. Given the high prevalence of minimally structured and uncommercialized activities (e.g. hiking and beach exploration), the low prevalence of tourism providers near the Project Area would not necessarily be a deterrent to tourists using the area.

The region is also known for its recreational offerings such as hiking, camping, biking, and going to the beach. There are several notable outdoor spots near the Project Area, including the Hopewell Heritage Foot Bridge Nature trail and the Concord Bridge; however, none are found to be impacted by the Project Area. Furthermore, there are no published or public trails within the Project Area on the public trail repository AllTrails.com (n.d.); a popular and well-used source for information about hikes globally recommended by Hike Nova Scotia as the source of information about trails in Nova Scotia. Despite the presence of some trails intersecting throughout the Project Area, it is unlikely that these trails contributed to the overall tourism and recreational enjoyment of Pictou Subd. B or the county. Enjoyment of the region's outdoor recreational activities is not expected to be impacted by the Project and Pictou County will remain an area of interest for visitors.

- Outdoor recreational activities such as snowmobiling, ATV use, fishing, and hunting are unlikely to be impacted by the Project as the Project Area does not overlap with any areas dedicated to these activities.
- Construction activities will be temporary, and any incidental encounters with recreational users (e.g., potential hunting activities) will be short-term and temporary.
- The Project is located within a private area, and recreational activities are not permitted within this area.
- An increase in the number of local outdoor recreational users may be experienced (because of the influx of personnel associated with the Project).

It is difficult to determine with certainty how tourists will react to a power generation facility. Industrial facilities can be seen to detract from natural scenery and a community's aesthetic. However, there is an opportunity to attract visitors to the Project during operation using industrial tourism. One study highlighted the economic potential of industrial tourism, inviting visitors to view public-facing aspects of the participating facilities while drawing a fraction of the tourisms to the local businesses and attractions (Otgaar & Klijs, 2010). Demonstrating the quality of the location and facilities may also provide additional promotions to the project and individual company, potentially raising awareness on the industrial facility and its processes to the local community (Montenegro et al., 2023).

As discussed above, the Project is compatible with most land-based recreation activities and is not expected to limit the usability of the area. The Proponent is committed to engaging with local recreational groups on the continued enjoyment of the region's recreational and tourism attractions, including addressing the value and possibility of continued use of the local trail within the Project Area.

Mitigation
While no specific mitigation related to land value is proposed, the Proponent is committed to continuing to engage with neighbouring landowners and nearby communities to solicit feedback and will assess any potential impacts brought forward as the Project progresses.

To reduce the impacts on recreation and tourism during Project phases, the following mitigation measures will be applied:

- Continue to work with local recreation groups to ensure continued access within the Assessment Area for recreation and hunting/trapping.
- Continue to work with nearby landowners to ensure there is a positive and productive relationship within the community.

Monitoring

A specific land use and recreation monitoring program is not recommended.

Conclusion

The impact to land values, land use, recreation, and tourism are listed in Table 11.10.

Table 11.10: Land Use Effects Assessment

VC Interaction	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
Land value	Working with neighbouring landowners and the local communities.	**Adverse**	**Negligible** No expected impact	**LAA**	**Continuous** Occur continuously during the Project lifespan	**Long Term** Effects will last through the decommissioning phase.	**Reversible** Residual effects are likely to be reversed after the Project is completed.	No significant impact
Recreation and Tourism Use	Continue to work with local recreation groups and nearby landowners on continued land use	**Adverse**	**Negligible** No direct impact on recreation and tourism activities	**LAA**	**Continuous** Occur continuously during the Project lifespan	**Medium Term** Effects will last through the decommissioning phase	**Reversible** Effects will terminate at the end of the construction phase.	No significant impact

Effects Assessment Ratings (Refer to Table 4.2 for definitions)

Nature of Effect: Adverse, Positive
Magnitude: Negligible, Low, Moderate, High
Geographic Extent: LAA, RAA
Frequency: Single Event, Intermittent, Continuous
Duration: Short Term, Medium Term, Long Term
Reversibility: Reversible, Irreversible, Partially Reversible

12.0 ARCHAEOLOGICAL RESOURCES

12.1 Overview

The purpose of the ARIA is to identify areas of archaeological potential within the Project Area. Cultural Resource Management Group Limited (CRM Group) was contracted to conduct the ARIA, which took place in 2025 with fieldwork conducted on September 25, 2025. This section discusses the results of the assessment.

12.2 Regulatory Context

The *Special Places Protection Act,* R.S., c. 438 s. 1 provides the province of Nova Scotia with a mandate to protect important archaeological, historical, and paleontological sites and remains, including those underwater. A permit is required for any archaeological or paleontological exploration or excavation in Nova Scotia. The permit system ensures that work is completed based on established standards by qualified applicants (Nova Scotia, 1989a).

This ARIA was conducted in accordance with the terms of Heritage Research Permit A2025NS176, issued by the NSCCTH – Special Places Program.

As archaeological work can often result in findings or information that is confidential or sensitive, a summary of the results of the ARIA is provided in the EARD/IPD, with the ARIA report provided directly to NSCCTH for review. It is understood that the findings and recommendations of the ARIA are considered “draft” until the report is accepted by NSCCTH.

12.3 Assessment Methodology

The objectives of the ARIA were to:

- Evaluate the potential for archaeological resources within the Project Area.
- Identify, delineate, and investigate (where recommended) areas considered to exhibit high potential for encountering archaeological resources.
- Provide detailed and accurate information on the results of the survey.
- Provide comprehensive recommendations so that appropriate archaeological resource management strategies can be devised.

To achieve these objectives, CRM Group applied an assessment strategy consisting of engagement with Kwilmu’kw Maw-klusuaqn’s Archaeological Research Division (KMK-ARD), desktop (background review), field components (field reconnaissance and exploratory subsurface testing), and analysis.

CRM Group’s engagement with KMK-ARD involved requesting available information pertaining to traditional or historical Mi’kmaw use of the Project Area to expand upon the results of other forms of background review. The information shared by KMK-ARD provided a better understanding of the cultural and archaeological importance of the Project Area.

CRM Group's background review examined the historical, cultural, environmental, and topographic context of the Project Area to identify areas of high archaeological potential. This included a review of the following resources:

- Maritime Archaeological Resource Inventory (MARI) forms
- Nova Scotia archives
- Nova Scotia Museum
- NSNR Natural Sciences Library
- Nova Scotia Registry of Deeds
- Nova Scotia Property Online
- Nova Scotia Crown Land Information Management Centre

In Nova Scotia, MARI is maintained by the Nova Scotia Museum, on behalf of NSCCTH. Reports from past archaeological assessments and academic research conducted near the Project provide archaeological context, which informs the interpretation and evaluation of any potential archaeological resources identified during the field component of the ARIA.

Many of these steps were informed by analysis of legal survey and historic maps, land grant records, and local and regional histories. Proximity to existing registered archaeological sites, heritage properties, cemeteries, Mi'kmaq First Nation Lands, Crown land parcels, and Nova Scotia Protected Areas was also reviewed.

Additionally, LiDAR Digital Elevation Models, satellite, and current and historic topographic maps and aerial photos were used to assess topography and to identify remains of historic infrastructure. Results of the desktop assessment inform the design of the field component and provide context for any resources found during field assessment.

Field reconnaissance included a visual assessment of the Project Area to delineate areas of low, medium, or high archaeological potential, which was accomplished by walking transects throughout the Project Area. Archaeologists searched for anomalies such as historic structural remains, cultural landscape elements, culturally-modified trees, petroglyphs, and exposed artifacts. Environmental conditions associated with past settlement such as relatively flat, dry land, topographic high points, and proximity to transportation routes were also considered. The visual assessment was followed by exploratory subsurface testing to investigate the depth and composition of sediment stratigraphy at a representative location within the Project Area. Exploratory subsurface testing consisted of a single archaeological shovel test. Data collected included photographs, field geomatic data, field sketches, field notes, and a shovel test form.

Upon completion of field activities, analysis, and interpretation, the results of the assessment were summarized in the ARIA report (submitted to NSCCTH), including recommendations for appropriate resource management strategies. Photographs, detailed plans, and GIS-based mapping of the testing area were also included in the ARIA report.

12.4 Assessment Results

Desktop analysis and engagement found that there were no reported archaeological sites, cemeteries of archaeological significance, or other cultural heritage features in the vicinity of the Project Area, however, the Project Area had not been subjected to archaeological investigation prior to the ARIA. The desktop analysis revealed a possible structure identified on historic mapping and LiDAR-DEM imagery within the Project Area.

The field component of the ARIA, conducted under Heritage Research Permit A2025NS176, was carried out on September 25, 2025. The fieldwork resulted in the identification of three potential archaeological features at the approximate location of the possible structure identified during the desktop analysis. These features are considered to exhibit high archaeological potential and were recorded as HPA-01. Due to the sensitive nature of potential archaeological features, their characteristics and locations have not been included in this report but will be provided to NSCCTH and NSECC for review. The remainder of the Project Area is considered to have low archaeological potential.

Based on the results of the ARIA and recommendations provided by CRM Group, a 30 m buffer zone was recommended for any development or ground disturbance associated with the Project around HPA-01. CRM Group recommended that if the buffer zone, or parts thereof, could not be avoided, the area should undergo systematic shovel tests to evaluate the presence, characteristics, and significance of any potential historic resources. CRM Group recommended that the remainder of the Project Area, as defined and depicted in this report, should be cleared of further requirement for archaeological investigation. NSCCTH responded November 21, 2025, accepting CRM Group’s findings, conclusions, and mitigation recommendations.

12.5 Effects Assessment

Project-Archaeological Resources Interactions

Project activities could interact with archaeological resources during earth moving activities in the construction phase (Table 12.1).

Table 12.1: Potential Project-Archaeological Resources Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Site Preparation	X
Placement of Sedimentation and Erosion Control Measures	-
Clearing and Grubbing	X
Civil Site Construction	X
Equipment Installation	-
Interconnections for Services	-
Removal of Temporary Works and Site Restoration	-

Project Phase	Potential for Interaction
Commissioning	-
Operations and Maintenance	
Facility Operation and Maintenance	-
Site Management	-
Decommissioning and Rehabilitation	
Infrastructure Removal	-
Site Reclamation	-

Assessment Boundaries
The LAA for archaeological resources is the Project Area (Drawing 2.1). The RAA is not applicable.

Assessment Criteria
Assessment criteria provided in Section 4.5 apply for archaeological resources. The VC-specific definition for magnitude is as follows:

- Negligible: Activities have no potential for encountering archaeological resources during ground disturbance.
- Low: Activities have a low potential for encountering archaeological resources during ground disturbance.
- Moderate: Activities have a moderate to high potential for encountering archaeological resources during ground disturbance, but risk of harm to potential archaeological resources can be mitigated through appropriate actions and procedures.
- High: Activities have a moderate to high potential for encountering archaeological resources during ground disturbance, and ARIA indicates a high potential for accidental and irrevocable loss of archaeological resources regardless of mitigative measures.

Effects
There is low potential for archaeological resources across most of the Project Area. Areas exhibiting high potential for archaeology resources have been avoided and a 30 m buffer will be maintained for Project development and ground disturbance activity. Therefore, no effects to archaeological resources are anticipated.

Mitigation
The following mitigation measures have been recommended by CRM Group and are subject to approval by NSCCTH:

- Maintain a 30 m buffer for Project development and ground disturbance activity on the three sites of high archaeological potential.
- If future Project engineering or design requires development or ground disturbance within the 30 m buffer zone, conduct confirmatory shovel testing in areas of development/disturbance.

- Conduct additional archaeological assessment if, during the detail design phase, it is determined that ground disturbance is required in areas not previously assessed. The EA Branch will be provided with the acceptance letter from NSCCTH to demonstrate this additional work has been completed prior to completion of any disturbance in newly proposed areas.
- Develop a chance find procedure related to the potential unexpected discovery of archaeological items or sites, or human remains, during construction. This would include halting any work immediately upon discovery of suspected resources and contacting NSCCTH.

Monitoring

No monitoring programs are proposed.

Conclusion

After mitigations, residual effects on archaeological resources are characterized as follows:

Table 12.2: Archaeological Resources Residual Effects

VC Interaction	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
Effects on archaeology resources	Maintain a 30 m buffer on sites with high archaeological potential. Shovel testing, as needed. Develop a chance find procedure. Conduct additional archaeological assessment if it is determined that ground disturbance is required in areas not previously assessed.	**Adverse**	**Low** Areas of high archaeological potential will be avoided, and a 30 m buffer will be maintained.	**LAA**	**Single Event** Effects may occur during initial clearing and ground disturbance.	**Short Term** Effects may occur during construction.	**Irreversible** in the unlikely event that impacts to archaeological resources occur.	**Not Significant**

<u>Effects Assessment Ratings (Refer to Table 4.2 for definitions)</u>
Nature of Effect: Adverse, Positive
Magnitude: Negligible, Low, Moderate, High
Geographic Extent: LAA, RAA
Frequency: Single Event, Intermittent, Continuous
Duration: Short Term, Medium Term, Long Term
Reversibility: Reversible, Irreversible, Partially Reversible

13.0 POTENTIAL ENVIRONMENTAL IMPACTS ON INDIGENOUS PEOPLES OF CANADA

Discussion on potential Project effects to human health, social factors, and economic factors for Indigenous Peoples of Canada are presented in the following sections. The Project is located within the traditional lands of the Mi'kmaq, the founding people of Nova Scotia, within the district of Epekwitk aq Piktuk (Parks Canada, 2025). This Project is anticipated to affect only Nova Scotia; therefore, the conversation relating to the Indigenous Peoples of Canada is focused on the Mi'kmaq of Nova Scotia. The Proponent has initiated a MEKS with Membertou Geomatics Solutions to identify current and traditional Indigenous land use within the regional area. The MEKS Report is scheduled to be available in 2026. When the MEKS is available, the Proponent will review it and apply recommended mitigation measures where appropriate. The MEKS will also be shared with local Mi'kmaq communities through ongoing engagement to further discuss application of recommended mitigation measures.

In this chapter, the term “private land” and “landowner” is used to align with federal and provincial regulatory frameworks. The Proponent acknowledges that this is a colonial construct that does not reflect Mi'kmaq understandings of land, stewardship, or relational responsibilities. The use of this term is not meant to diminish Mi'kmaq perspectives on land and its inherent rights, but rather reflects the terminology required within the EA process.

13.1 Physical and Cultural Heritage

The environmental effects of the Project's construction and operation are expected to be minimal and localized. Changes to the environment, including air quality, noise, land use, vegetation, wildlife, and cultural resources are expected to be localized in or near the Project Area, and therefore, potential impacts to the Mi'kmaq are anticipated to be localized to the Project Area and directly surrounding lands (defined in each VC chapter).

The Project Area consists of historically cleared agriculture or pastureland, regenerating forest, and wetlands. The Project Area is 55.95 ha, of which 12.55 ha is expected to be directly impacted by the Project. Background research and engagement conducted as part of the ARIA (Section 12) indicated that there were no reported archaeological sites, cemeteries, or other cultural heritage features in the vicinity of the Project Area but noted that the Project Area had not previously been subjected to archaeological investigation.

The landscape within the Project Area consists of topography that is stoney, undulating to steeply sloped, with significant modern disturbance related to field clearing and agricultural use. The ARIA notes that these factors, along with permanent wetland habitat, would have been a deterrent to both wildlife and human land use in the area, resulting in an ascription of low archaeological potential (CRM Group, 2025). The Project Area contains no navigable watercourses that may have served as transportation corridors, or other unique landscape features (e.g., look-offs, escarpments, etc.).

Current access to the proposed Project Area without landowner permission is and will continue to be constrained because it is privately owned. There is one trail providing access into the property which is used for recreational purposes by the landowner and is not connected to a wider network of public trails. Access within the Project Footprint will be further restricted during construction and operations as required for site safety and Project security.

The Project has been strategically sited based on proximity to natural gas supply (i.e., Maritimes & Northeast Pipeline), proximity to the electricity grid, maximizing use of previously disturbed areas, and accessibility of land parcels (i.e., road infrastructure), among other factors. The Project team continues to engage with the Mi'kmaq to continue to build knowledge relating to the physical and cultural heritage of the Project Area and surrounding lands and anticipates the completion of the MEKS will provide additional context relating to the physical and cultural heritage of the Project Area.

13.2 Lands and Resources used for Traditional Purposes

The Project is located on private forested land. To date, engagement with the Mi'kmaq has not demonstrated that this area is actively used by the Mi'kmaq of Nova Scotia, especially given it is privately owned. The Project team continues to engage with the Mi'kmaq to continue to build knowledge relating to if and how the Mi'kmaq uses this land for traditional purposes. Furthermore, the Project team anticipates the completion of the MEKS to provide additional insight into the use of these lands for traditional purposes.

13.2.1 Hunting and Trapping

Current land use within and adjacent to the Project Area suggests limited use for hunting and trapping by Mi'kmaq communities. Given the existing features and level of disturbance outlined below, hunting and trapping activities are considered unlikely. The Project Area is located adjacent to a natural gas pipeline corridor and transmission line, along White Hill Road and Lorne Station Road, with the Project Footprint consisting of clear-cuts, ATV trails, and old harvester trails. An active rail line (Cape Breton & Central Nova Scotia Railway) is located within 1 km of the Project Area's eastern boundary. Residential properties are located nearby, with the closest residence approximately 650 m (MR02) north of the closest Project Area boundary on White Hill Road.

13.2.2 Plant Gathering

The Project Area is located on private forestry land. Evidence of vegetation disturbance was documented throughout the Project Area, including much of the Project Footprint, where stumps, regenerating trees, and overgrown roads/access trails were indicative of timber harvesting. Forest cover was observed to be more intact in the southern half of the Project Area, particularly the southeast, where mature hardwood trees were observed.

Plants of significance to the Mi'kmaq were identified throughout the Project Area during vegetation surveys, including species traditionally consumed (e.g., sugar maple, yellow birch, American beech, cucumber root, red raspberry, etc.) and species traditionally used for medicinal purposes (balsam fir, wild sarsaparilla, white turtlehead, goldthread, bunchberry, etc.). An occurrence of black ash, or Wisqoq in Mi’kmaq, consisting of four individual trees, was identified in the northern portion of the Project Area. Black ash is a SAR and culturally significant species for its use in basketry (NSNR, 2015).

Impacts to intact flora habitat are local and have been minimized by the placement of the Project within an area that has been previously disturbed by recent forest harvesting. Individual black ash and their host wetland will be avoided by the Project. The Project will result in impact to flora species within the Project Footprint (12.55 ha). The location of the Facility was selected primarily to avoid black ash and suitable habitat, as a SAR and culturally significant species. Species within the Project Footprint are common species and available within the Project Area and likely other surrounding lands; therefore, impacts to traditional plant gathering are expected to be minimal.

13.2.3 Fishing

There are four small watercourses within the Project Area which range from ephemeral to intermittently flowing streams in heavily forested areas - they are not expected to directly support Mi’kmaq fishing activities. All watercourses will be avoided by infrastructure placement. Surface water management measures will be applied to ensure any discharged water will meet water quality guidelines and be protective of the receiving environment, so that water quality and quantity will be maintained. Therefore, no impacts to traditional fishing practices are expected within any fishing locations outside of the Project Area.

13.2.4 Use of Navigable Waters

The Project and associated infrastructure will not interact with navigable waters.

13.2.5 Recreational Use

The Project is located on private land with no current recreational use documented by the broader public.

13.2.6 Commercial Use of the Lands by Indigenous Communities

The Project is located on private forestry land with no commercial outfitting or other commercial use in place.

13.3 Sites and Structures of Historical, Archaeological, Paleontological or Architectural Significance

The Project’s ARIA (Section 12) was reviewed to highlight potential sites and structures of historical, archaeological, paleontological or architectural significance within the Project Area. According to the ARIA, there are three potential archeological features within the Project Area; these are not Mi’kmaq in nature based on historic literature and findings recorded in the field. Areas with archaeological features have been avoided and a 30 m buffer will be maintained for Project development and ground disturbance activity. No additional areas of high archaeological potential were identified within the Project Area.

A chance find procedure will be developed related to the potential unexpected discovery of archaeological items or sites, or human remains, during construction. This would include halting any work immediately upon discovery of suspected resources and contacting NSCCTH.

13.4 Potential Health, Social, or Economic Impacts on Indigenous Peoples

13.4.1 Health and Social Impacts on Indigenous Peoples

The Project is not expected to impact the health, social conditions, or overall well-being of the Mi'kmaq of Nova Scotia. The Community Noise Impact Assessment (summarized in Section 7.3) determined that the Project is expected to comply with the provincial Guidelines for Environmental Noise Measurement and Assessment (NSECC, 2023a). Similarly, the air quality assessment (Section 7.2) confirmed that air emissions from the facility will be below regulatory limits at receptors under a conservative modeling approach (worst-case emission scenario).

No ingestion or inhalation pathways that could trigger the need for a Human Health Risk Assessment are anticipated. The emissions (air and noise) from the Project during operations will be compliant with provincial regulations and will decrease with distance from the Project.

There is limited potential population growth associated with the Project given the number of anticipated long-term positions (10 to 15). Therefore, there would be almost no increased pressure for social or medical services, or other local health care service providers, or any disproportionate impact on the health and social services to the Mi'kmaq of Nova Scotia. The Proponent will continue to engage the Mi'kmaq of Nova Scotia as outlined in Section 5, and will provide updates regarding the Project's permitting, construction, operation, and decommissioning schedules and related activities.

13.4.2 Economic Impacts on Indigenous Peoples

As stated in Section 11, the Project will have positive economic impacts due to economic stimulus during construction primarily, and to a lesser extent during operations and decommissioning. In addition to the potential economic output, potential benefits to the Mi'kmaq of Nova Scotia as a result of the Project may include support for economic reconciliation. As noted in Chapter 5, the Proponent has met with WMA Ltd., the investment and economic development entity owned by the 13 First Nations of Nova Scotia, to explore potential economic opportunities related to the Project. During these discussions, the Proponent provided WMA Ltd. with Project information, including regulatory requirements, timelines, and supporting materials such as a background presentation and open house poster boards. These resources outlined key aspects of the Project at a conceptual level, including the need for EA studies, engagement plans, and anticipated benefits, reinforcing the Proponent's commitment to transparency and collaboration.

This engagement reflects a broader priority: advancing economic reconciliation. The Mi'kmaq of Nova Scotia are already significant participants in the renewable energy sector and are expected to continue playing a vital role as the sector expands. Investments by Mi'kmaw organizations contribute positively to the energy transition and represent an important component of reconciliation in Nova Scotia – an approach the IESO seeks to advance, in addition to encouraging proponents to maximize Mi'kmaw benefits through employment, contracting, and procurement.

Ultimately, the Proponent is committed to sharing economic opportunities with the Mi'kmaq throughout the development and lifespan of the Project and will continue to engage the Mi'kmaq on how best to maximize such opportunities.

13.5 Summary of Potential Health, Social, or Economic Impacts on Indigenous Peoples

Based on the studies completed to date, the Environmental Assessment indicates that the Project is expected to result in low adverse environmental and human health effects. This conclusion is supported by the results of multiple technical studies, including environmental baseline investigations, an air quality assessment, and a sound assessment. These studies demonstrate that predicted emissions and noise levels are below applicable regulatory thresholds and are not expected to result in adverse effects on surrounding communities.

Project siting and design have incorporated avoidance and mitigation measures, including the avoidance of Black Ash, a species of cultural significance to the Mi'kmaq. In addition, the Project has an established archaeological chance-find protocol, which will be implemented should archaeological or cultural materials be encountered during construction or operation. This protocol includes appropriate work stoppage procedures and engagement with Mi'kmaw representatives and relevant regulators, as required.

The Project is located at a distance from Mi'kmaw communities, which further reduces the potential for direct effects. Based on the results of the technical studies completed to date, the incorporation of avoidance measures, and the Project's location, the potential for adverse environmental, health, social, or economic effects on Indigenous Peoples is anticipated to be low.

Information on current use of lands and resources by Mi'kmaw communities will be further informed by the results of the MEKS, which is currently underway. The findings of the MEKS will be considered in finalizing mitigation measures and monitoring commitments, as appropriate.

While effects are predicted to be low, the proponent remains available and open to engage with Mi'kmaw communities should concerns be identified. If required, the proponent will work collaboratively with Mi'kmaw groups to identify and implement additional, mutually agreed-upon mitigation measures. Opportunities for Mi'kmaw participation in environmental monitoring programs during construction and operation may also be explored.

The proponent will continue discussions with Mi'kmaw communities and organizations regarding potential project benefits, including employment, training, and capacity-building opportunities, with the objective of providing meaningful benefits to the Mi'kmaq of Nova Scotia. Mi’kmaw representation may also be invited to participate on the Project’s Community Liaison Committee, providing an ongoing forum for communication and engagement.

14.0 EFFECTS OF THE ENVIRONMENT ON THE UNDERTAKING

The following sections examine how aspects of the external environment may impact Project infrastructure and operations, with a focus on extreme weather events and natural hazards. The Project is expected to be operational for a minimum of 30 years, such that the effects of climate change are highly relevant to the Project. Incorporating climate change and sustainability considerations into the Project’s design will increase its resilience, and a series of mitigation and adaptation strategies to minimize potential impacts have therefore been developed.

14.1 Climate Change

Climate change refers to a long-term, persistent change in average and extreme weather conditions (IPCC, 2018). Contemporary climate change (i.e., since the beginning of the industrial period) is being caused by increases in GHG emissions associated with human activities. Warming temperatures, altered precipitation regimes, and sea level rise are three notable aspects of climate change - associated impacts to the Project are considered in the following sections.

14.1.1 Temperature

A key aspect of climate change is global warming, which refers to the long-term rise in the Earth's average surface temperature, measured over 30 years, in comparison to preindustrial levels (IPCC, 2018). Air temperatures are an important driver of many environmental processes, including the intensity of severe weather events such as hurricanes (Gilford et al., 2024). Based on a range of emissions scenarios (Coupled Model Intercomparison Project Phase 6), average temperatures in the Project Area are expected to be 2.4°C warmer during the period 2041-2070 relative to the 1971-2000 baseline (ClimateData.ca, 2025).

Temperature increases associated with global warming may impact on-site personnel during all phases of the Project. For example, the demand for cooling in construction vehicles will increase with warmer temperatures and may require Project personnel to take regular breaks to cool down and rehydrate. Warmer temperatures also have the potential to enhance the spread and abundance of disease vectors such as ticks (Bouchard et al., 2019), with associated increases in health risks. Longer and more intense heat waves under climate change may also increase the risk of forest fires (ECCC, 2019b), as described in Section 14.2.2 below.

The direct risks of increased temperatures to Project personnel will be managed by ensuring staff are trained to understand the importance of regular breaks, proper hydration, and unsafe working conditions.

Additionally, higher ambient temperatures slightly reduce the maximum production capacity of the Project. Therefore, an increasing trend in ambient temperatures will correspond with a slightly decreasing trend in the maximum production capacity of the Project.

14.1.2 Changes in Precipitation

Heavy rainfall events are common and highly probable in NS and may be exacerbated by climate change. Although it is challenging to accurately forecast decadal-scale changes in rainfall events, future climate scenarios suggest that conditions will become "wetter" over the Project's lifespan. For example, total annual precipitation in the Project Area is expected to be 109 mm/year higher by 2041-2070 relative to the 1971-2000 baseline (ClimateData.ca, 2025). Heavy rainfall events have the potential to impact construction and operations by increasing the risk of overland flooding which may temporarily restrict site access, overwhelm ditches and culverts, and require operational strategies to be implemented (e.g., sedimentation and erosion controls).

More frequent and intense droughts may also occur under climate change, with potential to decrease surface and groundwater availability and quality. Water shortages may lead to increased water costs and reduced supplies of quality drinking water. The availability of abundant freshwater is essential for the Project to operate at capacity. Freshwater withdrawal is not included in this EA but is noted here because of the potential for periods of drought to significantly impact Project operations.

The Project will mitigate the risks of flooding and drought by:

- Developing and implementing Surface Water Management and Sedimentation and Erosion Control Plans.
- Minimizing alterations to wetlands.
- Appropriately sizing culverts.
- Designing roadside ditches and water off-take infrastructure next to all roads to encourage rainwater drainage.
- Revegetating roadsides to absorb excess water.
- Ensuring water use planning accounts for drought-like circumstances and that plans are available for limited water usage scenarios.
- Implementing strategies for reducing the production of fugitive dust during construction (described in Section 7.1).

14.1.3 Sea Level Rise

On a global scale, sea levels are currently rising because of warming air and ocean temperatures (via thermal expansion of ocean water and increased inputs of melting of sea ice/glaciers). Sections of the Atlantic coastline have been highlighted as some of Canada's most severely threatened areas from sea level rise and resulting impacts, with rising sea levels expected to amplify coastal flooding, erosion, and storm surge across the Atlantic region (ECCC, 2023a). According to the National Oceanic and Atmospheric Administration (NOAA, n.d.), the relative sea level trends across NS ranges from approximately 3.19 mm/year to 3.99 mm/year (based on data from 1895 to 2021).

The Project Area is located a sufficiently inland from the coast (> 20 km) such that coastal flooding poses a negligible risk to the Project.

14.2 Natural Hazards

NS regularly experiences natural hazards, including severe weather events (e.g., blizzards, hurricanes) and wildfires. These events can lead to adverse outcomes such as power outages, health-related emergencies, infrastructure damage, and road damage, thereby posing direct risks to infrastructure (Government of Canada, 2024).

14.2.1 Severe Weather Events

Hurricanes, blizzards, and other severe weather events are highly probable natural hazards that pose a moderate to high level of risk to the Project. Severe weather events may impact the Project through damage to infrastructure, safety risks to Project personnel, and disruptions to site access and operations. The intensity and frequency of some severe weather events, such as hurricanes, may increase over the Project's life-span due to climate change.

In the event of high winds and blowing debris, Project operations may be impacted by damage to electrical infrastructure, including the transmission line.

During severe weather events, safety risks may be elevated for Project personnel due to hazardous driving conditions, poor visibility, cold temperatures, and falling debris. Throughout the life of the Project, the safety of Project personnel will be managed by developing and implementing safe work procedures, and ensuring staff are trained in the use of PPE and understand unsafe work conditions. The Proponent will ensure safe access to the Facility is maintained during unfavourable conditions (e.g., through plowing, salting, road clearing).

14.2.2 Wildfire

Fire is one of the most important sources of natural disturbance in Nova Scotia, with moderate to high severity fires impacting an estimated 0.17% to 0.4% of forested land per year (Taylor et al., 2020). As a whole, the frequency and extent of fires has declined in Nova Scotia since 1980 due to the increased effectiveness of fire detection and suppression techniques (Taylor et al., 2020). However, although it is challenging to precisely predict changes to fire regimes, modelling suggests wildfire risk in the Acadian forest region (which includes the Project Area) will increase moderately under climate change as a result of warmer and drier conditions (Whitman et al., 2015). In recent years, several large wildfires have occurred in Nova Scotia, which were exacerbated by periods of prolonged dry conditions (e.g., Upper Tantallon/Hammonds Plains fire in 2023, Long Lake fire in 2025).

Wildfire has the potential to impact all phases of the Project. A substantial portion of the Project Footprint is surrounded by forest cover and there is potential for naturally occurring and/or human-caused forest fires to damage Project infrastructure and elevate safety risks for Project personnel. In the Central Uplands Ecodistrict where the Project is located, fire is considered to be one of the dominant disturbance agents, particularly in softwood and mixedwood forests (Neily et al., 2017). Although the likelihood of a wildfire occurring in the Project Area over the lifespan of the Project is expected to be low, if a wildfire were to occur the associated impacts would be severe, such that wildfires pose a high risk to the Project.

The following operational and technological measures will help to safeguard the Project from wildfires:

- Safety protocols for the Project will be implemented to mitigate the potential risk of wildfire to infrastructure, operations, and site personnel.
- A fire prevention and site evacuation plan will be implemented and developed, and fire extinguishers will be located on the site in case of fire, and the Facility will be equipped with a fire water system.
- During the summer months, the local Fire Weather Index (FWI; general measure of fire danger) will be reviewed regularly for nearby weather stations to determine the potential for highly dangerous wildfires.
- Precautions will be taken when undergoing construction or maintenance activities such as mechanical brushing/land clearing, using spark-producing tools, or piling of woody debris that may result in fires on days when FWI scores are moderate or higher.
- Should the risk of fires increase throughout the lifetime of the Project, mitigation strategies to protect Project Infrastructure and relevant VCs will be adapted accordingly.

14.3 Mitigation and Adaptation

Understanding climate projections leads to better planning and adaptation measures during each phase of the Project's development. Therefore, the projected increases in temperature, precipitation and potential weather extremes were considered during the Project design to ensure infrastructure would be able to manage these predictions, including:

- Reduce the contributions of the Project to climate change by reducing GHG emissions through mitigation and operational design strategies (described further in Section 7.2 – GHG Assessment),
- Stormwater management systems will be designed to manage predicted volumes for the next 50 years by considering the most conservative scenario precipitation projections.
- Infrastructure will be developed to withstand more intense storms and weather events.
- Purchase of more robust/weather considerate materials or equipment to minimize wear and tear from climate-related events (i.e., rain, snow, heat, ice) will be considered and implemented where feasible.
- The fire response plan will include practices to be followed in the event of a wildfire.
- Operation of power saws in vegetated areas within the Project Area will only occur when and as permitted under the Forest Fire Protection Regulations, N.S. Reg. 135/2019.

- Any activities requiring burning during the Project lifetime will be timed according to local burning restrictions.

In addition to Project design considerations, health and wellness mitigations to protect site personnel will also be implemented, including:

- Additional break rooms or water stations will be installed to ensure personnel remain cool and hydrated during all project phases.
- Educating personnel on potential pests and disease vectors that the Project may be exposed to through on-site training programs.
- Ensuring water use planning accounts for drought-like circumstances and that plans are available for limited water usage scenarios.
- Developing and implementing response plans and evacuation or muster programs for extreme weather events (i.e., wildfire, flooding).

14.4 Summary of Effects

The environmental effects associated with climate change and natural hazards have the potential to affect all phases of the Project. Project location siting, design measures, and education of Project personnel will help to minimize many of the risks associated with these factors. The mitigation and adaptation measures described above will allow for both proactive and adaptive management of remaining risks, thus limiting the overall impact on the Project.

15.0 ACCIDENTS AND MALFUNCTIONS

Without proper mitigation, accidents, and malfunctions can interact with many VCs and potentially result in adverse effects. Implementing preventative measures limits the probability of occurrence, and having appropriate response procedures in place reduces the magnitude of residual effects.

Accidents, malfunctions, and unplanned events considered for this Project include:

- Accidental Air Emission Release
- Erosion and Sediment Control Failure
- Fire and Explosions
- Hazardous and Non-Hazardous Spills & Releases
- Transportation Related Incidents

The safety of on-site personnel is a vital Project component; however, it is not specifically considered in the EA, as workplace occupational health and safety is regulated by the policies, procedures, plans, and codes of practice set out in the Nova Scotia *Occupational Health and Safety Act*, SNS. 1996, c. 7. A site-specific ERP will be developed to address accidents, spills, and malfunctions as detailed below.

15.1 Accidental Air Emission Release

The potential release of air pollutants into the atmosphere during an accident or malfunction at the Facility represents an environmental concern due to the potential effect on surrounding air quality.
Based on the operational process to generate power and provide synchronous condensing services, potential emissions may include pollutants such as CO, SO_2, NO_x, natural gas, volatile organic compounds (VOC), and PM. Emissions such as NO_x, SO_2, CO, and PM transported by wind and air currents can contribute to photochemical smog formation, acid rain, and nitrate particulates in the atmosphere (Majewski, 2024). Fine particulates ($PM_{2.5}$) and VOCs can cause health impacts including respiratory illnesses such as asthma and bronchitis (US EPA, 2024).

The accidental release of higher than normal emissions could occur in the event of a malfunction of the combustion turbine combustion and emissions control system associated with the power generation process.

Mitigation measures to limit the probability of an incident and reduce the magnitude and extent of potential effects include:

- Stack emissions testing to confirm environmental compliance.
- Routine combustion turbine inspection, testing and maintenance to ensure optimal operation.
- Equip and automate emergency stops integrated and controlled through gas detection systems (such as carbon monoxide and natural gas monitors) to detect any abnormal emissions, or overpressure conditions and pressure safety valve operation on the fuel gas system.
- Train Project personnel on system operation, failure response, and troubleshooting.
- Develop and implement a Project-specific ERP.
- Train Project personnel on the ERP and conduct periodic emergency drills.
- Train Project personnel working near emission sources and provide appropriate PPE (e.g., respirators, gloves, eye/skin protection) during servicing or repair scenarios.
- Develop a lock-out/tagout program for any work done on pressurized systems.

With the implementation of the above preventative measures, the likelihood of an accidental air emission release beyond the normal emissions and air quality impacts assessed for the project is low.

15.2 Erosion and Sediment Control Failures

Failure of erosion and sedimentation controls may result in potential adverse effects on VCs (primarily during construction), most notably to watercourses, wetlands, and fish and fish habitat. While the Project has been planned to avoid direct impact to fish and fish habitat, watercourses containing fish habitat are present within the Project Area. Erosion and sedimentation controls may fail due to extreme weather conditions (e.g., flooding), improper installation, improper maintenance, and unforeseen accidents (e.g., collisions). Failure of these control measures may release sediment into the environment, impacting water quality and aquatic and terrestrial habitats. Failure of any part of the sedimentation pond could result in release of water to the receiving environment. Detailed engineering design and regular inspections will be implemented to ensure structural integrity of the sedimentation pond and associated infrastructure (i.e. ditching and effluent release point). A detailed ESCP will be prepared and submitted to NSECC for review during the permitting phase.

Mitigation measures to limit the probability of an occurrence and reduce the magnitude and extent of potential effects include:

- Develop and implement an ESCP for all phases of the Project in consultation with NSECC prior to construction.
- Ensure erosion and sediment controls are installed per manufacturer's specifications.
- Follow industry standards and best management practices with respect to excavation and soil storage procedures.
- Heed Environment Canada's special weather warnings to ensure proper care is given to stabilize erosion and sediment controls in advance of, and following, extreme weather events (i.e., precipitation).
- Conduct regular monitoring of all the erosion and sediment controls and repair or replace them as necessary.
- Ensure erosion and sediment controls are functioning effectively and that additional support or controls can be applied and are available on hand to support with repair or reinforcement efforts, as needed.
- Complete detailed engineering design and an inspection plan for settling pond and associated infrastructure.

An erosion and sediment control failure may have a potentially significant impact on the surrounding environment due to its effects on water quality. However, implementing the above mitigations, along with best management practices and procedures, will reduce the likelihood of an accident or malfunction occurring.

15.3 Fires and Explosions

An accidental fire may occur from Project activities which could lead to larger events (explosions) and potentially adversely affect the atmospheric environment (emissions), the natural environment, Project infrastructure, and neighbouring communities.

Fires may occur as a result of equipment accidents, hot works, malfunction of fuel storage tanks or the fuel gas system, use of power tools and machinery, on-site burning, human carelessness, or natural causes such as a lightning strike under dry conditions. Of these potential sources, fires originating from, or in proximity to, fuel sources are inherently dangerous as fuel may sustain a fire for longer periods and lead to explosions and/or extensive damage. In addition, fires may release hazardous materials, which could impact air quality and cause adverse effects on the surrounding environment (i.e., terrestrial or aquatic habitat).

Electrical fires also pose a risk in the Facility due to the presence of low, medium, and high voltage electrical equipment. Electrical fires are one of the most common causes of workplace fires (Boskovic et al., 2020). Potential electrical fire hazards associated with all phases of the Project include the presence of high-voltage equipment, control panels, and interconnected systems that are critical for the safety and continuity of product production (CSTC, n.d.). Electrical fires could potentially result in explosions due to the presence of fuel and volatile materials in the Facility. Some electrical fire hazards include:

- Overloaded circuits due to the exceedance of the electrical capacity of a circuit.
- Faulty wiring or equipment failure.
- Malfunctioning electrical equipment, appliances, or devices.
- Poor maintenance of electrical systems.
- Mobile equipment operating in violation of the clearance requirements of substation and transmission line equipment.

Mitigation measures to limit the probability of an occurrence and reduce the magnitude and extent of potential effects include:

- Develop a fire prevention and evacuation plan, in addition to general safety protocols and training, as part of the ERP and share with local fire departments.
- Prohibit burning within the Project Area by staff and contractors.
- Allow smoking in designated areas only.
- Dispose of all flammable waste regularly at an approved facility (e.g., flammable chemicals, fuels).
- Implement mitigation related to chemical and fuel storage (see Section 14.4 for additional details).
- Install fire suppression systems suitable to the plant area and equipment protected.
- Require that installation of electrical equipment and wiring is completed by licensed technicians according to CSA requirements.
- Maintain corridors containing electrical infrastructure during operations.
- Implement fire detection and protection systems in vulnerable areas (e.g., fuel storage areas).
- Establish buffer zones or firebreaks between the Facility and the neighbouring properties.
- Provide appropriate PPE where the risk of arc-flash or arc-blast is present.
- Consult with local fire departments to review the suitability of access routes for emergency vehicles.
- Maintain access and conduct regular maintenance for fire water storage tanks.
- Conduct regular inspections, capacity assessments, and maintenance to ensure water availability and compliance with fire safety regulations.
- Require that an inventory of ancillary firefighting equipment is well-maintained and readily accessible to effectively manage on-site fires.
- Train all personnel in emergency response, fire prevention and evacuation plans, and the use of firefighting equipment.

- Require that the selection of pumps, motors, instrumentation, and other electrical components comply with the applicable electrical hazard zone, which will minimize the probability of ignition.
- Conduct regular inspection of wiring connectors, and switch gear for signs of wear, corrosion, or damage, and maintain a protection relay testing program.
- Schedule preventative maintenance of electrical systems to identify potential failure occurrences.
- Design electrical systems with adequate load capacity to prevent overloading.
- Require compliance with applicable Electrical Codes and Standards.
- Install, where feasible, emergency shutdown systems to isolate electrical power during critical electrical fire incidents to reduce the risk of fire spread and ensure the safety of personnel.
- Develop a lock-out/tagout program for any work done on energized systems.

15.4 Hazardous and Non-Hazardous Spills & Releases

Spills resulting from fuel (i.e., storage, refueling, operation of the Facility), lubricants, and other on-site chemicals may occur during Project construction and operations activities. Release from non-hazardous materials can be problematic as well; primarily release of raw water or demineralized water. Hazardous spills can adversely impact air, soil, surface water, groundwater quality, human health, and safety. The severity of the impacts will depend on the nature of the hazardous material and the quantity spilled. Significant quantities of fuel and chemicals will be stored on-site for facility operations, including diesel fuel, lube oil, and ethylene glycol.

15.4.1 General Spills and Release

During the Facility's operational phase, potential spills may occur during fuel unloading, due to the storage and handling of on-site chemicals, and the operation, refueling, or servicing of mobile mechanical equipment, and use of site-specific maintenance procedures. Some potential causes of spills and releases of hazardous and non-hazardous materials include:

- Damaged or punctured product containers.
- Leaks or ruptures in secondary storage containment.
- Operational errors resulting in accidental overfilling, incorrect handling of materials, or failure to follow standard operating procedures.
- Equipment failures due to improper operation, malfunction, or wear and tear.
- Failure of diesel fuel unloading connections, or failure of operators to property disconnect from the fuel unloading system.

General mitigation measures to limit the probability of an occurrence and reduce the magnitude and extent of potential effects include:

- Comply with all relevant regulations related to storage, transportation, handling, and use of hazardous materials (Section 2.3).

- Store all dangerous goods in compliance with the Workplace Hazardous Material Information System (WHMIS).
- Store all fuels, lubricants, and hazardous materials in designated containers and storage areas.
- Provide secondary containment in product storage areas and unloading and handling areas.
- Locate fuel storage areas, refueling, and/or mobile equipment maintenance activities a minimum of 30 m from watercourses, wetlands and groundwater features (i.e., well) (Per CSA B149.2:20 propane storage and handling code). If possible, complete these activities on an impervious surface.
- Design and implement high-integrity storage and piping systems.
- Schedule regular inspections for all mobile and processing equipment to assess for potential leaks, wear, or damage, particularly associated with hosing, joints, seals, and valves. Identify and repair leaks promptly.
- Complete mobile equipment servicing off-site, where possible. If this is not possible, require that the work is completed in a designated area, greater than 30 m from a watercourse or wetland.
- Equip mobile equipment with spill kits stocked with appropriate spill containment materials for the activities taking place, such as soaker pads, oil-absorbing materials, and containment booms.
- Locate stationary spill kits or spill drums at work areas utilizing mobile equipment, hazardous fluids and/or in proximity to environmentally sensitive areas (i.e., wetlands).
- Stock spill kits with the appropriate quantity and type of material for the anticipated product type(s) and volume(s) in use; include neutralizing agents as applicable.
- Provide Safety Data Sheets (SDS) for all chemicals and train personnel to ensure proper handling, storage, and response in the event of spills or exposure.
- Develop spill prevention and response procedures as part of the Project's ERP.

15.4.2 Natural Gas Release

The Facility will have an interconnection with the natural gas transmission pipeline to supply natural gas as the primary fuel source. Natural gas will not be stored on site but will be a continuous supply from the pipeline.

Natural gas is a fire hazard and a highly flammable clean-burning fuel contributing to the Project's low carbon objectives. However, improper handling, or system failures can result in product release and subsequently result in safety, and operational incidents. Release of natural gas could occur in the event of the following:

- Pipe failures due to corrosion or accidental impact damage.
- Improper use of over pressure protection.
- Lack of preventive inspection and maintenance could lead to unintended leakage from pipelines, valves, or other components of the natural gas interconnection.

The consequences of a natural gas release depend on the quantity released, the location of the release, environmental conditions, and the effectiveness of response measures. Gas travels faster, dispersing quickly into the surrounding environment, and can fill up space to form a cloud. Natural gas is lighter than air and tends to disperse into the atmosphere creating a cloud that can spread, posing significant explosion risks.

The following measures will be implemented to protect against natural gas releases:

- Comply with all relevant regulations related to storage, pipeline transportation, handling, and use (Section 2.3).
- Implement preventive maintenance schedules to address potential gas storage system vulnerabilities.
- Use corrosion-resistant, high-integrity piping systems to minimize risks of leaks.
- Ensure staff are trained as applicable on the safe operation of the natural gas interconnection equipment on site.
- Develop and train appropriate personnel on emergency response procedures, including safe venting of natural gas during system failures or maintenance.
- Notify local emergency services with information on the location of the master shut off valve on site to better assist in the event of an emergency.

15.5 Transportation Related Incidents

Vehicular incidents could occur at any stage of the Project although the type and intensity of vehicular traffic will vary depending on the Project phase. The vehicles in operation during the construction phase will include gravel trucks, loaders, and light-duty vehicles. Additionally, off-site contractors may access the site using their own vehicles or service-equipment. On the site especially, where personnel may be near light to heavy-duty traffic, there is a higher risk of incidents affecting human health (HSE, n.d.). During and following power plant operating periods on diesel fuel, there may also be significant fuel truck traffic to maintain and replenish diesel fuel storage inventory.

Mitigation measures to limit the probability of an incident and reduce the magnitude and extent of potential effects include:

- Comply with all relevant regulations related to storage, transportation, handling, and use of hazardous materials.
- Conduct periodic inspections to ensure all mobile equipment is in good condition and follow manufacturer’s specifications for preventative maintenance.
- Establish, post, and enforce speed limits on the site.
- Set in place applicable signage in accordance with relevant traffic regulations.
- Develop and maintain roads in accordance with the Project’s ESCP.
- Require that public road speed limits are followed by Project vehicles.
- Require that drivers follow all laws and regulations pertaining to distracted (e.g. cell phone usage) or impaired driving on and off-site.

- Minimize transportation-related traffic in school zones and on school bus routes during school hours and bus pick-up and drop-off times.
- Follow weather statements and alerts and adjust plans accordingly to avoid transportation in extreme weather conditions whenever possible.
- Establish the following, within the Project Area, to the extent possible (HSE, n.d.):
    a. Keep vehicles and pedestrians apart.
    b. Minimize vehicle movements.
    c. Minimize reversing by providing adequate room to turn vehicles.
- Ensure adequate visibility by operating in appropriate weather and providing ample lighting and visibility aids (e.g. mirrors around tight turns).
- Ensure visitors are familiar with the Project layout or are accompanied by Project personnel as necessary.
- Ensure compliance by operations personnel, fuel suppliers, contractors, and all visitors to the power plant site.

In addition to the above, the Project's ERP will include plans for spill prevention and response related to the storage and transportation of chemicals and products to and from the site. The Proponent will ensure that employees, suppliers, and clients comply with safety measures, spill prevention protocols, and best management practices during Project activities. The Proponent will also consult with local emergency services to strengthen coordinated response efforts and ensure an aligned approach.

16.0 CUMULATIVE EFFECTS

16.1 Overview

Cumulative effects are changes to environmental, social, and economic values caused by the combined effect of past, present, and potential future human activities and natural processes (Government of British Columbia, 2024). Concerns are often raised about long-term changes that may occur not only as a result of a single action but of the combined effects of each successive action on the environment (Hegmann et al., 1999). While a single undertaking might not cause significant adverse effects, multiple undertakings may result in incremental impacts, referred to as cumulative effects. These cumulative effects may potentially result in an overall impact to a VC of interest.

16.2 Cumulative Effects Assessment Methods

The goal of a Cumulative Effects Assessment (CEA) is to assess changes to an environmental condition (VC) that could occur based on a combination of the proposed Project with other past, present, or reasonably foreseeable future projects. The CEA is completed using publicly available data, with uncertainties clearly identified, following guidance outlined in the Cumulative Effects Assessment Practitioners Guide (Hegmann et al., 1999). As outlined by Hegmann et al. (1999), a CEA scoping exercise is completed using the following steps:

- Identification of the VCs that will enter the CEA process
- Determination of spatial and temporal boundaries for the CEA

- Identification and description of other projects or activities in the spatial boundary (or boundaries)
- Confirmation of which VCs will be carried through the CEA process

For those VCs selected for the CEA process, an analysis was conducted considering the residual effects of the Project on that VC, the effect of other activities or projects on that VC, and potential cumulative effect. Mitigation measures and proposed monitoring programs and follow up are described, if cumulative effects are predicted. At this stage, the certainty in effects predictions is considered. It is not uncommon for data on effects of other projects or activities to be limited, increasing the uncertainty of the CEA predictions.

16.2.1 Selection of Boundaries

To identify other projects for inclusion in the CEA, a 20 km buffer on the Project Area was selected as a conservatively inclusive boundary (the RAA; Drawing 16.1).

The temporal boundary for the Project is based on three Project phases: construction (2 years), operations and maintenance (30 years), and decommissioning and reclamation (2 years). For the CEA, Strum considered past projects as those registered, approved, and constructed within the past 10 years, selected from the Environmental Assessment Projects Dashboard (NSECC, 2025c). Reasonably foreseeable future projects are those which have been registered with an EA document through NSECC but have not been approved or constructed.

16.2.2 Other Undertakings in the Area

General land use is not accounted for as “other activities or projects” in the CEA. Nova Scotia’s landscape is a mosaic of intensive agricultural land, intact and disturbed forests, communities, and residential development. While these activities all affect the landscape and usage of lands by humans and other species, there is not a meaningful way to determine or quantify the effect of these activities on various VCs (no meaningful data are available to support an assessment of cumulative effects associated with general land use). Furthermore, the existing land use was considered in the determination of residual environmental effects within each VC within the Project’s EARD/IPD, so no additional conclusions can be made through the lens of a CEA.

Table 16.1 summarizes industrial activities/developments within approximately 20 km of the Project.

Table 16.1: Nearby Industrial Activities and Developments

Development	Project Type	Status of Activity	Activity Location	Distance from Project Area(1)
MacLellans Mountain Quarry Expansion	Aggregate Quarry Expansion	Approved with Conditions	McLellans Brook	15.1 km northeast

Development	Project Type	Status of Activity	Activity Location	Distance from Project Area(1)
Fast Acting Natural Gas Power Generation Facility – Salt Springs	Power Generation Facility	Registered for EA	Salt Springs	15.8 km northwest

(1) Distance from nearest point of the Project Area

16.3 Selection of VCs for Evaluation in the CEA

The primary pathways of effects to the environment from the Project include impacts to air quality, noise generation, groundwater withdrawal and surface water release. The Project will result in habitat loss in forest habitats (and therefore effects to species that rely on those habitats), however the impacts are relatively small (12 ha). Through the effects assessment, no significant adverse residual effects were identified to the VCs evaluated. Details of the effects assessment for each VC evaluated can be found in Sections 7 to 12.

Table 16.2 summarizes the potential for VCs to have cumulative impacts with other undertakings in the area.

Table 16.2: Potential for Cumulative Effects on Identified VCs

VC	Cumulative Effects Assessed	Reasoning
Atmosphere and Air Quality	No	Residual effects of dust, exhaust, and process emissions from the Project will be non-significant and will not add to atmospheric effects of adjacent commercial/industrial activities experienced by non-participating receptors. No spatial overlap of impacts expected between this Project and other assessed CEA projects.
Climate Change	No	Although GHGs will be emitted by the construction and operation of the Project, the purpose of the Project is to supply peaking capacity to the Nova Scotia electricity grid that is required to support renewable energy generation (which will ultimately reduce GHG emissions).
Noise	No	Construction noise due to the Project will be intermittent, and short-term duration, and operational noise will be below permissible sound levels for all non-participating receptors. The separation distances are such that noise from the Project will not add to noise produced by other projects.
Geophysical Environment	No	Groundwater withdrawal associated with the Project is not expected to interact with other projects in the area, either due to being in different groundwater regions or due to an absence of anticipated project effects on groundwater. Other Project interactions with the geophysical environment will be restricted to the Project Area.

VC	Cumulative Effects Assessed	Reasoning
Surface water, Fish and Fish Habitat	No	The Project has been designed to avoid all watercourses and potential fish habitat; therefore, no direct habitat destruction or death of fish by means other than fishing is anticipated. Indirect effects will be managed through mitigations such that no cumulative effects are expected.
Wetlands	No	The Project is maximizing the use of existing disturbed areas to minimize impacts to wetlands. In accordance with provincial permitting requirements, all impacted wetlands will be compensated for, such that there is no significant residual effect, and direct effects are limited to the Project Footprint.
Terrestrial Vegetation Communities and Flora	No	Loss of vegetation communities and flora individuals due to the Project is low due to the relatively small size of the Project Footprint. Individual SAR and most SOCI, as well as their supporting habitat, will be avoided by the Project.
Terrestrial Fauna	No	Habitat disturbance will be limited to a relatively small area (the Project Footprint) that is not expected to interact with habitat disturbance from nearby projects.
Avifauna	No	The Project is predicted to have moderate and non-significant impacts to birds through sensory disturbance and potential mortality. No spatial overlap of impacts expected between this Project and other assessed CEA projects.
Economy	No	Residual impacts are anticipated to be positive.
Land Use	No	Residual impacts are anticipated to have a negligible impact on land use.
Archeological Resources	No	Avoidance of archaeological resources.

In summary, the Proponent reviewed ongoing and reasonably foreseeable projects within a 20 km buffer of the Project (RAA). Considering the pathways of effects between the Facility and others within the RAA, there are no anticipated cumulative effects, based on limited spatial and temporal overlap of impacts.

17.0 EFFECTS OF THE UNDERTAKING ON THE ENVIRONMENT

Table 17.1 summarizes the results of the effects assessment for each VC.

Table 17.1: Summary of VC Residual Effects

VC	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
Atmosphere and Air Quality								
Construction Emissions (Fugitive Emissions)	Restrict idling. Maintain equipment in proper working order. Revegetate exposed groundcover.	**Adverse**	**Low*** Some air quality emissions are anticipated, but non-participating receptors are expected to be located far enough away for the impact to be minimal.	**PA**	**Short Term** Effects are mainly confined to the construction and decommission phases.	**Intermittent** Effects may occur during the Project's construction and decommission phases, but only intermittently.	**Reversible** Effects will return to baseline following construction (and decommission).	Not Significant
Operational (Stack) Emissions	Install emission-monitoring systems to track real-time concentrations of CO, NO_x.	**Adverse**	**Low*** Some air contaminant emissions are anticipated; however, maximum ground-level concentrations are expected to remain below NSAAQS limits beyond the Project Area.	**LAA**	**Medium Term** Effects are mainly confined to the operation phase.	**Intermittent** Effects may occur during the Project's operation phase, but only intermittently	**Reversible** Effects will return to baseline following the operation.	Not Significant
Greenhouse Gases								
Construction Emissions	Restrict idling. Maintain equipment in proper working order. Revegetate exposed groundcover.	**Adverse**	**Negative*** Construction is anticipated to generate GHGs above baseline.	**LAA**	**Short Term** Effects are mainly confined to the construction and decommission phases.	**Intermittent** Effects may occur during the Project's construction and decommission phases, but only intermittently.	**Irreversible** Effects will not return to baseline following construction (and decommission).	Not Significant

VC	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
Operational (Stack) Emissions	Implement an anti-idling policy to limit GHG emissions from vehicles and equipment and limit the use of fossil fuels.	**Adverse**	**Positive*** Facility operation is anticipated to reduce GHGs compared to baseline.	**LAA**	**Medium Term** Effects are confined to the operation phases.	**Intermittent** Effects may occur during the Project's operation phase, but only intermittently.	**Irreversible** Effects will not return to baseline following the operation.	Not Significant
Sound								
Construction and Decommissioning Sound	Design Project with sound suppression technologies as necessary to maintain compliance with regulatory thresholds. Restrict idling. Post and maintain speed limits for on-site transportation and mobile equipment. Conduct construction activities within the recommended daytime hours.	**Adverse**	**Moderate*** Construction sound may temporarily exceed available regulatory thresholds during intermittent, high-impact activities	**LAA**	**Short Term** Effects are mainly confined to the construction and decommission phases	**Intermittent** Effects may occur during the Project's construction and decommission phases, but anticipated to be rare and intermittent.	**Reversible** Effects will return to baseline following construction (and decommission.	Not Significant

VC	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
Operational Sound	Post and maintain speed limits for on-site transportation and mobile equipment. Design Project with sound suppression technologies as necessary to maintain compliance with regulatory thresholds	**Adverse**	**Low*** Operational sound is not anticipated to exceed regulatory thresholds at receptors	**LAA**	**Medium Term** Effects are confined to the operation phases	**Intermittent** Effects may occur during the Project's operation phase, but only intermittently	**Reversible** Effects will return to baseline following the operation	Not Significant
Geophysical Environment								
Encountered Geologic Hazard	Perform geotechnical surveys prior to facility construction.	**Adverse**	**Moderate*** Risk mapping shows the potential for geologic hazards in the Study Area.	**LAA**	**Continuous** If present, effects may occur continuously	**Medium Term** If present, effects may occur throughout the Projects operations phase	**Partially Reversible** Some but not all effects may be reversible	Not Significant
Change to Groundwater Quality or Quantity	Conduct pre-blast surveys prior to blasting (if required). Conduct hydrogeological studies prior to groundwater withdrawal.	**Adverse**	**Moderate*** Groundwater wells located within 800 m of the Project Footprint	**LAA**	**Intermittent** Effects may occur during blasting (if required), construction, or operational phases (groundwater withdrawal)	**Medium Term** Effects are possible throughout the Projects operations phase	**Partially Reversible** Change to the groundwater flow regime is not anticipated to be reversible; however, adequate alternative water supplies likely can	Not Significant

VC	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
							be constructed (if required)	
Surface Water and Fish and Fish Habitat								
Change in Surface Water Quality	ESC Plan Maintain 30 m buffers Ensure wastewater discharge meets CCME FAL Guidelines Surface Water Monitoring and Management Plan	**Adverse**	**Low*** Erosion and sediment controls and a 30 m buffer are expected to minimize impacts	**PA**	**Intermittent** Effects may occur during initial construction and during operations (continuously while operating, but operation is intermittent)	**Medium Term** Residual effects are expected to extend through the operation and maintenance phase.	**Partially Reversible** Mitigations and decommissioning cannot guarantee a return to baseline conditions	Not significant
Change in Surface Water Quantity	Implement water management systems Installation of a settling pond to hold water for treatment prior to release Evaluate potential changes to WC4 during fish and fish habitat permitting (if required).	**Adverse**	**Low*** Water management systems and monitoring are expected to minimize impacts	**PA**	**Intermittent** Effects may occur during construction and operations (continuously while operating, but operation is intermittent)	**Medium Term** Residual effects are expected to extend through the operation and maintenance phase.	**Partially Reversible** Mitigations and decommissioning cannot guarantee a return to baseline conditions	Not significant

VC	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
Thermal Change	Monitoring temperature of effluent	**Adverse**	**Negligible** Elevated temperature is not expected in effluent	**PA**	**Intermittent** Effects may occur during construction and operations (continuously while operating, but operation is intermittent)	**Medium Term** Residual effects are expected to extend through the operation and maintenance phase.	**Partially Reversible** Mitigations and decommissioning cannot guarantee a return to baseline conditions	Not significant
Blasting	Develop a Blast Management Plan	**Adverse**	**Low*** Blast Management Plan is expected to minimize impacts	**PA**	**Single Event** Effects may occur during initial construction	**Short Term** Effects are expected only during construction	**Reversible** – Return to baseline following initial construction phase is expected	Not significant
Wetlands								
Habitat Loss	Flag and avoid wetlands to the extent possible Wetland alteration approval Implement wetland compensation program	**Adverse**	**High*** Direct loss of wetland habitat and impact to wetland functions. Complete loss of WL4 (1.66 ha), which has been determined to be a potential WSS.	**PA**	**Single Event** Effects will occur during initial clearing and ground disturbance	**Medium Term** Effects to wetlands are expected to extend through the operation and maintenance phase	**Partially Reversible** Many of the wetlands may naturally rehabilitate upon decommissioning, however long-term changes to the structure and composition of wetlands is expected.	Not Significant High magnitude is based on potential designation of WSS; however, this is expected to be mitigated through increased

VC	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
								compensation ratio through the wetland alteration permitting process
Hydrological Effects	Maintain hydrological functions of wetlands to the extent possible	**Adverse**	**Low*** Mitigations are expected to minimize impacts	**PA**	**Intermittent** Effects may occur during construction and operations	**Medium Term** Effects to wetlands are expected to extend through the operation and maintenance phase	**Partially Reversible** Mitigations and decommissioning cannot guarantee a return to baseline conditions	Not Significant
Erosion and Sedimentation	ESC plan Maintain 30 m buffers on wetlands wherever possible	**Adverse**	**Low*** Erosion and sediment controls and a 30 m buffer are expected to minimize impacts	**PA**	**Intermittent** Effects may occur during construction and operations	**Medium Term** Effects to wetlands are expected to extend through the operation and maintenance phase	**Partially Reversible** Mitigations and decommissioning cannot guarantee a return to baseline conditions	Not Significant
Terrestrial Vegetation Communities and Flora								
Loss of vegetation communities	Continue to maximize the use of previously disturbed areas.	**Adverse**	**Low*** A small loss of vegetation communities and/or flora	**LAA**	**Single Event** Effects may occur during initial construction	**Long Term** Effects are expected to extend beyond the decommissioning phase	**Partially Reversible** Reversal of vegetation loss is not expected to be possible, but areas will be	Not Significant

VC	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
							allowed to revegetate following decommissioning.	
Loss of flora individuals	Avoid loss of all flora SAR and reduce indirect impacts to the extent possible.	**Adverse**	**Moderate*** Moderate loss of vegetation communities, moderate loss of flora, and/or loss of SOCI flora	**LAA**	**Single Event** Effects may occur during initial construction	**Long Term** Effects are expected to extend beyond the decommissioning phase	**Irreversible** Reversal of flora individuals is not expected to be possible.	Not Significant
Edge effects	Use native seed mix when revegetating cleared areas Inspect and clean equipment if required to reduce the introduction/spread of non-native species. Implement ESCP. Mitigate for dust.	**Adverse**	**Low*** A small loss of vegetation communities and/or flora	**LAA**	**Single Event** Effects may occur during initial construction	**Long Term** Effects are expected to extend beyond the decommissioning phase	**Irreversible** Reversal of habitat alteration is not expected to be possible	Not Significant
Terrestrial Fauna								
Loss or Alteration of Fauna Habitat	Maintain existing vegetation cover and minimize overall areas of disturbance.	**Adverse**	**Low*** Small loss of fauna habitat or small sensory disturbance to fauna	**LAA**	**Single Event** Impacts to fauna habitat will occur during the	**Long Term** Habitat loss and alteration will extend until after decommissioning	**Partially Reversible** Some habitat loss or alteration may	Not Significant

VC	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
	Implement spill prevention and ERP plans. Ensure safe handling of waste to prevent attracting wildlife. Revegetation or allow for natural revegetation of cleared areas. Target clearing activities outside the active bat window.				construction phase		be reversed by site rehabilitation	
Sensory Disturbance	Use noise controls on equipment/machinery. Limit use of lighting to the amount necessary to ensure safe operation.	**Adverse**	**Low*** Small loss of fauna habitat or small sensory disturbance to fauna	**LAA**	**Intermittent and Continuous** Varies depending on source and Project phase	**Medium Term** Sensory disturbance due to noise and light will end after decommissioning	**Reversible**	Not Significant
Human-wildlife Interactions	Install traffic signs to alert site users of speed limits and the potential for wildlife in the area.	**Adverse**	**Low*** Small loss of fauna habitat or small sensory disturbance to fauna	**LAA**	**Intermittent** Interactions may occur during all phases, but only intermittently	**Medium Term** Human-wildlife interactions will end after decommissioning	**Reversible**	Not Significant

VC	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
	Provide wildlife awareness training to site personnel. Prohibit harassment and feeding of wildlife by Project personnel.							
Avifauna								
Habitat Loss and Alteration	See Section 10.1.8	**Adverse**	**Low*** Small loss of fauna habitat or small sensory disturbance to fauna.	**LAA**	**Single Event** Impacts to avifauna habitat will occur during the construction phase	**Short Term** Habitat loss and alteration occur in the construction phase	**Partially Reversible** Some habitat loss or alteration may be reversed by site rehabilitation	Not Significant
Sensory Disturbance	See Section 10.1.8	**Adverse**	**Moderate*** Impact on a small number of birds in the PA and LAA up to a 500 m radius from the PF **Low*** Impact to birds in the LAA beyond 500 m from the PF.	**PA and LAA**	**Intermittent**	**Medium Term** Residual impacts of sensory disturbance due to noise and light will end after decommissioning	**Reversible**	Not Significant
Mortality and Injury	See Section 10.1.8	**Adverse**	**Moderate*** Impact on a small number of birds in the PA **Low*** Impact to birds in the LAA .	**PA and LAA**	**Intermittent**	**Medium Term** Mortality and injury will end after decommissioning	Mortality is **irreversible**, injury is **reversible**	Not Significant

VC	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
Socioeconomic								
Economy	No mitigations	**Positive**	**Positive*** Expected to have a positive impact on the economy	**LAA**	**Continuous** Occur continuously during the Project lifespan	**Long-Term** Effects are expected throughout operations and into decommissioning	**Irreversible** Effects are unlikely to be reversed	No significant negative impacts. Positive impacts are expected due to economic stimulus.
Land value	Working with neighbouring landowners and the local communities.	**Adverse**	**Negligible** No expected impact	**LAA**	**Continuous** Occur continuously during the Project lifespan	**Long Term** Effects will last through the decommissioning phase.	**Reversible** Residual effects are likely to be reversed after the Project is completed.	Not Significant
Recreation and Tourism Use	Continue to work with local recreation groups and nearby landowners on continued land use	**Adverse**	**Negligible** No direct impact on recreation and tourism activities	**LAA**	**Continuous** Occur continuously during the Project lifespan	**Medium Term** Effects will last through the decommissioning phase	**Reversible** Effects will terminate at the end of the construction phase.	Not Significant
Archaeological Resources								
Effects on archaeology resources	Maintain a 30 m buffer on sites with high archaeological potential. Shovel testing, as needed.	**Adverse**	**Low*** Areas of high archaeological potential will be avoided, and a 30 m buffer will be maintained.	**LAA**	**Single Event** Effects may occur during initial clearing and ground disturbance.	**Short Term** Effects may occur during construction.	**Irreversible** In the unlikely event that impacts to archaeological resources occur.	Not Significant

VC	Mitigations	Nature of Effect	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level
	Develop a chance find procedure. Conduct additional archaeological assessment if it is determined that ground disturbance is required in areas not previously assessed.							

*Indicates a non-negligible effect.

As outlined in Table 17.1, and following assessment methods outlined in Section 4.0, given the implementation of all appropriate mitigation measures, the Project is not anticipated to result in significant impacts to the VCs evaluated. This includes all valued components, including those relevant to provincial jurisdiction (i.e. wetlands) and those in federal jurisdiction (summarized in further detail in Section 21). Effects to VCs evaluated are believed to be adequately covered by the provincial EA process and any applicable federal permitting requirements.

18.0 SUMMARY OF IMPACTS TO VALUED COMPONENTS IN FEDERAL JURISDICTION

As outlined in Schedule 1 of the Information and Management of Time Limits Regulations SOR/2019-283, the proponent has prepared a list of any changes that, as a result of the carrying out of the project, may be caused to the following components of the environment that are within the legislative authority of Parliament:

- Fish and fish habitat as defined in subsection 2(1) of the *Fisheries Act.*
- Aquatic species, as defined in subsection 2(1) of SARA (marine plants).
- Migratory birds, as defined in subsection 2(1) of the *Migratory Birds Convention Ac*t, 1994.

18.1 Fish & Fish Habitat

The Project is not anticipated to directly impact fish and fish habitat (as defined under section 2 of the *Fisheries Act*) as the Project has been sited to avoid direct impact to all field verified fish habitat.

The Project will require the extraction of groundwater to supply process water needs. A hydrogeological field study will be conducted to support a provincial application for groundwater withdrawal. The application will incorporate key protective hydrogeological study elements such as sustainable yield, and a groundwater-surface water interaction assessment will be included as required to ensure groundwater withdrawal does not negatively impact water quantity (and quality) of nearby aquatic features that support or have the potential to support fish and fish habitat.

No impacts to fish or fish habitat as a result of treated process water discharge are anticipated. Treated process water from the demineralized water plant is expected to be discharged into WC4, as it is the largest of the on-site watercourses. Investigations are ongoing to determine how the water needs of the Facility can be reduced, including the use of recycled water or alternative Project technology with less water demand. Treatment and release of process water will be described in an Surface Water Monitoring and Management Plan, to be developed in consultation with NSECC and DFO. With the implementation of these mitigation and monitoring strategies, HADD of fish habitat is not expected. No change in water quality is anticipated. Consultation with DFO and NSECC will be conducted during the permitting stage to ensure permitting requirements are met.

At this time, blasting is not expected to be required, however this will be confirmed through geotechnical investigations planned to occur within the Project Area. Should blasting be required, guidance outlined by Wright and Hopky (1998) will be used to develop a Blast Management Plan. The Blast Management Plan will be designed to ensure that appropriate setback distances are maintained, or mitigations are implemented to protect fish and fish habitat from the potential impacts of blasting.

18.2 Aquatic Species

SARA defines aquatic species under subsection 2(1) as "wildlife species that are fish as defined in section 2 of the *Fisheries Act,* or a marine plant, as defined in section 47 of that Act". Potential effects to marine plants are not anticipated as the Project is over 14 km from the marine environment.

No fish or fish habitat will be lost (destruction of fish habitat) as a result of Project construction. Potential indirect effects (harmful alteration or disruption) to habitat for aquatic species as a result of water withdrawal needs, discharge options, and blasting are described in Sections 9.1 and 18.1. Furthermore, the Project is not anticipated to result in death of fish by means other than fishing.

18.3 Migratory Birds

Project impacts on migratory birds correspond to impacts described in Section 10.4, and include habitat loss and alteration, sensory disruption, and injury, and mortality.

Some migratory birds may be affected as a result of habitat loss (12.5 ha) or alteration (43.4 ha) during Project construction. Specifically, removal of forests and open areas within the Project Footprint could alter migration patterns via reduction of stopover areas and negatively affect food availability and abundance. Furthermore, habitat loss could reduce potential breeding habitat for species protected under the Migratory Bird Regulations, such as pileated woodpecker (one record of probably breeding evidence).

After the implementation of mitigation measures, the magnitude of effects on habitat loss and alteration during the construction is expected to be low and will be localized to the Project Area. Clearing will be scheduled to occur outside of breeding season, to the extent possible, to lessen stress on birds during their nesting period, and construction will employ best management practices to avoid unnecessary wildlife disturbance or interaction. If vegetation clearing must occur during the breeding and nesting season (typically April 15 to August 31), a pre-disturbance nest sweep/area search will be included as a mitigation strategy to avoid the disturbance or destruction of migratory bird nests that may be present during the breeding season. Setback distances will be implemented from known and identified avifauna nests within the Project Area such as pileated woodpecker and raptors.

Potential sensory disturbance (e.g., sound, light) may also cause migratory birds to avoid the localized area. Conversely, some birds may choose to nest near noisy areas which can impact hatching success. Artificial lighting will be minimized to lighting required only for safety and security of the site during the construction and decommissioning phases of the Project as these activities are not expected to occur at night. During the operational phase, the lighting on the site will be minimized and localized to the facility and access road. Mitigation measures are recommended to be implemented to further reduce the impacts of lights on birds in the Project Area (e.g., motion-activated lighting, lasers, shielding, LEDs, shades of light, etc.).

The risk of bird mortality from collisions with equipment during construction and operations is anticipated to be low and infrequent as it is expected that bird species will avoid the Project Area due to physical and sensory disturbance. Still, mortalities and injuries will not be completely avoided due to accidental collisions with Project infrastructure, vehicles, and heavy machinery. Injuries and death from exhaust emissions may also occur. Best management practices to reduce harm (e.g., speed limits, netting over ponds, maintaining good housekeeping practices) and specific deterrence techniques for exhaust stacks will be employed to mitigate these effects.

Overall, the residual effects of avifauna habitat loss and alteration, sensory disturbance, injury, and mortality are not anticipated to be significant as they are localized and would impact a low number of migratory birds.

19.0 POTENTIAL ENVIRONMENTAL IMPACTS ON FEDERAL LANDS, IN OTHER PROVINCES, OR OUTSIDE OF CANADA

19.1 Federal Lands

No federal lands will be used for the Project, nor will there be any granting of interest in federal land required. No federal protected areas are located within 10 km of the Project boundaries. Due to the distance of federal land from the Project, no direct changes to the environment will occur on federal lands because of the Project.

Potential air emissions from the Project were evaluated to comply with regulatory requirements at non-participating residential receptors and will be monitored quarterly for the first year of operation. In addition, sound from the Project was evaluated to meet provincial guidelines (NSECC, 2023a). Therefore, indirect changes to the environment on federal lands, such as through increased noise or reduced air quality, will also not occur due to the distance of the Project from federal lands.

19.2 Other Canadian Provinces

The Project will not have any environmental impacts to any other Canadian provinces as the Project Area is located approximately 56 km to Prince Edward Island, and 127 km to the Nova Scotia-New Brunswick border.

Given the size of the Project and the localization of effects to environmental components, the Project is not anticipated to have any adverse environmental effects outside of Nova Scotia.

19.3 Outside of Canada

Given the size of the Project and the localization of effects to environmental components, the Project will not have any environmental impacts outside of Canada as the Project Area is located approximately 350 km east of the Canada (New Brunswick) – United States (Maine) border.

20.0 CONCLUSION

In accordance with A Proponent's Guide to Environmental Assessment (NSECC, 2017), and the Information and Management of Time Limits Regulations SOR/2019-283 (IAAC, 2024), the studies completed, regulatory assessments, and VC evaluations described within this EARD/IPD, have been considered both singularly and cumulatively, for all phases of the Project.

The results of this assessment indicate that in consideration of the Project's mitigative and protection measures, adverse residual effects are not anticipated to be significant.

21.0 CLOSURE

This EARD/IPD was completed by Strum Consulting, an independent, multi-disciplinary team of consultants with extensive experience with submissions of EARD/IPD for undertakings within Atlantic Canada. Curriculum vitae for EARD/IPD contributors and Strum/Hatch Project Team members are provided in Appendix K. A list of the Project Team and their associated roles is provided below.

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