DILLON CONSULTING

OSCO AGGREGATES LIMITED

Environmental Assessment Registration

Pit No. 4 Extension, Glenholme, Colchester County, Nova Scotia

June 2024 – 23-6113

June 6, 2024

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Nova Scotia Department of Environment and Climate Change
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P.O. Box 442
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Attention: Allison Fitzpatrick, Environmental Assessment Officer

Environmental Assessment Registration Document: Proposed Pit No. 4 Extension in Glenholme, Nova Scotia

On behalf of OSCO Aggregates Limited (OSCO), Dillon Consulting Limited (Dillon) is pleased to submit this environmental assessment (EA) registration document for the proposed Extension of Pit No. 4 (the Project) in Glenholme, Colchester County, Nova Scotia for your review and consideration.

Should you have any questions, please contact the undersigned.

Sincerely,

DILLON CONSULTING LIMITED

Jonathan Oliver, M.Sc., P.Geo.
Project Manager, Associate

JTO:jmt

Our file: 23-6113

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Acronyms, Abbreviations, Definitions

Acronym or Abbreviation	Definition
AC CDC	Atlantic Canada Conservation Data Centre
amsl	above mean sea level
AQHI	Air Quality Health Index
ARD	acid rock drainage
ARIA	Archaeological Resource Impact Assessment
asl	above sea level
ATV	all-terrain vehicle
CAAQS	Canadian Ambient Air Quality Standards
CCME	Canadian Council of Ministers of the Environment
CCTH	Communities, Culture, Tourism and Heritage
CEPA	*Canadian Environmental Protection Act*
CER	Canada Energy Regulator
CH_4	methane
CLC	Community Liaison Committee
CMM	Confederacy of Mainland Mi'kmaq
CN	Canadian National Rail
CNWA	*Canadian Navigable Waters Act*
CO	carbon monoxide
CO_2	carbon dioxide
COSEWIC	Concern under the Committee on the status of Endangered Wildlife in Canada
CRM Group	Cultural Resource Management Group Limited
CSA	Canadian Standards Association
dBA	decibels
DFO	Department of Fisheries and Oceans Canada
Dillon	Dillon Consulting Limited
DUC	Ducks Unlimited Canada
EA	environmental assessment
EARD	environmental assessment registration document
ECCC	Environment and Climate Change Canada
ENGO	environmental non-governmental organization
EPP	Environmental Protection Plan
ERD	Emergency Response Plan
ESC	Erosion and Sediment Control Plan
FWAL	freshwater aquatic life
GCDWQ	Guidelines for Canadian Drinking Water Quality
GHG	greenhouse gases

Acronym or Abbreviation	Definition
GIS	geographic information systems
GOC	Government of Canada
HADD	harmful alteration, disruption, or destruction
H_2S	hydrogen sulphide
IAA	*Impact Assessment Act*
IBA	Important Bird Area
IPCC	Intergovernmental Panel on Climate Change
LAA	local assessment area
Leq	equivalent sound level
MAPC	Maritime Aboriginal Peoples Council
MBBA	Maritime Breeding Bird Atlas
MBCA	*Migratory Birds Convention Act* and regulations
mbgs	metres below ground surface
N_2O	nitrous oxide
NASA	North American Space Agency
NCNS	Native Council of Nova Scotia
NO	nitric oxide
NO_2	nitrogen oxide
NO_x	nitrogen oxides
NSDMA	Nova Scotia Department of Municipal Affairs
NSDNR	Nova Scotia Department of Natural Resources
NSDNRR	Nova Scotia Department of Natural Resources and Renewables
NSEL	Nova Scotia Environment and Labour- See NSECC
NSE	Nova Scotia Environment – See NSECC
NSECC	Nova Scotia Department of Environment and Climate Change
NS ESA	Nova Scotia *Endangered Species Act*
NSLSI	Nova Scotia Department of Labour, Skills and Immigration
NSPW	Nova Scotia Department of Public Works
O_3	ozone
OSCO	OSCO Aggregates Limited
PDA	Project development area
PID	property identification number
$PM_{2.5}$	fine particulate matter
RCMP	Royal Canadian Mounted Police
SAR	species at risk
SARA	*Species at Risk Act*
SO_2	sulphur dioxide
SoCC	species of conservation concern
TC	Transport Canada

Acronym or Abbreviation	Definition
TRS	total reduced sulphur
TSP	total suspended particulate
UNFCCC	United Nations Framework Convention on Climate Change
UNSM	Union of Nova Scotia Mi'kmaq
USACE	U.S. Army Corps of Engineers
VEC	valued environmental component
WAM	wet-areas model
WESP-AC	Wetland Ecosystem Services Protocol for Atlantic Canada
WSS	Wetland of Special Significance

1.0 Introduction

This document is an environmental assessment registration document (EARD) prepared by Dillon Consulting Limited (Dillon) on behalf of OSCO Aggregates Limited (OSCO) for the proposed extension of its existing Pit No. 4 aggregate operation located in the community of Glenholme, Colchester County, Nova Scotia (NS) (the Project). The Project, as determined by Nova Scotia Department of Environment and Climate Change (NSECC), is a modification of an undertaking, requiring the Project be registered as a Class I Environmental Assessment in accordance with Section 11(3)(b) of the Environmental Assessment Regulations.

The Project will allow OSCO to remain operational within the community of Glenholme and to provide an important source of aggregate material for many local and regional projects in Nova Scotia and the Maritimes.

Table 1.1 presents the minimum requirements for a Class I undertaking as outlined in the Guide to Preparing an EA Registration Document for Pit and Quarry Developments in Nova Scotia, Revised September 2009.

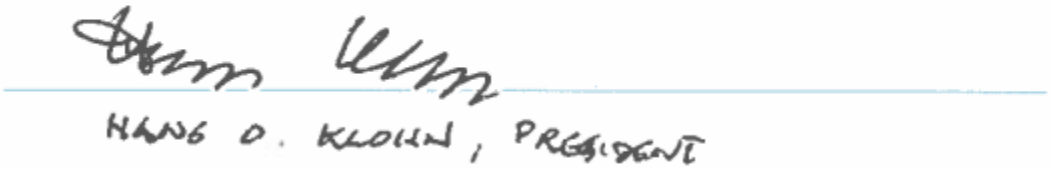
Table 1.1: Concordance Table with Nova Scotia Environmental Assessment Registration and Class I Requirements

EA Requirement		Location in Document
i)	Name of Undertaking	Section 1.2.1
ii)	Location of Undertaking	Section 2.1
iii)	Proponent Name, Address, Identification	Section 1.1
iv)	Undertaking Contact	Section 1.1
v)	Signing Authority	Section 1.1
vi)	Details of the nature and sensitivity of the area surrounding the proposed undertaking	Section 6.0 (See the Description of Existing Environmental Conditions for Each VEC)
vii)	Purpose and Need of Undertaking	Section 1.2.2, 2.4
viii)	Proposed Construction and Operation Schedules	Section 2.6
ix)	Description of Undertaking	Section 2.0
x)	Environmental Baseline Information	Section 6.0
xi)	List of Various Authorizations Required	Section 1.3, 11.0
xii)	Sources of Public Funding for the Undertaking	Section 12.0
xiii)	Steps taken to Identify and Address Public and Aboriginal Concerns about Adverse Effects or Environmental Effects	Section 3.0
xiv)	Steps to Address Public and Aboriginal Concerns about Adverse Effects or Environmental Effects Identified	Section 3.0

1.1 Proponent Identification

The Proponent of the Project is OSCO Aggregates Limited, a private Canadian Company. The Nova Scotia Registry of Joint Stocks information is provided in **Appendix A**. Contact information is provided below:

Proponent President
Hans O. Klohn President, OSCO Aggregates Limited 400 Chesley Drive, Saint John, New Brunswick Telephone: 506-632-2600 Fax: 506-648-3523 Email: klohn.ho@oscogroup.com
Proponent Contact
Chris Yurchesyn, P.Eng General Manager, OSCO Aggregates Limited 17 Estate Drive, Lower Sackville, Nova Scotia Telephone: 902-499-1888 Fax: 902-865-3033 Email: yurchesyn.chris@strescon.com
Environmental Assessment Consultant Contact Information
Jonathan Oliver, P.Geo., M.Sc. Associate, Dillon Consulting Limited 1149 Smythe Street, Fredericton, New Brunswick Telephone: 506.444.9717 Fax: 506.444.8821 Email: Joliver@dillon.ca
Signature of CEO Accepting the EA



1.2 Overview of the Undertaking

1.2.1 Name of the Undertaking

The name of the undertaking is the **"**Pit No. 4 Extension", which is also referred to as "the Project."

1.2.2 Scope of the Undertaking

The Project is located just south of the community of Glenholme on Little Dyke Road in Colchester County, Nova Scotia (**Figure 1.1**). The proposed Project will expand on operational activities currently occurring within Pit No. 4. Current operations include producing high quality aggregate (stone and sand) for use in concrete and construction projects. Specific activities in Pit No. 4 have included aggregate extraction, screening, mobile crushing, stockpiling of aggregate, and transport of aggregate to the existing OSCO Glenholme Wash Plant facility located at Pit No. 2, approximately 700 m away on Little Dyke Road.

The proposed Project will involve the continued excavation of aggregate material from the reserve within the current Pit No. 4 property, as well as expanding the pit towards the south, east, and north. The proposed Project will also include the addition of an electric washing/screening/crushing plant (the electric plant), eliminating the need of transporting aggregate material to Pit No. 2. The electric plant will also have some capacity to process off-site material, further increasing the production capabilities without increasing the footprint of the operation.

The Project will allow OSCO to remain operational within the community of Glenholme and continue to contribute to the natural resource sector of the economy and provide essential raw materials to the province's construction industry. The existing Glenholme facility has made a significant contribution to the local economy with employment of approximately 15 people (full-time and seasonal) on an annual basis and has paid over $2.5 million dollars in wages, royalties, fees and taxes over the last five years, and more previously. A large proportion of these local earnings are expected to go directly back into the economy of the area.

The Glenholme area is also a key source of aggregates for concrete stone for marine-based projects due to their non-reactive properties. Several major wharf and jetty projects in the Halifax area (Department of National Defence and Harbour Authority facilities) have relied on stone from the area as a preferred source. The aggregate will also be used in highway construction and maintenance projects in the region, as well as for municipal and residential construction projects.

OSCO AGGREGATES LIMITED

PIT NO. 4 EXTENSION

Subject Property

PROJECT LOCATION

FIGURE 1.1

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MAP DRAWING INFORMATION:
DATA PROVIDED BY ESRI, GeoNova

MAP CREATED BY: SCM
MAP CHECKED BY: JO
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

N W E S

SCALE 1:50,000

0 435 870 m

PROJECT: 23-6113
STATUS: FINAL
DATE: 2024-03-08

FILE LOCATION: \\dillon.ca\DILLON_DFS_projects\GIS\2023\236113\Product\Client\EA\SubmissionFigures\Final Figures\F1_1_ProjectLocation.mxd

1.3 Regulatory Framework

OSCO is committed to adherence with applicable municipal, provincial and federal regulatory requirements. Approvals/permits required will be obtained prior to construction and operation as applicable. Relevant policy guiding legislation such as the Nova Scotia Wetland Conservation Policy will also be followed. **Table 1.2** provides a summary of potential key regulatory requirements and applicability to this Project.

Table 1.2: Potentially Relevant Environmental Legislative Requirements Applicable to the Project

Legislation	Requirement	Approval/Permit Anticipated?
FEDERAL		
Impact Assessment Act (IAA) (Impact Assessment Agency of Canada)	Projects that meet the criteria of a 'Designated Project' under item 18 or 19 of the *Physical Activities Regulations* (not triggered by Project)	No
Fisheries Act and Regulations (Department of Fisheries and Oceans (DFO) Canada)	Protection of fish habitat (watercourses with suitable fish habitat are present within the Project development area [PDA])	**Yes**
Species at Risk Act (SARA) (Environment and Climate Change Canada (ECCC))	Protection of listed species at risk (SAR). (Although flora SAR species were not identified during the EA surveys, fauna SAR may be present on-site incidentally. Mitigation measures will be implemented for the protection of wildlife.	No
Transportation of Dangerous Goods Act and Regulations (Transport Canada (TC))	Documented handling, storage, emergency response requirements for transportation of dangerous goods, if to be used on-site, to be met.	Compliance Required
Migratory Birds Convention Act (MCBA) and regulations	Protection of migratory birds, nests, eggs and their young.	No (assuming clearing outside of nesting season)
Canadian Environmental Protection Act (CEPA) (ECCC)	Pollution prevention requirements, and direction on priority substances and deleterious substances to be met where applicable	No
Canadian Navigable Waters Act (CNWA)(Transport Canada [TC])	Regulates works that potentially interfere with navigation on navigable waters, as defined within the Act. Not triggered by the Project.	No
PROVINCIAL		
Nova Scotia *Environment Act* (Nova Scotia Environment and Climate Change (NSECC)	Supports and promotes the protection of the environment by maintaining environmental protection, implementing sustainable development, remediating adversely affected areas, and developing policies, standards, objectives, and guidelines to facilitate environmental protection.	**Yes** (see applicable regulations below)

Legislation	Requirement	Approval/Permit Anticipated?
Nova Scotia *Environment Act* (Nova Scotia Environment and Climate Change [NSECC]): *Environmental Assessment Regulations*	Project requires Ministerial approval as it will be in excess of 4 ha in area and involve the extraction of ordinary stone, building or construction stone, sand, gravel or ordinary soil.	**Yes**
Nova Scotia *Environment Act* (NSECC): *Activities Designation Regulations* – Construction	Industrial Approvals are required for the operation, construction, or reclamation of projects that fall under Division V of the *Activities Designation Regulations*. The Project will be a pit that is larger than 2 ha where a ground disturbance or excavation is made for the purpose of removing aggregate without the use of explosives, triggering the need for an Industrial Approval.	**Yes**
Nova Scotia *Environment Act* (NSECC): *Activities Designation Regulations* – Watercourses and Wetlands	Project activities resulting in the alteration to a watercourse, water resource, wetland or the flow of water will require an Approval by the Minister of Environment.	**Yes** (Watercourse Alteration Notification/ Approval is not Applicable; Wetland Alteration Approval required)
Nova Scotia *Environment Act* (NSECC): *Contaminated Sites Regulations*	Requirements for contaminated sites in contaminated sites identified as part of the Project.	No
Nova Scotia *Environment Act* (NSECC): *Sulphide Bearing Minerals Disposal Regulations*	Regulation of acid draining rock, including approval for disposal of sulphide-bearing material as defined by legislation over 500 m^3 in situ or 1,300 tonnes. There is no sulphide bearing bedrock present within the PDA.	No
Nova Scotia *Environment Act* (NSECC): Water Withdrawal Approvals	Required if a watercourse or water resource is used for the following: • withdrawing or diverting more than 23,000 litres per day; • constructing or maintaining a dam; • storing more than 25,000 cubic metres of water.	**Yes** (water withdrawal will exceed 23,000 litres per day; a dam will not be constructed; water storage will not exceed 25,000 m^3)
Nova Scotia *Environment Act* (NSECC): *Petroleum Management Regulations*	Petroleum storage requirements to be met as applicable.	Compliance required
Nova Scotia *Environment Act* (NSECC): *Environmental Emergency Regulations*	The Project will meet requirements specified in case of an environmental emergency or the release of substances into the environment	No
Nova Scotia *Environment Act* (NSECC): *Air Quality Regulations*	Standards for maximum permissible ground level concentrations of air contaminants are to be met.	No

Legislation	Requirement	Approval/Permit Anticipated?
Sustainable Development Goals Act (NSECC)	Environmental goals focusing on climate mitigation and adaptation and the requirements of a circular economy.	No
Nova Scotia *Endangered Species Act* (NSESA) (Nova Scotia Department of Natural Resources and Renewables {NSDNRR])	Protection of species listed as Extirpated, Endangered, Threatened or of Special Concern, and habitat which supports them. This act prohibits: • Killing, injuring, or disturbing species at risk; • Destroying, disturbing, or interfering with its residence (e.g., nest, den, hibernaculum); and • Destroying, disturbing, or interfering with its core habitat. A Species-at-Risk Permit may be required if SAR are identified in the PDA. Although SAR species were not identified during the EA surveys, fauna SAR may be present onsite incidentally. Mitigation measures will be implemented for the protection of wildlife).	No
Nova Scotia *Wildlife Act* (NSDNRR)	Among other wildlife management requirements, provides protection measures for wildlife including birds, turtles, and fur-bearing mammals.	No (assuming clearing outside of nesting season)
Special Places Protection Act (Communities, Culture, Tourism and Heritage [CCTH])	Heritage Research Permit was acquired for the purposes of the EA.	**Yes**
Crown Lands Act and Regulations (NSDNRR)	Crown land easements, leases and licences (Project is on private land).	No
Forests Act – Forest Fire Protection Regulations (NSDNRR)	Requirements for fire suppression equipment for operations in forests to be met	No
Dangerous Goods Transportation Act and Regulations (Nova Scotia Department of Public Works [NSPW])	Requirements for safe transport of dangerous goods to be met if applicable.	Compliance required
Labour Standards Codes	Labour requirements to be met	No
Nova Scotia *Public Highways Act* (NSPW)	Any work within the public road (e.g., potential road signage) would require Nova Scotia Department of Public Works approvals.	May be required

Legislation	Requirement	Approval/Permit Anticipated?
Occupational Health and Safety Act and Regulations (Nova Scotia Department of Labour, Skills and Immigration [NSLSI])	Workplace health and safety requirements to be met	Activity specific
Municipal Government Act (Nova Scotia Department of Municipal Affairs [NSDMA])	Provides authority to municipal governments to develop municipal planning strategies and land-use by-laws.	May be required

Key relevant environmental provincial and federal acts and guidelines include *Migratory Birds Convention Act;* Nova Scotia *Environment Act* and *Species at Risk Act*; as well as the Nova Scotia Pit and Quarry Guidelines (Nova Scotia Environment and Labour [NSEL, now NSECC] 1999).

To proceed with this Project, a Class 1 Environmental Assessment (EA) is required, pursuant to the *Environment Act* as identified in Schedule A of the *Environmental Assessment Regulations*, Section B (Mining) (2): "*A pit or quarry, other than a pit or quarry exempted under Section 4 of the regulations for the Department of Transportation and Infrastructure Renewal, that is larger than 4 ha in area for extracting one of the following: ordinary stone; building or construction stone; sand; gravel; ordinary soil.*" Provincial regulatory officials have been made aware of the intention to submit an EARD for this undertaking. Provincial regulators have provided assistance in scoping by bringing forth potential issues of concern. In addition, the Proponent also requires an NSECC Industrial Approval for its current operations. OSCO currently operates Pit No. 4 under a NSECC Industrial Approval (#2008-060731-06). A request will be made to amend NSECC 2008-060731-06 once the Project has satisfied the requirements of the NSECC *Environmental Assessment Regulations*.

Any project activities occurring in wetlands greater than 0.01 hectares (ha, or 100 m^2) will require an approval under the Nova Scotia *Environment Act* and *Activities Designation Regulations*. The Nova Scotia Wetland Conservation Policy was developed in 2011 to help conserve wetlands.

Heritage Research Permits (under the *Special Places Protection Act*) were acquired for the purposes of the baseline studies for this environmental assessment.

Federal environmental assessment triggers have not been identified and no other permits or approvals are expected to be required from the Province for the Undertaking. If it is determined that additional permits or approvals are required, the Proponent commits to obtaining all requisite approvals prior to work.

2.0 Description of the Undertaking

A brief description of the Project as it is currently conceived is provided below, based on the available information at the time of writing. The Project, as described in this document, is likely to evolve as Project planning and engineering design is completed. To not understate the potential environmental consequences of the Project at this planning stage, the Project Description provided in this Section presents an "outer envelope" or conservative estimate of the scope, footprint, and environmental effects of the Project.

In this document, the Project development area (PDA) is defined as the area of physical disturbance associated with the Project (also sometimes referred to as the Project footprint). The PDA consists of an area of 77 hectares (ha), encompassing the properties north of the current Pit No. 4 property, as well as the entirety of Pit No. 4.

2.1 Location of the Undertaking

The Project is located just south of the community of Glenholme on Little Dyke Road in Colchester County, Nova Scotia (**Figure 1.1**). The PDA will entirely be within the Project properties, which encompasses property identification numbers (PID No.) 20499364, 20499745, 20134177 and 20134193, owned by OSCO, (**Figure 2.1**). The approximate centre of the PDA is at latitude 45.3949103° and longitude -63.5507845°. The PDA is accessible from Little Dyke Road, approximately 3 kilometres (km) south of Exit 11 on Highway 104 via a private access road currently used for the existing Pit No. 4.

2.2 Existing Pit No. 4 Operations

The existing Pit No. 4 site is located on private land (PID No. 20134177) along Little Dyke Road, approximately 3 km south of Exit 11 on Highway 104. High quality aggregate (stone and sand) is produced from this pit for concrete plants and construction projects under an NSECC Industrial Approval (#2008-060731-06). Extraction from Pit No. 4 began in 2018 with an initial calculated reserve of 1.13 million tonnes (pers. comm., D. Bancroft, OSCO).

Activities in Pit No. 4 have included aggregate extraction, screening, mobile crushing, stockpiling of aggregate, and transport of aggregate to the existing OSCO Glenholme Wash Plant facility (**Figure 2.2**). Materials are transported to the existing OSCO Pit No. 2, which is part of the existing OSCO Glenholme Wash Plant facility, located just to the east of the Project. Transportation of the aggregate to the existing Pit No. 2 occurs along the Little Dyke Road (public) for approximately 700 m. Access to Pit No. 4 is via Little Dyke Road by use of a private access road. The access road is approximately 10 m wide and the first approximately 300 m of the access road is paved.

Note:ESRI Aerial Imagery from May 19, 2022

OSCO AGGREGATES LIMITED

PIT NO. 4 EXTENSION

Project Development Area

Property Parcels

PROJECT DEVELOPMENT AREA AND SURROUNDING PROPERTIES

FIGURE 2.1

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MAP DRAWING INFORMATION:
DATA PROVIDED BY
ESRI, GeoNova

MAP CREATED BY: SCM
MAP CHECKED BY: JTO
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

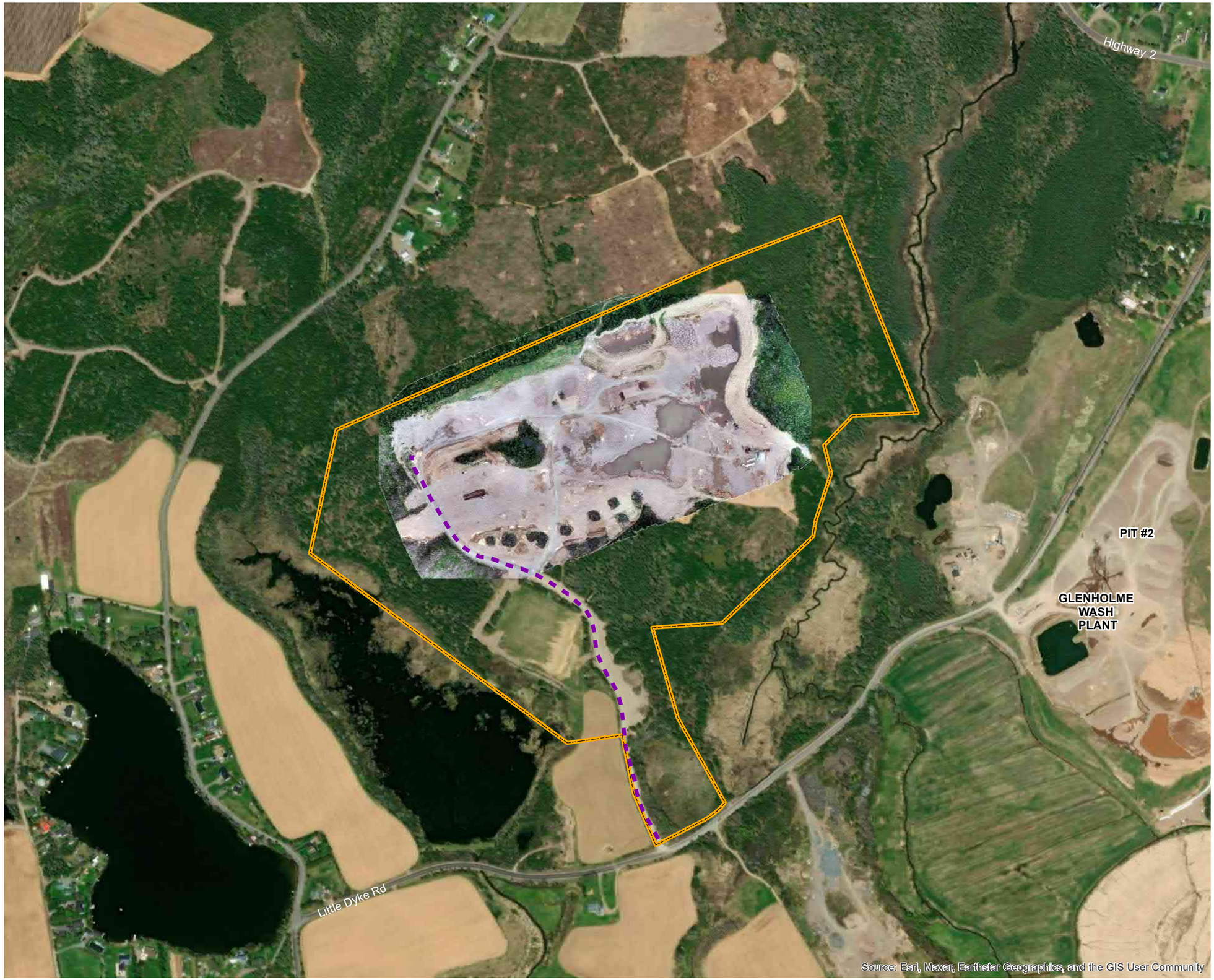
N
W E
S

SCALE 1:8,000

0 75 150 m

PROJECT: 23-6113
STATUS: FINAL
DATE: 2024-03-08

FILE LOCATION: \\dillon.ca\DILLON_DFS_projects\GIS\2023\236113\Product\Client\EA\SubmissionFigures\Final Figures\F2_1_PDAandSurroundingProperties.mxd



OSCO AGGREGATES LIMITED

PIT NO. 4 EXTENSION

EXISTING PIT NO. 4 SITE PLAN

FIGURE 2.2

Pit No. 4 Property

Access Roads

Current Access Road

Note:ESRI Aerial Imagery from May19, 2022

SCALE 1:6,000

0 75 150 300 m

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY OSCO Aggregates Limited,ESRI, GeoNova

MAP CREATED BY: SCM
MAP CHECKED BY: JTO
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

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PROJECT: 236113
STATUS: FINAL
DATE: 2024-03-12

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Excavation of the pit is typically undertaken using front end loaders; however, bulldozers and excavators may also be employed. The material excavated includes a mix of medium- to coarse-grained sand, gravel, and associated finer material including silt and clay fractions. Due to the unconsolidated nature of the aggregate, blasting is not required for extraction and blasting does not occur at the site. A portable crushing and screening plant is currently located within the existing Pit No. 4. The excavated material is dumped into the crusher; crusher output (approximately 2.5 cm diameter gravel and finer fractions) is conveyed to a dry screen. Screened material then goes to a stockpile. Stockpiles migrate as extraction progresses. Crushing, screening and stockpiling areas are within the active area of the current Pit No. 4 footprint.

There is no permanent fuel storage facility located within the existing Pit No. 4 property site.

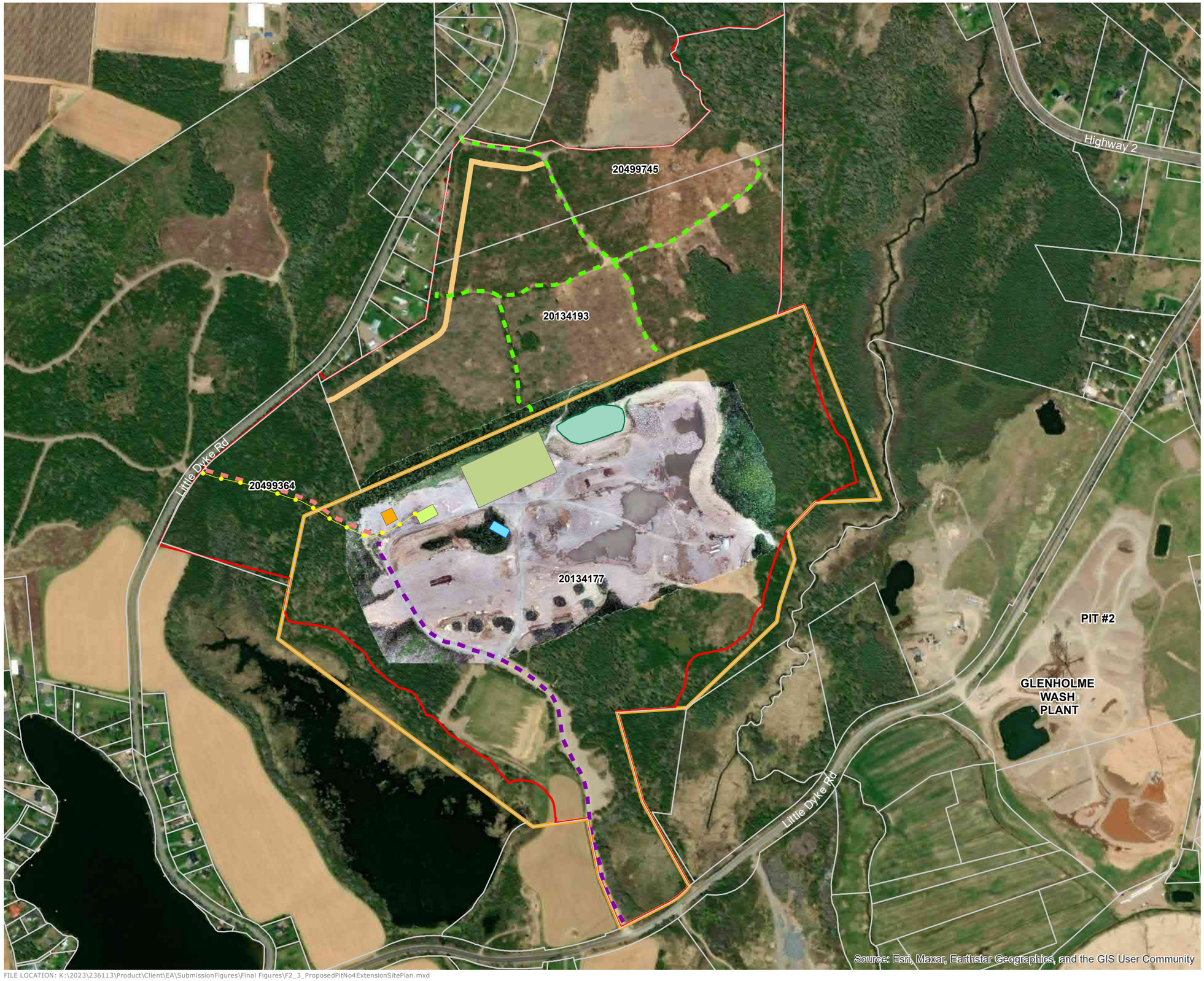
The Pit No. 4 operating schedule is currently 12-to-14 hours per day, 5 to 6 days per week, year-round; during peak season, operations expand to 22-to 24 hours per day. Activities in the winter months (January and February) are generally limited to aggregate processing and trucking; extraction activities generally occur from March to December. The rate of aggregate extraction from the existing Pit No. 4 is minimum of 150,000 tonnes or more depending on market demand, resulting in a remaining pit life of approximately 8 to 10 years. Approximately 5% of the material stockpiled at the existing Pit No. 4 is sold as is, with the majority trucked to the current Glenholme Wash Plant for processing. Trucking is generally large trailer loads (i.e., tri-axle or quad-axle).

The pit floor is maintained at least 0.5 m above the groundwater table. The inactive pit areas have been progressively reclaimed by grading to a stable slope and covered with topsoil/mulch and seeded as needed. Maintenance on the existing Pit No. 4 property consists of occasional grading or addition of gravel to the access road.

2.3 Proposed Pit No. 4 Extension Operations

The Project will involve the continued excavation of aggregate material from the reserve within the existing Pit No. 4 property, as well as expanding to the following areas, collectively referred to as the PDA (**Figure 2.3**):

- Extension within PID No. 20134177; and
- Extension throughout PID No. 20499364, 20499745 and 20134193.



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PIT NO. 4 EXTENSION

PROPOSED PIT NO. 4 EXTENSION SITE PLAN

FIGURE 2.3

- Proposed Transmission Line

Access Roads

- Current Access Road
- Existing Access Road from PID 20134193
- Proposed Access Road from PID 20451092
- Property Parcels
- Pit No. 4 Property
- Project Development Area

Site Features

- Berm
- Petroleum Storage
- Scale House
- Settling Pond (50m x 100m)
- Electric Processing Plant
- Water Source (15m x 30m)

SCALE 1:6,000

0 75 150 300 m

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY OSCO Aggregates Limited,ESRI, GeoNova

MAP CREATED BY: SCM
MAP CHECKED BY: JTO
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

DILLON CONSULTING

PROJECT: 236113
STATUS: FINAL
DATE: 2024-03-12

FILE LOCATION: K:\2023\236113\Product\Client\EA\SubmissionFigures\Final Figures\F2_3_ProposedPitNo4ExtensionSitePlan.mxd

Although Project planning and development is at an early stage, it can be expected that the Project would consist of many of the following components, subject to further design and confirmation by OSCO:

- An open pit for extracting aggregate material;
- An electric pleat for washing, screening and crushing plant;
- Heavy mobile equipment (e.g., front end loader, excavators, bulldozer, dump trucks) for moving aggregate, topsoil, and overburden on-site and for loading material into trucks for transportation;
- Storage areas, for temporary storage of crushed aggregate while awaiting transportation for further processing;
- Possible conveying and/or stacking equipment at the storage area, to stockpile aggregate;
- Storage areas for overburden and topsoil, for use in later progressive site reclamation;
- A truck scale, for weighing trucks entering and leaving the property;
- Security gates and signage at each access road, for controlling access to the site;
- A portable trailer, to serve as a site office/lunchroom;
- Access roads from Little Dyke Road to the site, and internal roads between various components of the Project;
- A settling pond with collection ditches; and
- The construction of a three-phase power line from Little Dyke Road into the PDA.

Some of the current infrastructure within the nearby Pit No. 2 (such as the scale house) will be relocated to the PDA to better service the Project. The current access road from Little Dyke Road to the existing Pit No. 4, as well as existing access roads on PID No. 20499745 and 20134193 to Little Dyke Road, will be maintained for use by the Project. An additional access road is proposed to be constructed on PID No. 20499364 to connect the western portion of the proposed Pit No. 4 Extension to Little Dyke Road. The proposed pit extension onto PID No. 20499364, 20499745 and 20134193 will add 30 ha to the current permitted pit surface area (**Figure 2.3**).

Based on regional geological mapping for the Project area, the proposed Pit No. 4 Extension is in an area underlain by a south flowing glacial outwash system. Aggregate resources from the Project are anticipated to consist of clean, coarse-grained aggregate (i.e., a mixture of gravel and medium- to coarse-grained sand) and localized sand bars, which is consistent with current extracted material from the existing Pit No. 4.

The quantity of aggregate excavated within a given year will vary based on market conditions. Annual extraction rates of 150,000 metric tonnes ranging upwards based on market demand are anticipated. Given the potential variation in annual production rates, the Project would add a 10-to-20-year reserve, for a total of 20 to 30 years aggregate supply for Pit No. 4. For the purposes of this document, the 30-year timeline will be discussed.

2.3.1 Operational Pit Boundaries

The Project will include the expansion of:

- the active pit working face to PID No. 20499745 and 20134193;
- a portion of PID No. 20499364;
- the eastern and southern limits of PID No. 20134177, which includes alterations of approximately 5.4 ha of wetland; and
- expansion to the south of PID No. 20134177, which includes the alteration of one wetland.

Alteration of wetlands and/or watercourses will only be carried out under an approved Wetland Alteration Application from NSECC, and the Proponent will adhere to the conditions of the approval. Information on the wetlands and proposed alterations to wetlands is presented in **Section 6.0**.

Physical components of the existing Pit No. 4 operations will continue under the current NSECC Industrial Approval #2008-060731-06 until the resource is exhausted or a new Industrial Approval is issued. As with the existing operations, the extension of Pit No. 4 will maintain the pit floor at or over 0.5 m above the groundwater table. Since an electric plant will be developed as part of the Project, trucking from the current Pit No. 4 to the Glenholme Wash Plant in Pit No. 2 will no longer be necessary; truck traffic on Little Dyke Road will be reduced by approximately 100 to 200 trucks per day as a result of the proposed Pit No. 4 Extension.

Equipment currently used for extraction, including front end loaders fitted with 2 to 6 cubic metre (m^3) buckets, bulldozers, and excavators, will continue to be used for the Pit No. 4 Extension operations.

There is currently an access road from Little Dyke Road onto the northern end of the PID No. 20499745 and extends onto PID No. 20134193. This access road will be maintained and used for the Project. Maintenance of this access road will include the occasional addition of gravel, grading, ditching, snow removal, and removing overgrown vegetation. Security gates and signage will be at each site entrance from Little Dyke Road.

2.3.2 Infrastructure

The Project will include the addition of infrastructure to the PDA, including an electric plant, construction of a settling pond, development of a water source, and a permanent fuel storage area. The

Project will also include the addition of a transmission line from Little Dyke Road to the PDA (PID No. 20499364).

A berm will be constructed on the western portion of PID No. 20499745 and 20134193, the portion of the PID that is adjacent to residents. The berm will be approximately 3 m high and composed of fill material from the PDA. This berm will act as a sound and visual barrier, as well as to reduce dust.
The proposed extension of Pit No. 4 within PID No. 20499364 will include constructing an access road from Little Dyke Road towards the expected location of the relocated scale house within the existing Pit No. 4 (**Figure 2.3**). The access road will be approximately 10 m wide and constructed of gravel material. A culvert will be installed where the access road crosses a wetland and an ephemeral stream. Assessment and delineation details of the wetland, as well as details of the proposed work, which have been designed to minimize alterations to the wetland, is presented in **Section 6.0**.

2.4 Consideration of Alternatives

Alternatives to the Project would include the development of a new pit nearby and not proceeding with the extension. The existing operations at Pit No. 4 would continue, including trucking of aggregate to Pit No. 2, until the resource was exhausted. The alternative pit would be developed and operated in parallel; the pit would likely have its own electric plant or would require trucking to Pit No. 2 for washing. Thus, resources would be duplicated to operate the current Pit No. 4 property and another property. However, extending the current pit and installing an electric plant within the existing footprint reuses/repurposes existing equipment, reduces trucking, and minimizes impacts on the environment.

In terms of alternative means of carrying out the Project, an alternate site access road was considered which would connect the Site directly to Highway 2; however, in doing so, the Project footprint would require an extension, including into an area with wetlands and a watercourse. By utilizing the existing site access road for Pit No. 4, OSCO can minimize the need to further disturb the habitat.

The Project includes the addition of an electric plant to be constructed within the PDA. In doing so, this will reduce the need for hauling material to the facility located at Pit No. 2. Although the facility is near the proposed Project location (i.e., within 1 km), washing on-site will considerably reduce the number of trucks on local roadways.

The proposed Project is in an area that has already been exposed to and used for aggregate excavation for several decades. A comparable resource of the high-quality aggregate and sand material currently produced in the existing Pit No. 4, significantly increased transportation routes to both processing facilities and markets would be required, and more extensive development disturbance and conflict with other land uses (e.g., forestry, agriculture) would be anticipated. OSCO, representing the main provider of aggregate and sand for the area, supplies the local construction and concrete industry over 100 km from Pit No. 4. Thus, it is crucial this valuable resource continues to remain available.

The proposed Project supplies a valuable and needed material, minimizes potential for environmental interactions, is located within an area of existing aggregate extraction, and is a preferred option from a market-based perspective.

2.5 Project Phases and Activities

The extension project will consist of three phases:

1. Construction;
2. Operation and Maintenance; and
3. Decommissioning and Reclamation.

The key activities associated with each Project phase are described in the following sections. The Project will progress in phases; however, activities in each phase may be occurring in parallel.

2.5.1 Construction

The Construction phase of the Project will include the following activities:

- Implementation of a Project specific mitigation measures (e.g., Erosion and Sediment Control (ESC) Plan);
- Clearing and grubbing;
- Site preparation for the electric plant, settling pond and water source;
- Construction of on-site electric plant and moving the location of the scale house from Pit No. 2 to the current Pit No. 4; and
- Installation of the access road on PID No. 20499364.

2.5.1.1 Clearing and Grubbing

Clearing and grubbing will be required for the development of the access road on PID No. 20499364 and an area immediately north of the current Pit No. 4 (**Figure 2.3**). Vegetation clearing of a 275 m long corridor for a 10 m wide access road will be required between Little Dyke Road and the existing Pit No. 4. The road will be constructed of gravel materials from existing Pit No. 4.

The area immediately north of Pit No. 4 has been clear-cut by the previous owner and contains a thin layer of resource available (Putnam, S., pers. comm., 2023). Therefore, the remaining topsoil will be pushed back towards the residential property line. This topsoil will be used, in part, to construct the berm. The limited resource in this area will be extracted and stockpiled in the existing Pit No. 4. The area will then be covered with a layer of topsoil and seeded with native vegetation. The berm will be approximately 10 m wide at its base and 3 m in height with 2:1 slope. The berm will be approximately 650 m in length.

Where approved, remaining areas of PID No. 20499745, 20134193 and 20499364 will then be cleared and grubbed. The underlying resource is permeable, preventing water from pooling; therefore, runoff from the pit floor is not anticipated. Topsoil will be stockpiled to be used for progressive reclamation as the Project progresses. Ground preparation will involve the use of bulldozers, front end loaders, and excavators.

Topsoil will not be sold as part of this Project. Topsoil that is removed will be stockpiled elsewhere within the PDA and either used for reclamation purposes, construction activities (berm, access roads, etc.) or placed back where it was originally removed from.

The alteration of wetlands will be conducted through the approval from NSECC, and conditions of the approval will be adhered to. The proponent will apply for a NSECC Wetland Alteration Application prior to working within wetlands. In total, the Project is anticipated to require the alteration, or work within the 30 m buffer, of six wetlands on-site. The Project will require the alteration of approximately 5.4 ha of wetland area. As part of the EARD, a wetland delineation and functional assessment for all the wetlands within the Project properties was conducted, the locations of the wetlands and details of the assessments are provided below in **Section 6.5.2**.

2.5.1.2 Infrastructure Development

Buildings

The scale house, located in Pit No. 2 and currently used for existing Pit No. 4 operations, will be moved to a more central location within the existing Pit No. 4.

The electric plant will be constructed on-site and will consist of conveyor belts, hoppers, and an electrical room. The electric plant will encompass an area approximately 175 m by 100 m.

Settling Pond

The settling pond will be approximately 100 m by 50 m; the depth of the settling pond will vary to maintain 0.5 m above the groundwater table. The maximum stored volume of water and settled solid materials will not exceed 24,000 m^3. Water from the settling pond will be recirculated to the electric plant. Water from the settling pond will not be discharged to the surrounding environment.

It is anticipated the settling pond will receive 10,000 to 12,000 tonnes per year of fine materials. Once the settling pond reaches capacity, the pond will be reclaimed, and a new settling pond will be constructed. Reclamation will include stabilizing the bank slopes by grading and adding vegetation.

Water Source

Currently, a water source is within the existing Pit No. 4 that was excavated by the previous landowner. It is believed this water source is not lined with material. As part of the Project, the water source will be expanded to an area of approximately 15 m by 30 m to a depth of 4 m. The water source will be used for washing and screening purposes; washed water will be discharged to an adjacent settling pond. The water from the settling pond will be recirculated back to the electric plant for washing.
Water usage for washing and screening is expected to be similar to existing operations. The water source will be partially replenished with water recirculated from the settling pond. Therefore, the overall total use of water maybe reduced over time compared to existing operations.

Fuel Storage Tanks

There is no storage of dangerous goods, pipelines, port facility, or railway associated with the existing Pit No. 4, and none are proposed for this extension project with the exception of two proposed fuel storage tanks. A 4,500-litre diesel fuel storage tank at a dedicated location is proposed as part of the Project to provide fuel for site mobile equipment as well as a 200-litre tank to store used engine oil. Used oil and oil filters will be stored and sealed in properly labeled drums, which will be picked up regularly by a licensed waste management service and shipped to a licensed waste oil recycling facility.

Access Roads

A 10 m wide access road will be constructed between Little Dyke Road and the existing Pit No. 4. The road will be approximately 275 m long constructed of gravel materials from existing Pit No. 4. The road will cross one wetland and ephemeral stream with a culvert installed. Prior to development, applications to NSECC for watercourse and wetland alteration will be submitted by OSCO. Details on the wetland and watercourse alterations will be discussed in **Section 6.0**.

The current access road through PID No. 204997745 and 20134193 will be graded and vegetation cleared, as needed. A security gate and signage will be placed at each site entrance.

Drainage Ditches

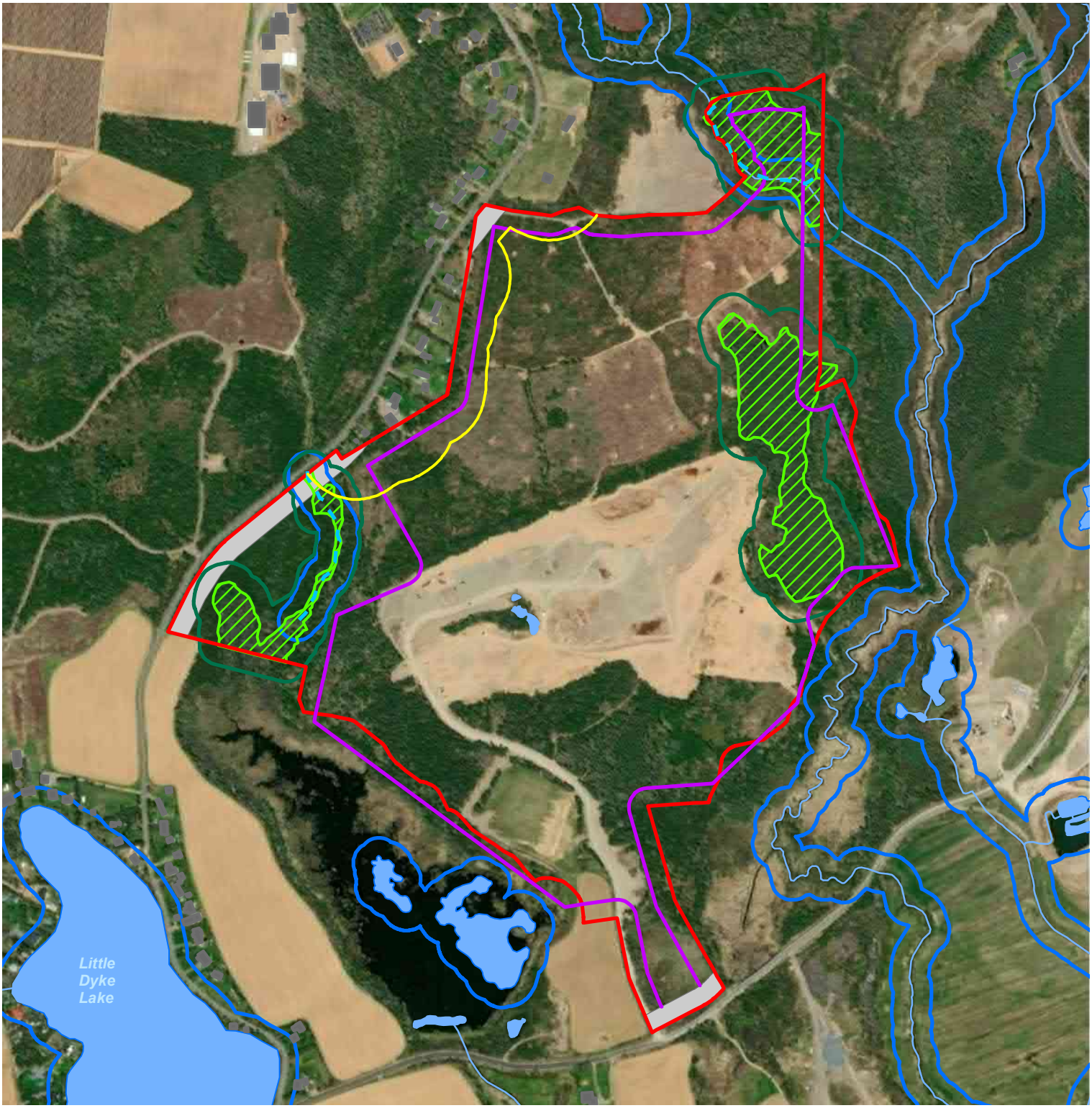
Due to the permeable nature of the unconsolidated material underlying a thin vegetation layer, pooling of water is not expected to occur. However, if this does occur or water needs to be diverted, drainage ditches will be constructed so that surface water will discharge into natural wetted areas or into the settling pond.

2.5.2 Operation and Maintenance

2.5.2.1 Excavation and Crushing

All working faces will adhere to all requirements for setbacks (**Figure 2.4**) identified in the NSEL (now NSECC) Pit and Quarry Guidelines (NSEL 1999) and in concordance with a NSECC Industrial Approval.

Excavation of the pit will typically be undertaken using front end loaders fitted with 2 to 6 m^3 buckets. Occasionally, other types of excavation equipment may be required to aid excavation such as excavators and bulldozers. The material to be excavated will include a mix of medium- to coarse-grained sand and gravel and associated finer material, including silt and clay fractions. Blasting will not be undertaken at the site.



OSCO AGGREGATES LIMITED

PIT NO. 4 EXTENSION

- Adjacent Building Buffer (90m)
- Abutting Property Buffer (30 m)
- Field Delineated Wetland Buffer (30 m)
- Project Development Area (Pit No. 4 Extension)
- Watercourse
- Field Delineated Watercourse
- Adjacent Building
- Open Water
- Road Buffer (30m)
- Watercourse Buffer (30m)

PROJECT SETBACKS

FIGURE 2.4

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY
ESRI, GeoNova

MAP CREATED BY: SCM
MAP CHECKED BY: JTO
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

N
W E
S

SCALE 1:8,500

0 50 100 200 m

PROJECT: 23-6113
STATUS: FINAL
DATE: 2024-03-08

FILE LOCATION: \\dillon.ca\DILLON_DFS_projects\GIS\2023\236113\Product\Client\EA\SubmissionFigures\Final Figures\F2_4_ProjectSetbacks.mxd

The electric plant and scale house will be constructed on or brought to the site and located within the PDA (refer to **Figure 2.3** for the proposed locations). The excavated material will be loaded into the crusher. The crusher output will consist of gravel and finer fractions and will be conveyed to a screen. The gravel will then be washed, discussed below. The proponent may receive deliveries of material from other nearby sources for washing and stockpiling.

2.5.2.2 Processing at the Electric Plant

The water source will be an excavated pond within the existing Pit No. 4; the proposed final dimensions are 15 m x 30 m to a depth of 4 m below the surface. The electric plant will be used to wash fine silt and clay off the crushed stone and sand products (essentially cleaning the product before it is sold). Chemicals, such as detergents and solvents, will never be used for washing, only water. After washing, the water will be directed to a settling pond, allowing the silt and clay to settle out. If required, an inert flocculation aid may be introduced to promote sediment settling. The water will be recycled back to be reused for washing; the fine silt and clay will be used for site reclamation purposes. Water from washing operations will not be discharged to nearby watercourses or wetlands.

2.5.2.3 Product Storage

Washed products will be stockpiled on-site across the extraction area and stockpiling locations will move from year to year as extraction progresses. Crushing, screening and stockpiling areas will be kept within the active area of the PDA.

2.5.2.4 Trucking

The majority of truck traffic for the Project is anticipated to be from customers as the finished products will be sold directly from site. The estimated average number of trucks hauling aggregate material from the site will be 20 to 50 trucks per day and will vary depending on market demand are anticipated. Additionally, material may be trucked in for washing from nearby sources.

2.5.2.5 Maintenance

Maintenance for the Project will include occasional grading or the addition of gravel to the private access road, as well as plowing during the winter months as required. Minor vegetation control may be required to maintain vehicle clearance required for the access road. Routine maintenance and repairs to equipment will occur on-site.

2.5.2.6 Operation Schedule

The Project operating schedule is anticipated to be from 5:00 am to 10:00 pm on weekdays and 7:00 am to 6:00 pm on weekends. Aggregate extraction activities will typically only occur for 10 months of the year (March to December), but aggregate processing and trucking operations will occur year-round. The rate of aggregate extraction from the site is expected to vary from year to year, starting from 150,000

metric tonnes per year, upwards depending on market demand. The resulting pit life (Pit No. 4 plus Pit No. 4 Extension) is estimated to be approximately 30 years.

With the addition of an electric crusher, OSCO can reduce the need to hire third-party companies for crushing operations. Third parties operate long hours to complete the required crushing so that they can move on to the next job. By increasing their capacity for in-house crushing, OSCO will have more control over operational hours and be able to reduce their needs for crushing activities that that occur in the evenings.

2.5.3 Decommissioning and Reclamation

Progressive reclamation will occur in phases as aggregate removal is completed from sections of the site. The inactive pit areas will be graded to a stable slope and covered with topsoil/mulch and seeded if needed.

Final reclamation will be completed following regulatory requirements. Infrastructure, including the electric plant, scale house and other equipment will be removed from site. Internal access, settling pond, and ditches will be allowed to naturally revegetate. The excavated area will be stabilized, and steps will be taken to promote revegetation. OSCO will consider options such as working with environmental non-governmental organizations in developing closure plans. A reclamation plan will be developed for the site and submitted to NSECC at their request.

2.6 Project Schedule

OSCO plans to undertake the Project in phases that will span multiple years between 2024 and approximately 2056. The anticipated Project schedule (subject to change) is provided in **Table 2.1**. Site preparation and construction activities are anticipated to take in the order of one year. The proposed Pit No. 4 Extension is expected to add approximately 10 to 20 years to the lifetime of the existing Pit No. 4. Therefore, the total lifetime, for the existing Pit No. 4 and Pit No. 4 Extension, is estimated at 30 years. During this time, operations and progressive reclamation are expected to occur. Final decommissioning will include completion of progressive reclamation and site stabilization. The timeline for establishment of final conditions is to be developed as part of the approval conditions and will depend on the timing of material removal (which will be based on market conditions at the time).

Table 2.1: Anticipated Project Schedule

Project Phase	Anticipated Schedule
Project planning and Environmental Assessment	Q2 2023 to Q2 2024
Construction	Q3 2024 to Q2 2025
Operation and Maintenance	Q2 2025 to Q4 2055
Decommissioning and Reclamation	Q1 2056 to Q4 2056

2.7 Environmental Management

2.7.1 Plans and Policies

Throughout the life of the Project, the proponent will adhere to the conditions of regulatory approvals and permits issued for the Project and in consultation with the appropriate regulatory authorities.

2.7.2 Erosion, Sediment Control, and Water Management

Specific stormwater control infrastructure is not required for the pit, as the pit will be graded to drain internally. Precipitation and snowmelt will readily infiltrate into the subsurface based on the high permeability of the sands and gravels. Any surface water resulting from major precipitation or snowmelt events will be controlled by means of pit floor grading, berms, and swales. There will be no discharge of wash water from the operation because the wash water system is a recirculating design. Further, infiltration to the groundwater is not anticipated from the settling pond since the settling pond will be positioned approximately 0.5 m above the groundwater table and the fines that settle out will act as a natural barrier.

If surface run-off is directed off-property (for example during an extreme precipitation or snowmelt event), the flows will be periodically monitored in accordance with terms and conditions in the future Industrial Approval and the Nova Scotia Pit and Quarry Guidelines (NSEL 1999) to monitor for total suspended solids (TSS) levels in excess of the approved final discharge limits. In the unlikely event that run-off from the property exceeds final discharge limits, as determined through monitoring, pumping of sediment-laden water may be directed to the settling pond.

2.7.3 Dust and Noise Control

Dust control will be undertaken during dry weather conditions with the application of water obtained from an approved source or the application of environmentally friendly dust suppressants in high traffic areas. Stockpiles of topsoil and vegetative material may be seeded and/or covered with mulch to minimize erosion and dust generation.

Forest cover within the property buffers and the construction of a berm where residential properties boarder PID No. 20499745 and 20134193 (i.e., at the north-western area of the property) will aid in mitigating noise and dust from operational activities.

2.7.4 Hazardous Materials

There will be a 4,500-litre diesel fuel storage tank to provide fuel for on-site mobile equipment and a 200-litre tank to store used engine oil, stored at a dedicated location. Fuel storage will be located, at minimum, more than 100 m from the nearest surface water body. Preventive maintenance may be required to be performed on-site equipment by qualified personnel and contractors. Used oil and filters

will be stored for a short time and removed from the site and disposed of in an appropriate manner. Refuelling activities will not be conducted within 30 m of any watercourse or wetland, and equipment operators will remain with the equipment during refuelling in accordance with the *Petroleum Management Regulations* of the Nova Scotia *Environment Act*.

In the event of a leak or spill during refuelling, maintenance, or general equipment operation, immediate action will be taken to stop and contain the spilled material. Spill kits containing spill response materials and equipment will be available on-site at strategic locations in the areas of pit development and material processing to permit immediate clean-up if a spill were to occur. All contaminated material will be collected and stored in an appropriate manner so as not to be re-released to the environment until such time as it will be transported to an approved treatment/disposal facility. Spills in quantities greater than those listed in Schedule A of the *Environmental Emergency Regulations, NS Reg 16/2013* will be reported to the 24-hour environmental emergencies reporting system (1-800-565-1633). All equipment operators and those responsible for refuelling and maintaining equipment will undergo mandatory spill response training, which will be documented. Mobile equipment will be equipped with spill kits to for immediate response and containment should a spill occur.

The Canadian Standards Association publication “Emergency Planning for Industry” (CAN/CSA-Z731-03; CSA 2003) will be consulted as a reference in the preparation of contingency planning.

3.0 Indigenous and Public Engagement

OSCO is committed to working with Indigenous communities and organizations as well as the public and understands that meaningful engagement is an important step in building trust and maintaining relationships. As such, the *Proponents' Guide: The Role of Proponents in Crown Consultation with the Mi'kmaq of Nova Scotia* (2011) was used to inform Indigenous engagement for this EARD. This document provides an overview of the principles to guide engagement with Indigenous communities and organizations, including mutual respect; early engagement; openness and transparency; and adequate time to review/respond. OSCO also followed the guidelines for public engagement as outlined by the Government of Nova Scotia and understands that there will be a public comment opportunity after the EARD is submitted. As identified in the Methods of Engagement section below, OSCO has engaged with Indigenous communities and organizations as well as the public prior to the submission of the EARD.

3.1 Indigenous Context

The Project is taking place within the traditional territory of the Mi'kmaq. OSCO retained Dillon to assist in engaging with Indigenous communities and organizations in Nova Scotia to share information about the proposed Project and understand issues and concerns, if any.

Understanding that the Government of Nova Scotia will conduct Crown consultation with the Mi'kmaq of Nova Scotia to confirm whether their rights are impacted and how they can be mitigated/ accommodated, OSCO conducted engagement with six Indigenous communities and organizations, including:

- Three organizations representing the Mi'kmaq/Indigenous population in Nova Scotia: The Confederacy of Mainland Mi'kmaq, Native Council of Nova Scotia, and The Union of Nova Scotia Mi'kmaq;
- Two Mi'kmaq communities, based on their proximity to the Project area: Millbrook First Nation and Sipekne'katik First Nation; and
- One organization representing the Mi'kmaq, Wolastoqey, and Peskotomuhkati peoples across the Maritime provinces: Maritime Aboriginal Peoples Council.

Each Indigenous community and organization were provided with two notification letters about the Project and was given the opportunity to ask questions and relay concerns, outlined in the Methods of Engagement section below. A brief description of each Indigenous community and organization follows, in alphabetical order.

3.1.1 Confederacy of Mainland Mi'kmaq

The Confederacy of Mainland Mi'kmaq (CMM) is a Tribal Council that represents eight Mi'kmaq communities in Nova Scotia, including Acadia, Annapolis Valley, Bear River, Glooscap, Millbrook, Paqtnkek, Pictou Landing, and Sipekne'katik. The organization's board of directors is made up of one member from each community. CMM provides various services and programs to member communities including its Department of Environment and Natural Resources, which advocates for CMM's member communities' interests related to the environment and natural resources (CMM 2023).

3.1.2 Maritime Aboriginal Peoples Council

The Maritime Aboriginal Peoples Council (MAPC) was established by the Native Council of Nova Scotia, the New Brunswick Aboriginal Peoples Council, and the Native Council of Prince Edward Island. The organization is described as a regional Aboriginal Peoples Leaders Institution and represents the traditional territory of the Mi'kmaq, Maliseet, and Passamaquoddy peoples. The purpose of MAPC is to protect the rights and advance the interests of Indigenous peoples in the Maritimes, while also fostering cultural and environmental awareness (MAPC 2023).

3.1.3 Millbrook First Nation

Millbrook First Nation is a Mi'kmaq community in Nova Scotia, which has a registered population of 2,312, and an on-reserve population of 981. The community comprises four different parcels of reserve lands, including Millbrook, Beaver Dam, Cole Harbour, and Sheet Harbour (Millbrook First Nation 2023). The Millbrook reserve land is the most developed of the four and is located just under 20 km southeast from the Project site.

3.1.4 Native Council of Nova Scotia

The Native Council of Nova Scotia (NCNS) is a self-governing authority representing Indigenous peoples (Mi'kmaq or otherwise) who reside off-reserve throughout Nova Scotia. NCNS provides programs and services to its members and aims to protect Aboriginal, treaty, and other rights of Indigenous peoples in Nova Scotia (NCNS 2023).

3.1.5 Sipekne'katik First Nation

Sipekne'katik First Nation is the largest Mi'kmaq community in Nova Scotia, which has a registered population of 3,000, and an on-reserve population of 1,195. The community is comprised of the communities of Indian Brook IR #14, New Ross, Pennal, Dodd's Lot, Wallace Hills, and Grand Lake (Sipekne'katik First Nation 2023). Sipekne'katik First Nation's Indian Brook Reserve is located approximately 30 km south of the Project site, while their Shubenacadie No. 13 is located just over 50 km southeast of the Project site.

3.1.6 Union of Nova Scotia Mi'kmaq

The Union of Nova Scotia Mi'kmaq (UNSM) provides a political voice to the Mi'kmaq people of Nova Scotia and represents their rights and interests. The organization is governed by a board of directors made up of the Chiefs from each of the five communities including: Eskasoni, Membertou, Potlotek, Wagmatcook, and We'kokma'q. The organization provides services and programs to member communities and also advocates and litigates for Aboriginal and treaty rights (UNSM 2021).

3.2 Public Engagement

In addition to Indigenous engagement, OSCO engaged with the public. In collaboration with the local community of Glenholme, OSCO established a Community Liaison Committee in 2018. The Committee typically meets twice a year to provide an opportunity for feedback related to ongoing works and activities, as well as Project updates.

OSCO has also engaged with Colchester County, as outlined in the Methods of Engagement below and sent out a community flyer on November 27, 2023, to homes within a one-kilometre radius of the Project.

After the EARD is submitted, the public will have the opportunity to review and submit comments on the document, which are considered by the Minister for a decision. To inform members of the public about the submission of the EARD, a notice was distributed to the general public via a regional and local periodical publication, as per the requirements of Nova Scotia's *Environmental Assessment Regulations*.

3.3 Methods of Engagement

3.3.1 Notification Letters

OSCO completed two rounds of engagement using notification letters prior to the submission of the EARD. Letters were sent to the following organizations, listed in alphabetical order:

- Colchester County;
- Confederacy of Mainland Mi'kmaq;
- Maritime Aboriginal Peoples Council;
- Millbrook First Nation;
- Native Council of Nova Scotia;
- Sipekne'katik First Nation; and
- Union of Nova Scotia Mi'kmaq.

The first round of letters was sent between October 16-17, 2023, notifying each organization of the Project and the associated works and activities, and inviting organizations to reach out to share questions, concerns, or to learn more. A second notification letter was sent on November 17, 2023, summarizing the initial notification letter and included an approximate timeline for submission of the EARD. A Record of Engagement has been completed and includes any incoming and outgoing communications (**Appendix B**). As with the existing Pit No. 4, OSCO remains committed to ongoing communications with its surrounding neighbours and will maintain its process to submit complaints related to the Project.

No comments were received from the Indigenous or public communities and organizations with whom OSCO engaged with via the notification letters.

3.3.2 Community Liaison Committee

The Community Liaison Committee (CLC) is composed of representatives from OSCO and local community members. The aim of the CLC is to maintain positive relationships between OSCO and the community through ongoing communication on matters pertaining to current operations and future planned development. The CLC typically meets twice a year, with OSCO providing a presentation on project updates. Community member representatives in attendance have the opportunity to provide feedback, whether positive or negative, on operations and planned future development.

The first meeting of 2023 was held on March 7; two community member representatives and three OSCO representatives were present. The second meeting took place on November 7, 2023; three community member representatives, four OSCO representatives, and one Dillon representative were in attendance. Dillon was present to answer any technical questions about the Project posed by community members.

The questions, and associated answers, from the November 7 meeting are provided in **Table 3.1** below. One important item to highlight was the suggestion for OSCO to organize a community information session to establish transparent communication about the ongoing developments and to disseminate pertinent information to the residents in the area. The Proponent emphasized their commitment to public disclosure and noted that the environmental assessment process would involve public notices to keep the community informed. OSCO decided to deliver a flyer based on this comment.

Table 3.1: Public Questions and Answers

Questions from Public	Response from OSCO
Inquiry about whether a portion of PID No. 20451092 is included in the current EA.	Confirmed that piece of property is included in the current EA. The portion of the property was acquired by OSCO and is now identified as PID no. 20499364.
Will the properties on the north side of Little Dyke Road be a separate EA?	Yes, and the EA will likely be 15 years away.

Questions from Public	Response from OSCO
Will you be eventually moving the electric plant to Pit 4?	Yes [illustrated on map during presentation].
Did you ever consider using Bob's piece of land?	Yes, but there are a lot of wetlands and small brooks to cross. This would be the preferred route, but given the environmental constraints, we are not pursuing this route for now. It could be a possibility in the future.
Waste from Pit No. 2 will be smaller compared to Pit No. 4. Will you be able to do anything with the waste from Pit No. 2?	Yes, there will be less waste with Pit No. 4. Waste from Pit No. 2 will likely be gone because they have a customer in PEI that is interested in purchasing the excess sand. Goal is to produce closer to equal amounts of sand and stone so future stockpiles will be smaller.
In Pit No. 4, if you had your crusher and system there, would your concrete plant also be there?	No, there is too much infrastructure where it currently is located.
What is the timeline to move the electric plant to Pit No. 4?	2025 if everything goes well. Large expense for trucking, would like to move ASAP. However, we must wait for the project to get approved, plus once the electric plant is ordered from the manufacturer, it will likely take 1 year to arrive.
Suggestion – there is a lot going on from when you opened Pit No. 4, a lot of info was exchanged. We do our best to pass along our notes to the community. Wondering if it would be good to have a community information session? We can't pass along all this info to each of the residents in the area.	Part of the EA is to make the information public. Land acquisition deals are recent. We aim to let you know ASAP. And to let you know that the EA has started. There will be public notice, as we do not have any intention of surprising anybody. Only finalized the project description today (November 7, 2023).
Is there any information we need to keep confidential?	Purchase agreement is okay to say with landowners; hold-off for 24 hours after this meeting saying the land acquisition has been completed as the lawyers may not have notified the landowners yet. Scope of the project is available for public consumption – we want this information out in the open.
OSCO also received recommendation from CLC member to reclaim PID 20134243: Removed berm that along with Little Dyke Road and planting raw of maple trees instead.	OSCO thanked the member for the comment and committed to looking into this option.

3.3.3 Community Flyer

A community flyer was distributed to residents of Glenholme residing around the Project perimeter. A copy of the flyer can be found in **Appendix B**, Record of Engagement. In response to frequently asked questions and key concerns received in response to the flyer, Dillon issued a response letter to public concerns on behalf of OSCO on December 11, 2023. A summary of frequently asked questions and key issues of concern, as well as the response letter, is provided in **Appendix B**.

3.3.4 Public Notice

A public notice, per the requirements of Nova Scotia's *Environmental Assessment Regulations*, was issued in the Chronicle Herald and the Truro News on June 6, 2024. The notice included the following:

NOTICE

Registration of Undertaking for Environmental Assessment ENVIRONMENT ACT

This is to advise that on June 6, 2024, OSCO Aggregates Limited registered the PIT NO.4 EXTENSION PROJECT for environmental assessment, in accordance with Part IV of the Environment Act.

The proposed Project, located near Glenholme in Colchester County, will expand on operational activities currently occurring within Pit No. 4. Current operations include producing high quality aggregate (stone and sand) for use in concrete and construction projects. Specific activities in Pit No. 4 have included aggregate extraction, screening, mobile crushing, stockpiling of aggregate, and transport of aggregate to the existing OSCO Glenholme Wash Plant facility located at Pit No. 2, approximately 700 m away on Little Dyke Road. The current Pit is located within PID No. 20134177; and the proposed extension will include portions of this PID and PID Nos. 20499364, 20499745 and 20134193.

The proposed Project will involve the continued excavation of aggregate material from the reserve within the current Pit No. 4 property, as well as expanding the pit towards the south, east, and north. This expansion will add 30 hectares to the current permitted pit surface area. The proposed Project will also include the addition of an electric washing/screening/ crushing plant, installation of a settling pond, development of a water source, addition of an access road, and a fuel storage area. The rate of aggregate extraction from the site is expected to vary from year to year, starting from 150,000 metric tonnes per year, upwards depending on market demand. The Project intends to begin construction in 2024 and is expected to be operational for 30 years ending in 2055.

Copies of the environmental assessment registration information may be examined at the following locations:

- Truro Library, 754 Prince Street, Truro, NS
- Municipality of the County of Colchester Office, 1 Church Street, Truro, NS
- Department of Environment and Climate Change, Regional Office, 36 Inglis Place, Truro, NS
- EA website (when available) at http://www.gov.ns.ca/nse/ea

The public is invited to submit written comments to:

Environmental Assessment Branch
Nova Scotia Environment & Climate Change
P.O. Box 442, Halifax, Nova Scotia B3J 2P8

on or before July 6, 2024, or contact the Department at (902) 424-3600, (902) 424-6925 (Fax), or e-mail at EA@novascotia.ca.

All comments received from the public consultation will be posted on the department's website for public viewing. In the case of an individual, the address, email and contact information will be removed before being placed on the website. By submitting your comments, you are consenting to the posting of your comments on the department's website.

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3.4 Future Steps

Comments, concerns, and issues raised through the engagement efforts are summarized in **Appendix B**. OSCO is interested in understanding issues or concerns related to the Project and commits to working directly with these communities and organizations to mitigate and/or accommodate issues.

The next Community Liaison Committee meeting is scheduled for June 2024. In response to community members that voiced concerns after receiving the community flyer, OSCO invited interested members of the public to select representatives to join the Committee before June 2024 so that concerns related to the Project can be heard. The response letter also provided a link to Nova Scotia's "Citizens' Guide for Environmental Assessment" so that community members are aware of the process for public input.

4.0 Environmental Assessment Scope and Methods

The scope of the environmental assessment (EA) of the Project under the Nova Scotia *Environmental Assessment Regulations* of the Nova Scotia *Environment Act* is discussed within the following sections.

4.1 Scope of the Environmental Assessment

As noted in **Section 1.3**, the Project must be registered for an EA as a Class I Undertaking pursuant to the *Environmental Assessment Regulations* of the Nova Scotia *Environment Act*. This registration document is intended to fulfill the requirements for registration of the Project under the provincial regulation and to initiate the EA review of the Project. As described in **Section 1.3**, there are no known requirements for a federal impact assessment under the *Impact Assessment Act* since the Project is not located on federal land and its size does not exceed the threshold for a designated project as defined in the *Physical Activities Regulations* under that Act.

The Project includes development of an extension to the currently active Pit No. 4 for aggregate extraction in Glenholme, Nova Scotia (the Project). Refer to **Section 2.5** (Project Phases and Activities) for specific details of the Project. The scope of the Project to be assessed under the EA Regulations includes construction of the open pit and related facilities and infrastructure, operation of the open pit and related facilities, and eventual reclamation and closure of the site at the end of Project life. The scope of Project to be assessed is limited to the facilities and activities that will be conducted on the Project site, up to and including the time that trucks arrive at and leave the Project site but excludes the transportation of materials on the provincial highway network as well as activities that are carried out by third parties.

The related Project phases, and activities to be conducted within each phase, that are subject to this EA Registration and that will be carried forward within this assessment, were defined in **Section 2.5** and are summarized in **Table 4.1**, below.

Table 4.1: Project Phases and Activities to be Carried Forward within the EA

Project Phase	Activities to be Conducted
Construction	• Vegetation clearing and grubbing • Site preparation • Infrastructure development • Removal and stockpiling of topsoil and overburden • Construction of the water source and settling ponds • Development of a new access road and transmission line from Little Dyke Road (PID No. 20499364)
Operation and Maintenance	• Excavation and crushing • Processing at the electric plant • Product Storage • Trucking
Decommissioning and Reclamation	• Decommissioning • Reclamation • Closure

The scope of the assessment has been determined based on the requirements for Project registration under this legislation and as outlined in "A Proponent's Guide to Environmental Assessment" (Nova Scotia Environment [NSE] 2017). The methods of assessment were selected with the consideration of the proposed Project phases and activities, the existing environment, stakeholder/regulatory consultations, regulatory framework, and on the associated identification of, and evaluation of the potential for the Project to interact with valued environmental components (VECs) following mitigation.

OSCO met with the Nova Scotia Environmental Assessment Branch initially in September 2023 to confirm the EARD requirements, including requirements for wildlife assessment, and to preliminarily evaluate the scope of the Project and assessment. Scope of assessment refers to the determination of the environmental effects to be addressed, the scope of those effects to be addressed, and the effects to be considered in making decisions regarding the project.

4.1.1 Selection of Valued Environmental Components

Valued environmental components (VECs) are those components of the biophysical and socioeconomic environments that are of value or interest to regulatory agencies, the public, other stakeholders, and Indigenous peoples. VECs are typically selected for assessment on the basis of the following: regulatory issues, scientific concern, legislation, guidelines, policies, and requirements; input arising from consultation with regulatory agencies, the public, stakeholder groups, and First Nations; field reconnaissance; and professional judgment.

The VECs selected for this EA Registration document, and the rationale for their selection in relation to the Project, are outlined in **Table 4.2**, below. Additional detail on each of these factors is provided in subsequent sections (**Section 5.0** to **10.0**).

Table 4.2: Valued Environmental Components for the Project, and Rationale for their Selection

Valued Environmental Component (VEC)	Rationale for Selection of the VEC
Atmospheric Environment	• Emissions of particulate matter (e.g., dust), light and combustion gases related to Project activities may interact with the atmospheric environment and nearby receptors.
Acoustic Environment	• Noise and vibration related to Project activities may interact with nearby receptors.
Water Resources (Surface Water and groundwater)	• The Project may interact with surface water drainage as a result of site development and the presence of the open pit. • The Project may interact with groundwater through project activities resulting in a change in the quality or quantity of groundwater resources.
Fish and Fish Habitat	• Fish and fish habitat are protected by the federal *Fisheries Act*. The Project may interact with fish and fish habitat through the Project activities by temporarily altering fish habitat or through temporary changes in water quality or sediment quality.
Vegetation	• The loss of immature vegetation on the Project site (including flora species at risk and species of conservation concern if present).
Wetlands	• The Project activities may involve the removal of some wetland areas onsite.
Wildlife and Wildlife Habitat	• The loss of immature vegetation on the Project site may result in the loss of wildlife habitat, and Project activities may interact with wildlife (e.g., sensory disturbance due to Project activities) including wildlife species at risk and species of conservation concern.
Socioeconomic Environment	• The Project may interact with labour and economy through the generation of employment and associated expenditures. • The Project may result in a change in land use from forestry to mineral extraction activity for the duration of the Project. • The Project may result in a decrease of truck traffic on provincial roads leading to the Project site.
Archaeological, Cultural and Heritage Resources	• Heritage resources (e.g., archaeological, palaeontological, or built heritage resources) are protected under the Nova Scotia *Special Places Protection Act*. • Though there are no known heritage resources that may be affected by the Project, earth moving activities on the Project site may result in the potential accidental discovery of previously unknown heritage resources that may be present on the Project site.
Traditional Land and Resource Use	• The Project is located in the traditional Mi'kmaq territory. It is known that the general area of the Project has historically been, and may be currently used by, Indigenous persons for practicing traditional activities such as hunting, fishing, trapping, and gathering through the practice of unextinguished Aboriginal and treaty rights. Further consultation with Indigenous peoples is required to determine the extent of potential traditional land and resource use of the area.
Effects of the Environment on the Project	• Natural forces and other effects of the environment (such as climate change and other natural hazards or risks) may pose a risk to the

Valued Environmental Component (VEC)	Rationale for Selection of the VEC
	Project components and their longevity, or cause delays in the Project.

The scope of the Project was evaluated based on the Description of the Undertaking (**Section 2.0**) and is summarized in the Environmental Assessment Methods section (**Section 4.2**).

4.2 Environmental Assessment Methods

Environmental assessment is used as a planning tool in the initial phases of project conceptualization, planning and design. Its intention is to identify or predict Project-related effects (based on results of scientific assessment or traditional knowledge), as well as design mitigation strategies to avoid, reduce, or eliminate adverse environmental effects. The methods used to conduct the environmental effects assessment for the Project, including the characterization of the study boundaries, the factors to be considered, and the details of the assessment of each VEC selected in **Section 4.1.1**, are provided below.

4.2.1 Study Boundaries (Temporal and Spatial)

Study boundaries set the limits of the area (spatial) and period of time (temporal) examined within the assessment. Boundaries for the EA were defined by good practice and professional judgment.

Temporal boundaries vary according to the different Project phases and potential effects. In the construction phase, specific construction-related effects are typically short-term (for example, effects related to the use of laydown areas for construction activities). Effects associated with the operation and maintenance phase tend to be longer term (i.e., lifespan of the pit); however, some effects associated with the open pit are unique in the sense that they will be long lasting and will extend past the life of the pit. The temporal boundaries for the Project correspond to the periods of construction, operation and maintenance, and decommissioning and reclamation as were defined in the Project schedule in **Section 2.6**.

The spatial boundaries of the assessment, which represent the area in which a potential effect could occur, will typically be based on natural system boundaries for biophysical VECs, or administrative/ political boundaries for socio-economic VECs. The spatial boundaries to be defined for the EA will include:

- The **Project Development Area (PDA)** is the area of physical disturbance (or physical footprint) associated with the Project. Although the total land area of the properties associated with the Project is approximately 91 ha, the entirety of that area will not be disturbed by the Project, with only the areas of these properties that will be physically used to accomplish the Project. Therefore, the PDA on land consists of an area of approximately 77 ha upon which Project

activities will be carried out. The PDA that is subject to this EARD was shown in **Figure 2.3**. The Project site is the same for all VECs discussed within this EARD.

- The **Local Assessment Area (LAA)** is the maximum area where Project-specific environmental interactions can be predicted and measured with a reasonable degree of accuracy and confidence (i.e., the zone of influence of the Project phases on each VEC). The LAA will vary by VEC.

4.2.2 Factors to be Considered

The EA will consider the following factors:

- the environmental effects of the physical activities associated with the Project;
- mitigation measures that are technically and economically feasible and that would mitigate significant adverse environmental effects of the Project, including requirements for follow-up studies or monitoring;
- the environmental effects of malfunctions or accidents that may occur in connection with the Project;
- change to the Project that may be caused by the environment;
- guidance provided by Indigenous communities; and
- comments from the public or other stakeholders.

4.2.3 Scope of Factors to be Considered

The VECs selected for this EA will be assessed at an appropriate level based on professional judgement, existing information, regulatory issues, legislation, guidelines, policies, requirements and engagement. In order to characterize the baseline conditions of each VEC, both qualitative and quantitative assessment methods were employed. The characterization and description of the VEC is limited to the spatial and temporal boundaries (as described in **Section 4.2.1**) that were applied to that specific VEC for the purposes of the assessment. The factors to be considered during the assessment as well as the approach that will be used to carry out the assessment are further discussed in **Table 4.3**, below.

Table 4.3: Scope of Factors to be Considered and Approach to the Assessment for Each Valued Environmental Component

Valued Environmental Component (VEC)	Scope of Factors to be Considered	Approach to the Assessment
Atmospheric Environment	• Ambient air quality • Climate and greenhouse gases	• Qualitative (desktop) assessment of ambient air quality and trends • Qualitative (desktop) assessment of air contaminant emissions and GHG emissions

Valued Environmental Component (VEC)	Scope of Factors to be Considered	Approach to the Assessment
Acoustic Environment	• Sound quality (noise)	• Baseline noise monitoring, and noise modelling
Water Resources (Surface Water and Groundwater)	• Surface water resources • Groundwater resources, including bedrock and surficial geology	• Quantitative and qualitative desktop assessment of regional groundwater environment • Quantitative assessment/ reconnaissance of surface water features and a water balance assessment
Fish and Fish habitat	• Fish and fish habitat • Species at risk and their habitat • Species of conservation concern and their habitat • Fisheries including sport or subsistence fisheries • Fish migration routes/movement corridors • Surface water quality	• Review of historical occurrences of species at risk/species of conservation concern • Biological field studies of fish and fish habitat
Wetlands	• Functional assessment • Delineation	• Field wetland delineation and functional assessment
Vegetation	• Vegetation including rare plants • Species at risk and their habitat • Species of conservation concern and their habitat	• Review of historical occurrences of species at risk/species of conservation concern • Rare plant survey and recording of vegetation species
Wildlife and Wildlife Habitat	• Wildlife and wildlife habitat • Species at risk and their habitat • Species of conservation concern and their habitat	• Review of historical occurrences of species at risk/species of conservation concern • Biological field studies of avian wildlife, combined with incidental wildlife observations
Socioeconomic Environment	• Population and economy • Land and resource use	• Desktop review of Statistics Canada's database • Qualitative assessment of local socioeconomic environment • Understanding of local planning requirements
Archaeological, Cultural, and Heritage Resources	• Structures, sites or things of historical, archaeological, palaeontological, or architectural significance	• Qualitative (desktop and database review of high potential areas) • Initial walkover • Provision for later field investigation (shovel testing) as follow-up

Valued Environmental Component (VEC)	Scope of Factors to be Considered	Approach to the Assessment
Traditional Land and Resource Use	• Biophysical resources of cultural importance • Current use of land and resources for traditional purposes by Indigenous persons	• Indigenous engagement • Information from secondary sources
Effects of the Environment on the Project	• Changes or potential effects on the Project caused by: ○ Extreme weather ○ Climate change ○ Natural forest fires	• Qualitative assessment of current regional/local climate conditions and predictions

4.2.4 Environmental Effects Assessment Methods

Dillon uses a streamlined and focused approach in the preparation of the effects analysis. During the environmental effects analysis, Project-VEC interactions are first identified through a matrix table. If a Project-VEC interaction is not identified, a rationale is provided to explain its exclusion from the assessment.

Following the identification of Project-VEC interactions, effects that may occur as a result of the interactions are predicted and proposed mitigation is outlined. Effects are assessed assuming that standard industry design/mitigation practices will be implemented. The environmental effects assessment methodology involves the following generalized steps.

- **Scope of VEC** – This involves the scoping of the assessment for the VEC and includes a definition of the VEC and a rationale for its selection, a description of temporal and spatial boundaries, and the definition of thresholds that are used to determine the significance of environmental effects. This step relies upon the scoping undertaken by regulatory authorities; consideration of the input of the public, stakeholders, and First Nations (as applicable); and the professional judgment of the Study Team.
- **Existing Conditions** – This step involves the establishment of existing (baseline) environmental conditions for the VEC, in the absence of the Project. In many cases, existing conditions expressly and/or implicitly include those environmental effects that may be or may have been caused by other past or present projects or activities that have been or are being carried out.
- **Environmental Effects Assessment** – Project-related environmental effects are assessed. The assessment includes:
    - a description of how a potential environmental effect could occur (in the absence of mitigation);

  - a discussion of the mitigation and environmental protection measures that are proposed to avoid, reduce, or eliminate the environmental effect; and
  - a characterization of the residual environmental effects of the Project (i.e., the environmental effects that remain after planned mitigation has been applied). Each phase of the Project is assessed (i.e., construction, operation and maintenance, and reclamation and closure), as are accidents, malfunctions, and unplanned events. The evaluation also considers the effects of the environment on the Project.

- **Summary** – A summary of the assessment for the VEC is provided, leading to an overall conclusion in respect of the effects of the Project on the VEC. The significance of residual environmental effects is then determined, in consideration of the significance thresholds that have been established for each VEC.

The Study Team will consider the direction, magnitude, frequency, duration, geographical extent, ecological/socioeconomic context, and reversibility of potential Project-related effects. Residual effects (i.e., those that remain after the application of mitigation, or those that will not be avoided/mitigated) are predicted, and thresholds of significance are characterized using regulatory standards or other thresholds, where available, within the defined spatial and temporal boundaries. Where regulatory standards are not available, the significance threshold may be determined through indicators derived from existing scientific knowledge (e.g., status of biological populations and critical habitats). Through this process, potential effects on the environment are evaluated with a view to mitigating them such that effects can be avoided, reduced, or controlled through mitigation. A determination is then provided as to whether residual effects are positive or negative, their significance, and the likelihood of a significant effect. Consideration is also given to the potential for accidents or malfunctions during the Project phases (provided in a standalone section). Cumulative environmental effects are also assessed for those VECs for which a residual environmental effect was predicted (whether significant or not). Measures and monitoring programs for potential residual environmental effects are outlined and described, where applicable, for planned implementation as a means of verifying the environmental effects predictions or the effectiveness of mitigation.

5.0 Identification of Project Interactions with the Environment

An assessment of the environmental effects of the Project on each of the identified VEC is provided in this chapter. Following an identification of Project interactions with the environment, potential environmental effects in the absence of mitigation are described at a high level with a view to determining if an interaction between the Project and the VEC could occur. The identification of Project-VEC interactions is done for each Project phase in a matrix format (see **Section 5.1**) to determine which potential interactions may occur; justification is provided for those VECs for which the Project is not expected to interact. Then, for each VEC for which an interaction with the Project was identified, a more detailed assessment is provided in a standalone section whereby: the scope of the VEC is defined; existing conditions are established; potential effects without mitigation are identified; mitigation to avoid, reduce, or eliminate environmental effects is described; residual environmental effects after the application of mitigation are described and assessed, and the significance of residual environmental effects is predicted.

5.1 Project Interactions with the Environment

The identification of potential interactions between the Project and the VECs has been undertaken in consideration of the nature of the Project and its planned activities during each phase. Additionally, accidents and malfunctions will be considered in **Section 8.0**.

The phases of the Project include:

- Construction;
- Operation and Maintenance; and
- Decommissioning and Reclamation.

This initial screening assists in determining if an interaction between the activities being carried out in each phase of the proposed Project and the VEC is possible. A qualitative rating system was used to evaluate the potential for interactions between the Project and the environment.

One of the following two ratings was prescribed for each individual VEC:

- An interaction between the Project and the environment could occur (which is identified with a checkmark in the matrix below); or
- No interaction occurs between the Project and the environment (I.e., no checkmark).

A preliminary screening of available information on VEC was conducted prior to selecting the VECs, information gathered on each VEC is presented in **Section 6.0** with the Description of the existing environment for each VEC. Based on the Project Description (refer to **Section 2.0**), and the scope of the environmental assessment (refer to **Section 4.0**), the potential interactions between the Project and the environment are summarized in **Table 5.1** below.

Table 5.1: Project-VEC Interactions

Valued Environmental Component (VEC)	Project Phases		
	Construction	Operation and Maintenance	Decommissioning and Reclamation
Atmospheric environment	✓	✓	
Acoustic Environment	✓	✓	
Water resources (surface water and groundwater)	✓	✓	
Fish and fish habitat	✓		
Vegetation	✓		✓
Wetlands	✓		✓
Wildlife and wildlife habitat	✓	✓	✓
Socioeconomic environment	✓	✓	✓
Archaeological, cultural, and heritage resources	✓	✓	✓
Traditional land and resource use	✓	✓	✓

Legend:
✓ = Potential interaction

In the table above, the interaction with a particular VEC is identified when the interaction first occurs. VECs for which an interaction occurs are carried forward in the environmental effects assessment in **Section 6.0**, below. Some VECs were found to not have interactions during a Project activity, although there were interactions with all VECs during one phase or another. A brief justification/rationale behind the selection or omission of an interaction is provided below (this is also related to the selection of VECs for the assessment which can be referenced in **Section 4.1.1**).

5.1.1 Atmospheric Environment

Emissions of particulate matter (particularly dust), light, and combustion gas, related to project activities may occur during construction activities (site development) and operation and maintenance activities (resource extraction and processing) and affect the atmospheric environment or adjacent receptors. Substantive interactions during decommissioning and reclamation are not expected. Therefore, this VEC will be carried through for further assessment in **Section 6.0**.

5.1.2 Acoustic Environment

Emissions of sound related to Project activities may occur during construction activities (site development) and operation and maintenance activities (resource extraction and processing) and affect the acoustic environment or adjacent receptors. Substantive interactions during decommissioning and reclamation are not expected. Therefore, this VEC will be carried through for further assessment in **Section 6.0**.

5.1.3 Water Resources

The Project will result in a change in both surface water and groundwater flow across the landscape as a result of the impact to on-site wetlands and one watercourse (i.e., during construction activities) and the development of the open pit (i.e., during construction and operation and maintenance activities). Upon reaching the end of the lifespan of the pit, water will require further management for site decommissioning and reclamation as the open pit will act as a reservoir for surrounding drainage. Therefore, this VEC will be carried through for further assessment in **Section 6.0**.

5.1.4 Fish and Fish Habitat

The Project will interact with fish and fish habitat through the alteration of a small ephemeral watercourse during the construction activities. Interactions during operation and maintenance are not anticipated; water from a settling pond on-site will be recycled for operations and drainage into the natural environment is unlikely. Substantive interactions during reclamation and closure are not expected. This VEC will be carried through for further assessment in **Section 6.0**.

5.1.5 Vegetation

During construction, the Project will require the loss of vegetation within much of the PDA. This effect will not continue during operation and maintenance, no new vegetation is expected to be affected during this phase. Upon decommissioning and reclamation, vegetation will be able to naturally regenerate over time. This VEC will be carried through for further assessment in **Section 6.0**.

5.1.6 Wetlands

During construction, the Project will require the loss of up to 5.4 ha of wetlands within the PDA. During operation, there will be a reduction in surface water drainage toward a wetland to the south of the PDA. Water flow into the natural environment is not anticipated to occur from a settling pond on-site as water will be recycled for the electric plant and for dust suppression. As such, interactions with the adjacent wetlands to the west of the PDA are unlikely during operation and maintenance. Upon decommissioning and reclamation, vegetation will be able to naturally regenerate over time, and the affected wetlands may be naturally restored. OSCO will complete a Wetland Alteration Application, obtain approval from NSECC and abide by the conditions of the approval when conducting work in wetlands. This VEC will be carried through for further assessment in **Section 6.0**.

5.1.7 Wildlife and Wildlife Habitat

During construction, the Project will result in the loss of wildlife habitat (from clearing activities). During operation and maintenance, Project activities may interact with wildlife through sensory disturbance and/or avoidance due to noise or vibration in the area. Following site decommissioning and reclamation, wildlife will be able to return to the site and some wildlife habitat will be restored through revegetation, providing a positive effect. This VEC will be carried through for further assessment in **Section 6.0**.

5.1.8 Socioeconomic Environment

During construction, the Project may interact with the socioeconomic environment from a change in land use as the character of the site changes from forestry/agriculture to industrial activity. During operation and maintenance, potential nuisance effects from noise, vibration, and emissions could be experienced in a manner similar to those experienced during construction. Additionally, the Project will interact with labour and economy through employment and expenditures during both construction and operation and maintenance phases. Upon site decommissioning and reclamation, the Project will cease to interact with the socioeconomic environment through employment and expenditures. Once reclaimed, OSCO will consider allowing access for recreational use; details of reclamation and future use will be provided in a reclamation plan. This VEC will be carried through for further assessment in **Section 6.0**.

5.1.9 Archaeological, Cultural, and Historical Resources

During the construction phase of the Project, there is potential for accidental discovery of archaeological or historical resources and the effect would be permanent in such a case, as no archaeological or heritage resource can be returned to the ground undisturbed following its discovery. During operation and maintenance, though the discovery of archaeological resources would not be expected (as those resources are typically located in surficial soils rather than bedrock), there is a potential for accidental discovery of palaeontological resources (fossils) during the operation and maintenance phase. Substantive interactions during decommissioning and reclamation are not expected. This VEC will be carried through for further assessment in **Section 6.0**.

5.1.10 Traditional Land and Resource Use

During the construction phase, Indigenous peoples that may have used the Project site historically to carry out their traditional activities will no longer be able to access the entirety of the PDA for safety and security purposes while Project activities are taking place. This interaction will extend through the lifespan of the Project, until the end of the operation and maintenance phase. Upon site decommissioning and reclamation, the PDA will become re-accessible for traditional land and resource use. This VEC will be carried through for further assessment in **Section 6.0**.

6.0 Environmental Effects Assessment

The following sections are organized by VEC and describe: the scope of each VEC; their existing conditions (based on the qualitative and quantitative assessments described herein); potential environmental effects that could occur in the absence of mitigation; planned mitigation to offset, reduce or eliminate predicted environmental effects; residual environmental effects that may occur after the implementation of site specific and general mitigation; and the significance of the residual environmental effects. Furthermore, and where applicable, specific follow-up or monitoring plans to verify the effects predictions or the effectiveness of mitigation will be described.

6.1 Atmospheric Environment

The potential environmental effects of the Project on the atmospheric environment are assessed in this section.

6.1.1 Scope of VEC

The atmospheric environment is defined as the layer of air above the earth's surface to a height of approximately 10 km. The atmospheric environment includes the following key aspects: air quality, climate (including greenhouse gases), and light quality as follows.

- **Air quality** is characterized by the composition of the ambient air, including the presence and quantity of air contaminants in the atmosphere in comparison to applicable air quality objectives.
- **Climate** is characterized by the historical seasonal weather conditions of a region, which can include temperature, humidity, precipitation, sunshine, cloudiness, and winds. Statistical climate data are typically averaged over a period of several decades (GOC 2023b). Project-based releases of greenhouse gases (GHGs), such as carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), are typically used as an indicator of the potential for environmental interactions with climate change. It is understood that GHG releases on a global scale from both natural processes/sources and human activities are increasing global concentrations of GHGs in the atmosphere and they contribute to climate change.
- **Light quality** is characterized by the type, frequency, intensity, and duration of unwanted light in the outdoor environment. Specific regulations or guidelines related to light quality have not been established in Nova Scotia and may be addressed through the Certificate of Approvals process for industrial facilities under the *Environment Act*.

The atmospheric environment has been selected as a valued environmental component (VEC) because the atmosphere helps maintain the health and well-being of humans, wildlife, vegetation, and other

biota. This assessment of the atmospheric environment considers the contaminants that are typically associated with this type of project, and includes the following:

- Emissions of contaminants to the atmosphere during the Project activities (i.e., construction of site infrastructure, and placement, temporary storage and transportation of materials), which may present a pathway for humans and biota to be exposed to minor quantities of contaminants;
- Provisions regarding air contaminant emissions under the Nova Scotia *Air Quality Regulations – Environment Act*;
- Releases of GHGs (through combustion engines of heavy equipment) and their accumulation in the atmosphere influence global climate and may affect emission reduction targets for GHGs that have been set or are being developed federally and provincially. With the addition of the on-site electric plant, and subsequent reduction in trucking, releases of GHGs for the Project are expected to be lower than current operations; and/or
- Release of light emissions from heavy equipment and site infrastructure during Project activities which may pose a nuisance to nearby residences and potentially attract wildlife, increasing the risk of accidental encounters.

6.1.1.1 Regulatory Framework

This assessment of the atmospheric environment considers the air contaminants that are typically associated with this type of project, some of which are regulated provincially (and in some cases federally). These air contaminants are generated from fuel combustion and fugitive dust generated from the movement of mobile equipment and material transfer mechanisms required for construction and operation. For the Project components and activities assessed herein, combustion gases (including but not limited to sulphur dioxide [SO_2], carbon monoxide [CO], and nitrogen oxides [NO_x]) and particulate matter (PM) are considered to be the potential contaminants of concern relating to air quality. Releases of GHGs from the combustion of fossil fuels in mobile equipment are also considered in relation to the potential for interactions with climate change.

Air quality in Nova Scotia is regulated pursuant to the Nova Scotia *Air Quality Regulations* under the *Environment Act*, administered by Nova Scotia Environment and Climate Change (NSECC). Federally, the main instrument for managing air quality is the *Canadian Environmental Protection Act* (CEPA) as well as Canada-Wide Standards developed by the Canadian Council of Ministers of the Environment (CCME). In addition, the Canadian Ambient Air Quality Standards (CAAQS) developed by the CCME provide additional ambient limits for nitrogen dioxide (NO_2), and additional standards for SO_2, fine particulate matter ($PM_{2.5}$), and ozone (O_3) have been proposed. Nova Scotia's *Air Quality Regulations* specify maximum permissible ground-level concentrations for six air contaminants, namely total suspended particulate (TSP), O_3, CO, SO_2, NO_2, and hydrogen sulphide (H_2S) as presented in **Table 6.1** below.

Table 6.1: Ambient Air Quality Standards in Nova Scotia

Air Contaminant	Averaging Period	Nova Scotia *Air Quality Regulations* Maximum Permissible Ground Level Concentration (µg/m³)	Canadian Council of Ministers of the Environment, Canadian Ambient Air Quality Standards
Ozone (O_3)	1 hour	160	-
	8 hours	-	62 ppb
Total suspended particulate (TSP)	24 hours	120	-
	Annual	70 (geometric mean)	-
Fine particulate matter ($PM_{2.5}$)	24 hours	-	27 µg/m³
	Annual	-	8.8 µg/m³
Carbon monoxide (CO)	1 hour	34,600	-
	8 hours	12,700	-
Nitrogen dioxide (NO_2)	1 hour	200	60 ppb
	Annual	100	17 ppb
Sulphur dioxide (SO_2)	1 hour	900	70 ppb
	24 hours	300	-
	Annual	60	5 ppb
Hydrogen sulphide (H_2S)	1 hour	42	-
	24 hours	8	-

Legend:
µg/m³ = micrograms per cubic metre, ppb = parts per billion

6.1.1.2 Temporal Boundaries

The temporal boundaries for the Project include the following:

- **Construction**: extending for a period of approximately 1 year, anticipated to begin in the fourth quarter of 2024 (subject to the receipt of all approvals and permits required for the Project);
- **Operation and Maintenance**: beginning in approximately the second quarter of 2025, and lasting for approximately 30 years or until the mineral resource has been depleted; and
- **Decommissioning and Reclamation**: to be initiated following the completion of operations at the site, with decommissioning and reclamation of the surface facilities at the site for an anticipated duration of six months following operation and maintenance.

6.1.1.3 Spatial Boundaries

The PDA is defined as the area of physical disturbance associated with the Project. The PDA consists of an area of approximately 77 ha that includes the open pit and all related surface facilities represented by the physical Project footprint.

The local assessment area (LAA) is the maximum anticipated area within which Project-related environmental interactions can be predicted and measured with a reasonable degree of accuracy and confidence. For the atmospheric environment, the LAA includes an area consisting of a 2 km radius centred on the PDA and includes the PDA and adjacent areas where Project-related environmental effects could be expected to occur. Beyond this radius, based on experience with similar facilities and professional judgment, emissions of air contaminants and noise from the Project would not likely be distinguishable from background levels.

6.1.1.4 Significance Threshold

A significant adverse residual environmental effect on the atmospheric environment is one where Project-related releases result in a frequent exceedance of the ambient air quality standards defined in the Nova Scotia *Air Quality Regulations* under the *Environment Act*. A frequent exceedance is defined as one that occurs more than 1% of the time.

For Climate (as represented by GHG Emissions), it is recognized that it is not possible to assess significance related to a measured environmental effect on climate change on a project-specific basis. Thus, instead of setting a specific significance criterion for climate, the assessment involves a qualitative comparison of Project-related GHG emissions to provincial and national GHG emission totals.

Since specific regulations or guidelines related to light quality have yet to be established, for the purposes of this assessment a significant adverse residual environmental effect is characterized as one where Project-related releases would cause a deterioration of light quality below current conditions.

6.1.2 Description of Existing Environmental Conditions

The existing conditions for the atmospheric environment are defined in terms of climate (including GHGs), ambient air and light quality.

6.1.2.1 Ambient Air Quality

Nova Scotia Environment and Climate Change (NSECC) and Environment and Climate Change Canada (ECCC) maintain and operate ambient air quality monitoring stations within the province to measure ground-level concentrations of a variety of air contaminants (NSECC 2023a). Pollutants measured at the monitoring stations can include:

- Ground-level ozone (O_3);

- Fine particulate matter ($PM_{2.5}$);
- Carbon monoxide (CO);
- Sulphur dioxide (SO_2);
- Total reduced sulphur (TRS); and
- Nitrogen oxides (NOx), nitric oxide (NO), and nitrogen dioxide (NO_2).

This information is compared against Maximum Permissible Ground Level Concentrations in the Nova Scotia *Air Quality Regulations* and the Canadian Ambient Air Quality Standards (CAAQS), which replaced the Canada-wide Standards for Particulate and Ozone in 2015 (NSECC 2023a).

The most recent Nova Scotia Air Zone Report was used to develop an understanding of the ambient air quality in the area. Nova Scotia Air Zone Reports are part of the Air Quality Management System implemented across Canada through the Canadian Council of Ministers of the Environment (NSECC 2020). The report compares station data to Canadian Ambient Air Quality Standards (CAAQS), which in 2020 included ground-level ozone (O_3), fine particulate matter ($PM_{2.5}$), sulphur dioxide (SO_2), and nitrogen dioxide (NO_2). The reports compare ambient air quality data from monitoring stations with the standards according to air management zones. The Project is located in the Northern Air Zone, where CAAQS were achieved in 2020. However, the NSECC establishes an air zone management framework to work towards continuous improvement even when the CAAQS are achieved (NSECC 2020).

The air zone management framework has four management levels, represented by four colours, and provides guidance on management actions for each level. Numerical values of O_3 and $PM_{2.5}$ in the form of the CAAQS are calculated from the data measured at each monitoring station. The values are compared to management level threshold values, and the highest CAAQS value in an air zone sets the air zone's management level. Management levels have continuous improvement as a priority and require more stringent management actions as the numerical form of the air pollutant measurements approach the CAAQS limits. The Northern Air Zone has a 'yellow' management level, meaning management actions are focused towards preventing air quality deterioration (NSECC 2020). Air management threshold values according to NSECC are presented in **Figure 6.1**.

Management Level	Management Actions	Air Management Threshold Values (2020-2024)						
		Ozone 8-hour (ppb)	$PM_{2.5}$ 24-hour (µg/m³)	$PM_{2.5}$ Annual (µg/m³)	SO2 1-hour (ppb)	SO2 Annual (ppb)	NO2 1-hour (ppb)	NO2 Annual (ppb)
Red	Actions for **Achieving** Air Zone CAAQS	>62	>27	>8.8	>70	>5.0	>60	>17.0
Orange	Actions for **Preventing** CAAQS **Exceedance**	57 - 62	20 - 27	6.5 - 8.8	51 - 70	3.1 - 5.0	32 - 60	7.1 - 17.0
Yellow	Actions for **Preventing** air quality **Deterioration**	51 - 56	11 - 19	4.1 - 6.4	31 - 50	2.1 - 3.0	21 - 31	2.1 - 7.0
Green	Actions for **Keeping Clean Areas Clean**	≤50	≤10	≤4.0	≤30	≤2.0	≤20	≤2.0

Figure 6.1: The Air Quality Management Framework and Associated Threshold Values (NSECC 2020)

There is one ambient air monitoring station in the Northern Air Zone, Pictou. The $PM_{2.5}$ measurements in the Northern Air Zone in 2020 fell in the green and yellow management levels. Ground-level ozone in Pictou was yellow in 2020. Sulphur dioxide and nitrogen dioxide fell in the green management level (**Figure 6.2**).

Reporting Year	CAAQS						
	Ozone 8-hour (ppb)	$PM_{2.5}$ 24-hour (µg/m³)	$PM_{2.5}$ Annual (µg/m³)	SO2 1-hour (ppb)	SO2 Annual (ppb)	NO2 1-hour (ppb)	NO2 Annual (ppb)
	Pictou	Pictou	Pictou	Pictou	Pictou	Pictou	Pictou
2015	45	23	7.6	n/a	n/a	n/a	n/a
2016	45	18	6.6	n/a	n/a	n/a	n/a
2017	46	14	5.7	n/a	n/a	n/a	n/a
2018	48	10	5.1	n/a	n/a	n/a	n/a
2019	50	10	5.2	n/a	n/a	n/a	n/a
2020	51	10	5.0	28	0.5	12	1.0

Figure 6.2: Year-to-year Comparison of the Northern Air Zone's Air Quality in the form of the CAAQS (NSECC 2020)

Additionally, ECCC publishes an additional Air Quality Health Index (AQHI) in six communities across Nova Scotia, including Pictou. The AQHI is a scale designed to measure the current levels of outdoor air pollution using an easy-to-understand scale from 1 to 10. The AQHI is designed as a guide to the relative risk presented by common air pollutants which are known to be harmful to human health (GOC 2023a). Only three pollutants contribute to the calculation of AQHI: i) ground level ozone ($_{O3}$); ii) fine particulate matter ($PM_{2.5}$); and iii) nitrogen dioxide (NO_2) (GOC 2023a). The current observed level at any given time can be viewed at the following link:

https://weather.gc.ca/airquality/pages/provincial_summary/ns_e.html.

Typically, the air quality measured in Pictou receives a score of 1 to 2, or 'low risk', according to the AQHI. With respect to local conditions, the key air quality parameter of concern would be particulates, i.e., dust.

6.1.2.2 Climate and Greenhouse Gases

The proposed Project site is in an area with coastal influence from the Bay of Fundy but also south of the Cobequid Hills. Typically, this region experiences warm early spring, hot summers with less precipitation than elsewhere in the province, and a higher frequency of clear skies. Winters are cold with a mean daily temperature of -7°C in January, with mean daily temperatures rising to around freezing in late March. Spring is warm, and by July the mean daily temperature is 19°C. Total annual precipitation is less than 1,200 mm. Representative climate normals from the nearest principal weather station (Debert, Nova Scotia located within 10 km to the northeast), are provided in **Table 6.2** below.

Table 6.2: Representative Climate Normals for Debert

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Temperature Normals, Debert NS (1991 – 2020)													
Daily Average (°C)	-6.7	-6.2	-2.0	4.0	9.9	14.8	18.9	18.3	14.2	8.3	3.2	-2.7	6.2
Daily Maximum (°C)	-1.4	-0.9	3.1	9.4	16.1	21.0	25.0	24.4	20.1	13.6	7.6	1.9	11.7
Daily Minimum (°C)	-12.0	-11.6	-7.1	-1.5	3.6	8.6	12.7	12.1	8.2	2.9	-1.3	-7.2	0.6
Precipitation Normals, Debert NS (1991 – 2020)													
Precipitation (mm)	91.0	77.1	81.4	90.4	89.3	98.7	87.5	91.9	118.9	117.5	113.7	121.5	1178.5
Wind Normals for Debert, NS (1991-2020)													
Extreme Speed (km/h)	65	67	65	61	47	46	52	43	56	52	61	63	N/A
Direction of Maximum Hourly Speed	SE	N	N	W	W	W	SE	N	NE	N	S	E	N/A

Source:
Canadian Climate Normals 1991-2020 http://climate.weather.gc.ca/climate_normals

Greenhouse gas emissions (GHG) in the province of Nova Scotia have been steadily declining over the past decade and a half. Emissions of GHG are reported through Environment and Natural Resources Canada (GOC 2022) as megatonnes of carbon dioxide equivalent (Mt CO_2eq). From 2005 to 2020, GHG emissions in Nova Scotia decreased by 8.4 Mt CO_2eq (a 36% reduction) (GOC 2022). The Canada Energy Regulator (CER) produces Provincial and Territorial Energy Profiles. According to the CER's Nova Scotia profile, the largest emitting sectors in Nova Scotia are electricity generation at 41% of emissions, transportation at 31%, and buildings (residential and commercial) at 13% (**Figure 6.3**).

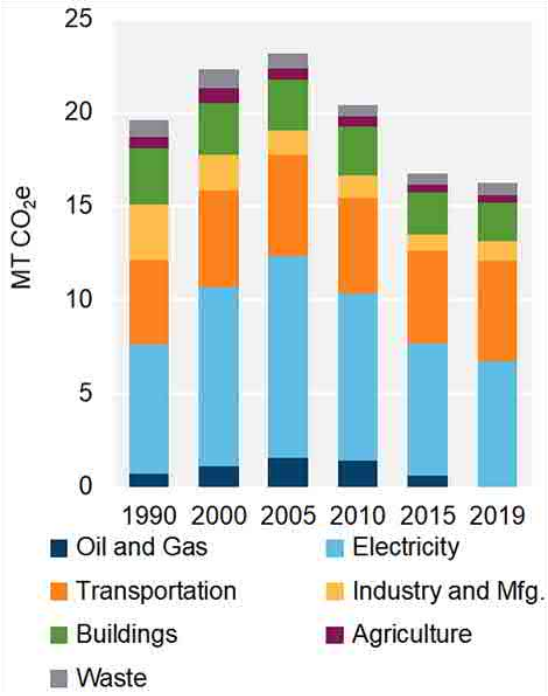


Figure 6.3: GHG Emissions in Nova Scotia by Sector from 1990 to 2019 (GOC 2022)

6.1.2.3 Light

The proposed Project is surrounded by various resource use and residential properties. Properties immediately adjacent to the proposed Project are either undeveloped or resource use, including operating aggregate pits. There are several residences located to the east, north and southwest areas of the proposed Project area along Little Dyke Road.

Given the setting of the Project, existing light levels in the vicinity of the Project are expected to be typical of levels in a rural/resource development area. Though occasional night-time operations may be required, the impact of the Project on light is expected to be similar to the existing operations, with little or no change from previous operations at the pit.

6.1.3 Potential Environmental Effects

Without mitigation, the Project could interact with the atmospheric environment in multiple ways:

- Emissions of combustion gases and fugitive dust from earth moving activities and transport of materials on site during construction could result in air contaminants that could disperse in the atmosphere to off-site receptors;
- Emissions of combustion gases and fugitive dust from operational activities including excavating, on-site transport, and storage of aggregate on-site during operation and maintenance could result in air contaminants that could disperse in the atmosphere to off-site receptors;
- Light during night-time operations— particularly during times of low-hanging cloud and fog—can attract migrating birds traveling over land towards the rest of the mainland of Nova Scotia; and
- The operation of mobile equipment and on-site trucks during construction and operation and maintenance could result in emissions of greenhouse gases.

6.1.4 Proposed Mitigation and Management Measures

The following mitigation measures will be implemented to reduce environmental effects on the atmospheric environment:

- Maintain existing tree buffers and using berms where appropriate between on-site activities and nearby receptors to mitigate the effect of emissions;
- Apply dust suppressants during dry periods when appropriate;
- Implement and follow a non-idling policy;
- Vehicles and equipment will be maintained in proper working order;
- With respect to light emanating from the site during infrequent night-time operations, measures will be taken to ensure use of directional lighting, which minimizes emanation of light upward and laterally over the horizon;
- Progressive reclamation will be undertaken with stabilization and re-vegetation of exposed soils as soon as practical; and
- Applicable guidelines and regulations will be followed including the NSECC Pit and Quarry Guidelines.

Monitoring of airborne particulate emissions (dust) is being conducted for current operations at the existing Pit No. 4 at the request of NSECC and in accordance with the Nova Scotia Pit and Quarry Guidelines. It is anticipated that the following total suspended particulate maximum permissible ground level concentrations will be included in the Industrial Approval for the Project, and airborne particulates will continue to be monitored for the duration of the Project to confirm levels below the following limits at the property boundaries:

- Annual Geometric: Mean 70 micrograms per cubic metre (µg/m^3); and
- Daily Average (24 hours): 120 µg/m^3.

6.1.5 Residual Environmental Effects

For the purposes of characterization of residual effects, interactions between the Project and the atmospheric environment during all applicable Project phases (construction, operation and maintenance) were considered to be similar in nature and are discussed as a whole in the following sections. There were no interactions anticipated with the atmospheric environment during decommissioning and reclamation.

Interactions between the Project and the atmospheric environment are expected to be primarily related to the operation of heavy mobile equipment and vehicles as well as the transport of materials on- and off-site. These activities have the potential to result in changes to the local air quality through the generation of emissions of fugitive dust and particulate matter from material movement as well as combustion emissions associated with the combustion of fossil fuels in heavy equipment.

Emissions of combustion gases from the combustion of fossil fuels by heavy equipment and vehicles during on-site construction activities and from transport of materials on- and off-site will be mitigated by implementing a non-idling policy and ensuring that equipment is in good working order. With the application of mitigation measures, the effects of combustion gases are not expected to be substantive. Emissions are not expected to result in impaired ambient air quality beyond the PDA.

Similarly with emissions of combustion gases, the emissions of greenhouse gases from the operation of mobile equipment and on-site trucks during construction activities will be mitigated by a no-idling policy. Equipment will also be in good working order which will also keep emissions of GHGs as low as possible.

Although emissions of combustion and greenhouse gases due to the Project are expected, given the addition of an electric plant closer to operations and consequent lower trucking distances, they are anticipated to be less than current emissions on -site, and as such residual effects are not anticipated.

Though some nuisance light emissions may occur during limited nighttime operations, most Project activities will be during the day. For those limited night operations, lighting will be set up to not pose a nuisance to nearby residences and to not attract wildlife. Furthermore, it is expected that light emissions will not be any different than current operations. As such, residual effects are not anticipated.

6.1.6 Summary

The effects of the Project on the atmospheric environment due to fugitive dust, emissions from equipment, and light from limited nighttime operations are expected to be localized and minimal, using standard and site-specific mitigation as identified. Appropriate mitigation measures will be taken when required to ensure nuisance dust levels, and combustion gases are controlled such that they do not cause an exceedance of ambient air quality standards or a nuisance at the closest residential receptors. It is unlikely that emissions will exceed provincial or federal air quality standards beyond the boundary (i.e., PDA) for the Project.

In light of the above, and in consideration of the nature of the Project, its anticipated environmental effects, and the implementation of mitigation and best practices that are known to reduce environmental effects, the residual environmental effects of the Project on the atmospheric environment during all phases of the Project are rated not significant, with a high level of confidence. No follow-up or monitoring is proposed.

6.2 Acoustic Environment

6.2.1 Scope of VEC

The acoustic environment considers sound quality, which is characterized by the type, frequency, intensity, and duration of noise (unwanted sound) in the outdoor environment. Vibration, or oscillation in matter that may lead to noise or stress in materials of adjacent structures, is also considered as an element of sound quality.

The acoustic environment has been selected as a VEC because it contributes to the health and well-being of humans, wildlife, vegetation, and other biota. Emissions of sound pressure (including vibration) to the atmosphere during construction and operation and maintenance of the Project may present a disturbance or nuisance for humans and wildlife nearby.

This assessment of the acoustic environment considers sound pressure levels and vibration in the vicinity of the Project are considered relating to sound quality.

The following sound level limits from the Nova Scotia Pit and Quarry Guidelines will be followed:

- 55 A-weighted decibels (dBA) measured as a 1-hour equivalent sound level (Leq) from 23:00 to 07:00 (Night) and all day on Sunday and statutory holidays;
- 60 dBA measured as a 1-hour Leq from 19:00 to 23:00 (Evening); and
- 65 dBA measured as a 1-hour Leq from 07:00 to 19:00 (Daytime).

6.2.1.1 Temporal Boundaries

The temporal boundaries for the Project include the following:

- **Construction**: extending for a period of approximately 1 year, anticipated to begin in the fourth quarter of 2024 (subject to the receipt of all approvals and permits required for the Project);
- **Operation and Maintenance**: beginning in approximately the second quarter of 2025, and lasting for approximately 30 years or until the mineral resource has been depleted; and
- **Decommissioning and Reclamation**: to be initiated following the completion of operations at the site, with decommissioning and reclamation of the surface facilities at the site for an anticipated duration of six months following operation.

6.2.1.2 Spatial Boundaries

The PDA is defined as the area of physical disturbance associated with the Project. The PDA consists of an area of approximately 77 ha that includes the open pit and all related surface facilities represented by the physical Project footprint.

The LAA is the maximum anticipated area within which Project-related environmental interactions can be predicted and measured with a reasonable degree of accuracy and confidence. For the acoustic environment, the LAA includes an area consistent with the 500 m radius centred on the PDA and includes the PDA and adjacent areas where Project-related environmental effects could be expected to occur. Beyond this radius, based on experience with similar facilities and professional judgment, emissions of noise from the Project would not likely be distinguishable from background levels.

6.2.1.3 Significance Threshold

A significant adverse residual environmental effect on the acoustic environment is one where Project-related releases result in the sound pressure levels at the nearest noise sensitive receptor to frequently exceed a 1-hour Leq of 65 dBA during the day (07:00-19:00), 60 dba during the evening (19:00 to 23:00) or 55 dBA during the night (23:00-07:00). A frequent exceedance is defined as one that occurs more than 1% of the time.

6.2.2 Description of Existing Environmental Conditions

The Project includes the existing Pit No. 4 operations and extends northwards towards Little Dyke Road and the property is surrounded by various resource use and residential properties. Properties immediately adjacent to the proposed Project include undeveloped or resource use, including operating aggregate pits and residential properties.

There are approximately 60 residences within 500 m of the proposed Project boundaries. For the purposes of this assessment, we focus on predicted noise levels at the closest residential receptors (i.e.,

six residentially zoned properties located adjacent to the east of the PDA area along Little Dyke Road), with the assumption that Project-related interactions with the acoustic environment at other locations would be of similar or lesser magnitude.

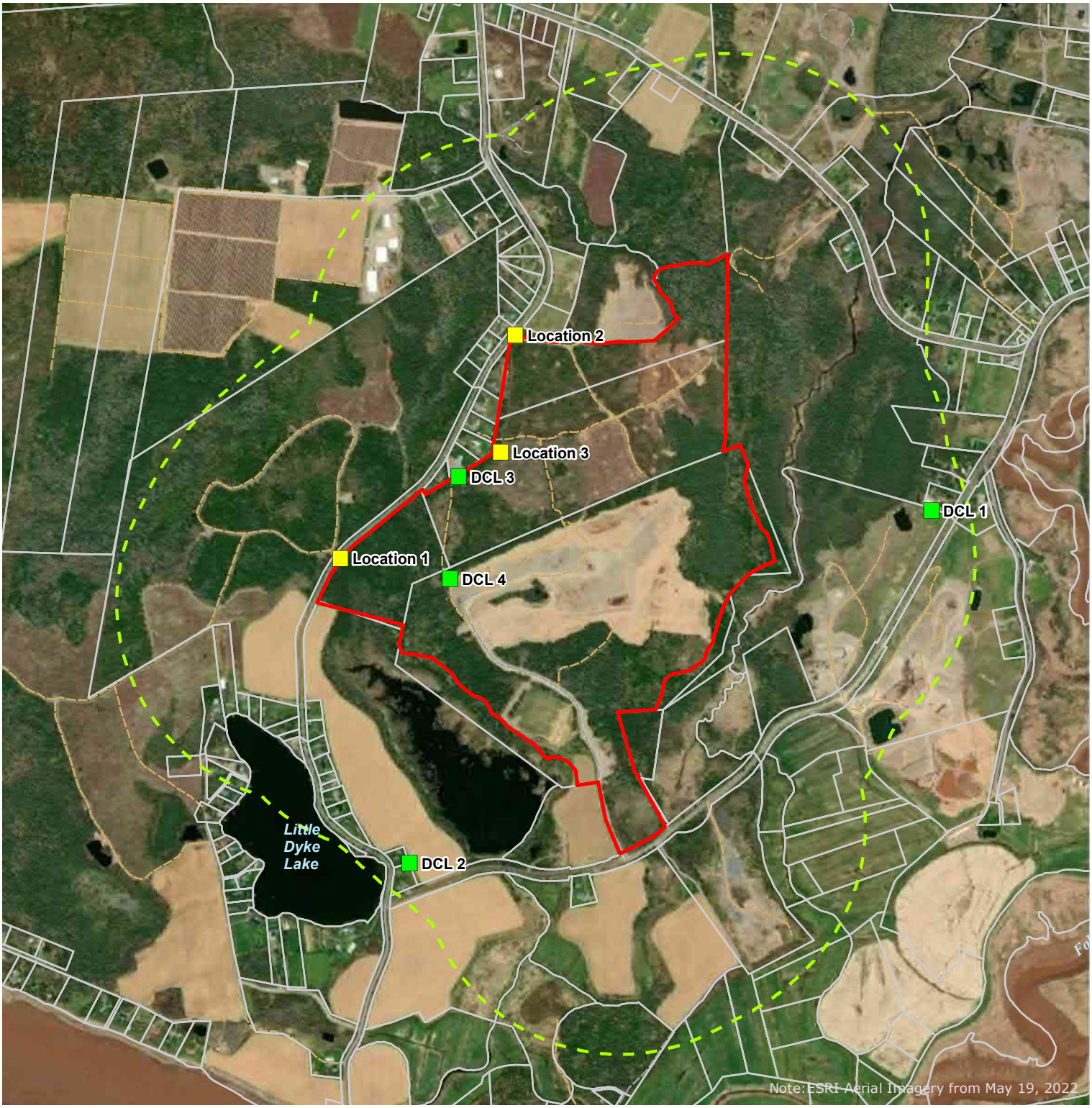
To characterize the existing sound quality, Dillon completed baseline noise measurements at three representative receptor locations in October 2023. In addition, OSCO conducts noise monitoring for the existing Pit No. 4. The representative receptors used for the baseline noise monitoring, as well as the location of OSCO noise meters, are identified in **Table 6.3** and shown on **Figure 6.4**.

Table 6.3: Representative Noise Receptors in the Vicinity of the Proposed Project

Representative Receptor	Approximate Distance from the PDA (m)
Across Little Dyke Road from 199 Glenholme Marsh Road (Resource/Farmland)	0
Across Little Dyke Road from Civic 172 (Residence)	0
Tree stands west of 239 Little Dyke Road (Residence)	0
OSCO Pit No. 4 Monitoring	
247 Little Dyke Road (Residence, DCL 3)	0
539 Little Dyke Road (Residence, DCL 2)	400
885 Little Dyke Road (Residence, DCL 1)	400
(Pit 4, DCL4)	0

Approximately 72 hours of continuous sound monitoring was recorded with a data logger at three locations between October 18 and October 20, 2023. Dillon's baseline noise measurements used NL-22 and ML-52 Type 1 integrating sound level meters to measure one-hour sound pressure levels that were then used to calculate hourly Leq (Equivalent Sound Level) values.

The A-weighted maximum, minimum and mean hourly sound level equivalents (Leq) for daytime (7 am – 7 pm), evening (7 pm – 11 pm) and nighttime (11 pm – 7 am) for the three noise monitoring locations (Location 1, 2 and 3) are presented in **Table 6.4**. Also included in this table are the 90th percentile sound levels (i.e., Lp90).



OSCO AGGREGATES LIMITED

PIT NO. 4 EXTENSION

- Pit No. 4 Noise Monitors
- 2023 Baseline Monitoring Locations
- Acoustic Local Assessment Area
- Project Development Area
- Property Parcels

ACOUSTIC ENVIRONMENT LAA AND NOISE MONITORING LOCATIONS

FIGURE 6.4

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY
OSCO Aggregates Limited,ESRI, GeoNova

MAP CREATED BY: SCM
MAP CHECKED BY: JTO
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

N W E S

SCALE 1:13,574
0 75 150 m

PROJECT: 23-6113
STATUS: FINAL
DATE: 2024-03-08

FILE LOCATION: \\dillon.ca\DILLON_DFS_projects\GIS\2023\236113\Product\Client\EA\SubmissionFigures\Final Figures\F6_4_AcousticEnvironmentLAAandNoiseMonitoringLocations.mxd

Table 6.4: Baseline Noise Monitoring Results

Receptor ID	Receptor Description Receptor Address	Maximum Hourly Leq (dBA)	Minimum Hourly Leq (dBA)	Geometric Mean Leq (dBA)	Ave. Lp90 (dBA)
Daytime (7 am – 7 pm)					
Location 1	Resource Land/Forest	53.8	43.3	48.5	29.4
Location 2	Single story residential	40.8	8.1	19.6	8.2
Location 3	Single story residential	45.6	34.0	40.4	32.2
Evening (7 pm – 11 pm)					
Location 1	Resource Land/Forest	46.9	22.6	38.1	21.5
Location 2	Single story residential	39.5	8.1	13.5	8.2
Location 3	Single story residential	34.2	25.5	29.8	21.7
Night (11 pm – 7 am)					
Location 1	Resource Land/Forest	51.6	23.1	33.8	23.8
Location 2	Single story residential	21.4	8.1	11.2	8.1
Location 3	Single story residential	33	24.6	27.6	23.0

The three monitoring sites were located near residences and a resource property along Little Dyke Road, which contributes to the background sound levels at these receptors. Baseline sound monitoring results indicate that the NSECC noise guidelines were not exceeded on an average basis near the receptors at monitoring locations 1, 2 and 3. The sound monitoring results are indicative of typical rural/resource areas with some noise during the day, which includes operations of existing Pit No. 4.

OSCO conducted noise monitoring during facility operating hours (i.e., 6 am to 5 pm). A portable noise monitor was used to record sound for each of four monitoring locations for two hours per location and every two weeks during operations. The maximum noise level reported during monitoring at the four representative locations near Pit No. 4 collected between April and October 2023 are summarized in **Table 6.5**. The maximum noise level recorded was 58 dBA, below the allowable level at property boundaries and below the Nova Scotia Noise guidelines for Pit and Quarries of 65 dBA.

Table 6.5: Noise Monitoring Results for Existing Pit No. 4

Monitoring Date	Maximum Noise Level Recorded (dBA))			
	DCL1	DCL2	DCL3	DCL4
27-Apr-23	47.72	58.27	50.64	48.31
2-May-23	49.35	47.76	37.8	42.48
17-May-23	48.49	41.25	45.09	40.03
24-May-23	51.99	50.41	58.43	47.67
30-May-23	51.41	52.92	40.55	41.3
12-Jun-23	46.26	51.83	46.06	45.72
21-Jun-23	44.08	37.93	46.6	44.26
11-Jul-23	44.66	42.61	50.99	NA
18-Jul-23	41.3	44.42	42.74	31.46
8-Aug-23	50.7	41.68	43	45.68
23-Aug-23	47.17	38.74	35.74	42.23

Monitoring Date	Maximum Noise Level Recorded (dBA))			
	DCL1	DCL2	DCL3	DCL4
31-Aug-23	53	47.05	53.55	-
3-Oct-23	50.53	46.29	47.75	50.69
19-Oct-23	47.58	52.28	52.39	49.13

Given the setting of the Project, existing sound pressure levels in the vicinity of the Project are expected to be typical of sound pressure levels in a rural/resource development area.

6.2.3 Potential Environmental Effects

Without mitigation, the Project could interact with the acoustic environment in the following ways:

- Noise and vibration emissions from on-site equipment during construction could result in off-site receptors experiencing a change in ambient sound; and
- Noise and vibration emissions from on-site equipment and processing activities during operation and maintenance could result in off-site receptors experiencing a change in ambient sound.

6.2.4 Proposed Mitigation and Management Measures

The following mitigation measures will be implemented to reduce environmental effects on the acoustic environment:

- Maintaining a vegetated berm and tree buffer between on-site activities and nearby receptors to mitigate the effect of sound emissions;
- Vehicles and equipment will be maintained in proper working order; and
- Operating hours will vary depending on the time of year; typically, the washing and screening portions of the electric plant will operate during normal operating hours (5:00 am to 10:00 pm on weekdays and 7:00 am to 6:00 pm on weekends). The crushing portion of the electric plant will be limited from 7:00 am to 10:00 pm on weekdays and 7:00 am to 6:00 pm on weekends.

6.2.5 Residual Environmental Effects

Noise impacts on residences during construction and operation and maintenance are expected to be minimal using standard and site-specific mitigation as identified. Appropriate mitigation measures will be taken when required to ensure noise limits are met and nuisance dust levels are controlled.

Activities during the decommissioning and reclamation phase are expected to be similar in nature to those occurring during construction (though somewhat in reverse order). Though not specifically quantified for the decommissioning and reclamation phase, noise and vibration are expected to be similar to, or less than, those could occur during construction. As such, environmental effects on the acoustic environment during the reclamation and closure phase are not expected to be substantive.

6.2.6 Summary

The sound pressure levels related to on-site activities are not expected to exceed the criteria for daytime for both construction and operation and maintenance. Baseline noise monitoring was conducted in October 2023 and the results are presented above. No other follow-up or monitoring is proposed, though it is anticipated that monitoring of noise emissions may be required as part of the Project's Approval to Operate.

In light of the above, and in consideration of the nature of the Project, its anticipated environmental effects, and the implementation of mitigation and best practices that are known to reduce environmental effects, the residual environmental effects of the Project on the acoustic environment during all phases of the Project are rated not significant, with a high level of confidence. No follow-up or monitoring is proposed.

6.3 Water Resources (Groundwater and Surface Water)

6.3.1 Scope of VEC

Changes in the availability of water, both in the amount of water and the quality of the water, may affect the lives of people and other living things. In this document, water resources include groundwater and surface water resources available for use by humans and wildlife (including vegetation). Water resources were selected as a VEC based on the importance of the resource, and because of the potential for these resources to be affected by the Project through changes in surface water or groundwater quality or quantity.

The water resources VEC can be discussed as two separate elements: surface water and groundwater.

Surface water consists of wetlands, watercourses, water bodies, and surface water drainage channels that are within the property boundary or within the areas that may be potentially affected by the Project. For this assessment, watercourses are those defined under the Nova Scotia *Environment Act* as the bed and shore of every river, stream, lake, creek, pond, spring, lagoon, or other natural body of water – whether it contains water or not – and the water therein, within the jurisdiction of the province. It also includes all groundwater.

Groundwater consists of water that is contained within the ground and recharged through infiltration of precipitation or surface water and is important to local ecosystems and private potable wells. In general, groundwater flows from recharge areas (i.e., areas of high elevation) to discharge areas (i.e., areas of low elevation), which are commonly lakes, streams, and rivers. Groundwater is contained in aquifers, which are geological units such as gravels, sands, or fractured bedrock. The quality of the water contained in aquifers varies depending on the geochemical composition of the material within which the water flows.

Objectives for the quality of surface water and groundwater as a source of drinking water are provided in Health Canada's Guidelines for Canadian Drinking Water Quality (GCDWQ) (Health Canada 2022). Though not having force of law unless formally adopted by provincial legislation, these guidelines provide guidance to decision-makers with respect to the potability of drinking water for human use.

The groundwater and surface water environment are considered VECs as they are an important part of the hydrologic cycle, are critical to the water balance, and are contributing components to both ecological and human health. The overall groundwater environment includes consideration of potential effects on both surface water and groundwater quality as well as quantity.

6.3.1.1 Temporal Boundaries

The temporal boundaries for the Project include the following:

- **Construction**: extending for a period of approximately 1 year, anticipated to begin in the fourth quarter of 2024 (subject to the receipt of all approvals and permits required for the Project);
- **Operation and Maintenance**: beginning in approximately the second quarter of 2025, and lasting for approximately 30 years or until the mineral resource has been depleted; and
- **Decommissioning and Reclamation**: to be initiated following the completion of operations at the site, with decommissioning and reclamation of the surface facilities at the site for an anticipated duration of six months following operation.

6.3.1.2 Spatial Boundaries

The PDA is defined as the area of physical disturbance associated with the Project. The PDA consists of an area of approximately 77 ha that includes the open pit and all related surface facilities represented by the physical Project footprint.

The LAA is the maximum anticipated area within which Project-related environmental interactions can be predicted and measured with a reasonable degree of accuracy and confidence. For water resources, the LAA includes watercourses within the PDA, a 500 m buffer around the PDA, 500 m of watercourses that extend beyond the PDA as well as a buffer of 30 m around such watercourses.

6.3.1.3 Significance Threshold

A significant adverse residual environmental effect on water resources is one where Project-related activities:

- degrade the quality of previously unaffected surface water or groundwater by exceeding the objectives of one or more parameters as specified in the Guidelines for Canadian Drinking Water Quality (Health Canada 2022) for potable domestic water supplies for a period of more than 30 days; or

- reduce the quantity of groundwater recoverable from an aquifer on a sustainable basis such that it no longer meets present or future needs of current users or landowners.

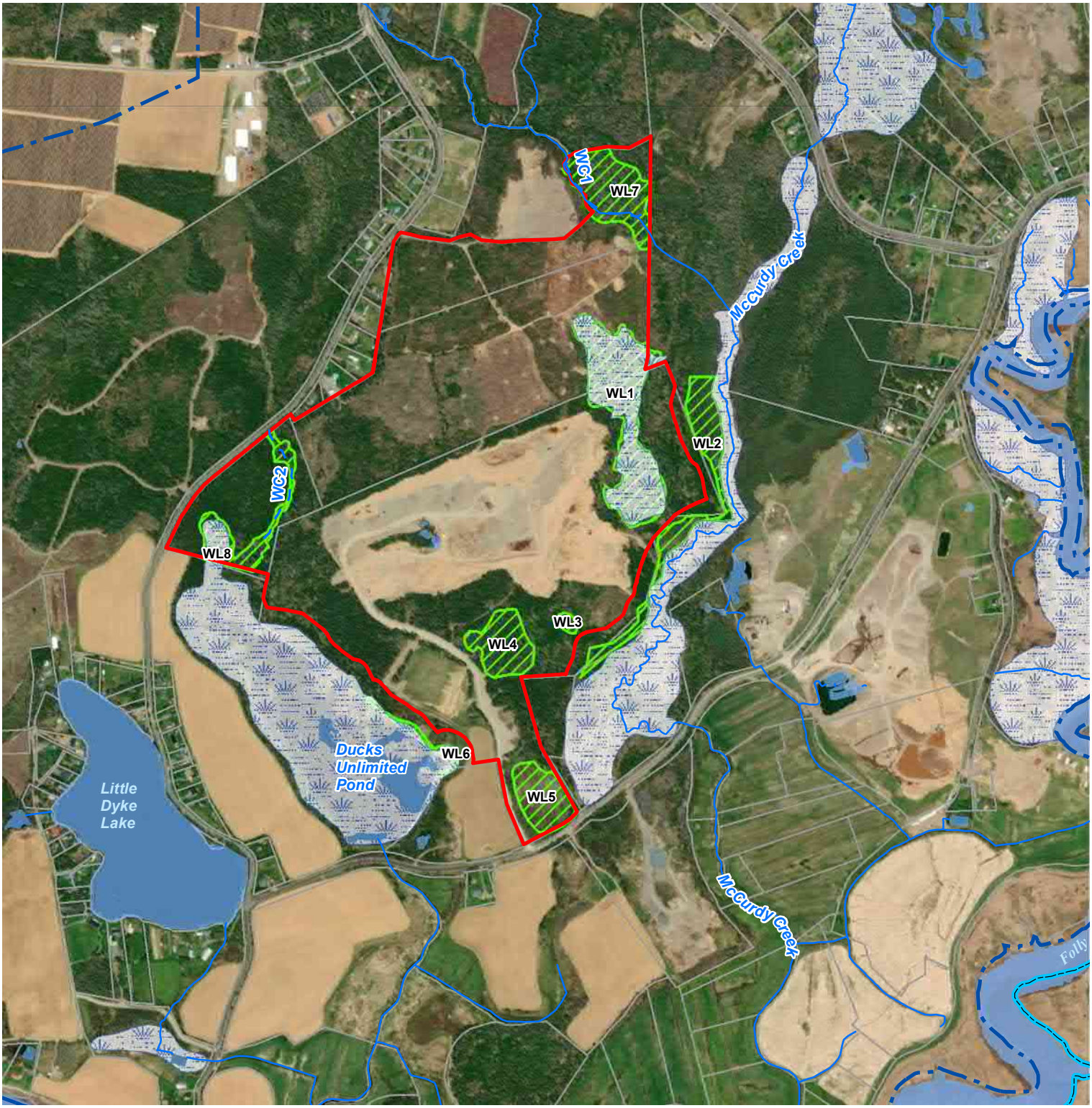
6.3.2 Description of Existing Environmental Conditions

6.3.2.1 Surface Water Resources

The Project is located within the Salmon River/Debert River primary watershed (NSECC designation 1DH). These watersheds ultimately drain south, to the Bay of Fundy via Folly River, McCurdy Creek, and via overland flow. The topography of the Project site generally sits between 10 and 20 m above mean sea level (m amsl).

Locally, water collected within the existing Pit No. 4 infiltrates groundwater or drains southward and eastward to McCurdy Creek. McCurdy Creek originates approximately 3 km to the north of the PDA, and generally flows in a southeasterly direction to Cobequid Bay of the Bay of Fundy, approximately 1 km downstream of the PDA. The watershed receives run-off from agricultural, other aggregate operations, and woodlots, as well as a residential development. The portion of the watershed downstream of Little Dyke Road is predominantly farmland created by historical dykes. A small portion of the western part of the PDA drains toward a Ducks Unlimited Canada (DUC) pond. The pond borders approximately 500 m of the Project property. The pond's sub-watershed originates within 0.5 km upstream. The land bordering the DUC pond is used for agriculture, except the northeastern shore, which is forested. The southern end of the pond has historically been modified to allow DUC to manage water levels. Downstream of the DUC pond, a watercourse drains southward through the agricultural dyke lands and discharges to Cobequid Bay approximately 1 km downstream of Little Dyke Road.

There are two small watercourses that intersect the PDA, as shown in **Figure 6.5**. Additionally, there are three small (15 m by 25 m) ponds that receive drainage from the existing Pit No. 4 area and were likely human made. These ponds appear to be present throughout the year, but drainage from them was not observable during the 2016 or 2023 field visits. Given the aggregate substrate nature and the potential for infiltration, run-off is expected to be limited. The on-site ponds had silt substrate underlain by gravel but are not lined. Water quality information for these watercourses is provided in **Section 6.4**. The general site location and general topographical features of the site are presented in **Figure 6.5**.



OSCO AGGREGATES LIMITED

PIT NO. 4 EXTENSION

- Field Delineated Watercourse
- Watercourse
- Salmon River/Debert River Primary Watershed
- Debert River Secondary Watershed
- Project Development Area (Pit No. 4 Extension)
- Waterbody
- Wetland (NS Topographic Database)
- Field Delineated Wetlands
- Property Parcels

WATERCOURSES, WATERBODIES AND WETLANDS

FIGURE 6.5

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY ESRI, GeoNova, NSDNRR

MAP CREATED BY: SCM
MAP CHECKED BY: JTO
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

N W E S

SCALE 1:11,500
0 100 200 m

PROJECT: 23-6113
STATUS: FINAL
DATE: 2024-03-08

FILE LOCATION: K:\2023\236113\Product\Client\EA\SubmissionFigures\Final Figures\F6_5_WatercoursesWaterbodiesandWetlands.mxd

6.3.2.2 Groundwater Resources

Surficial Geology

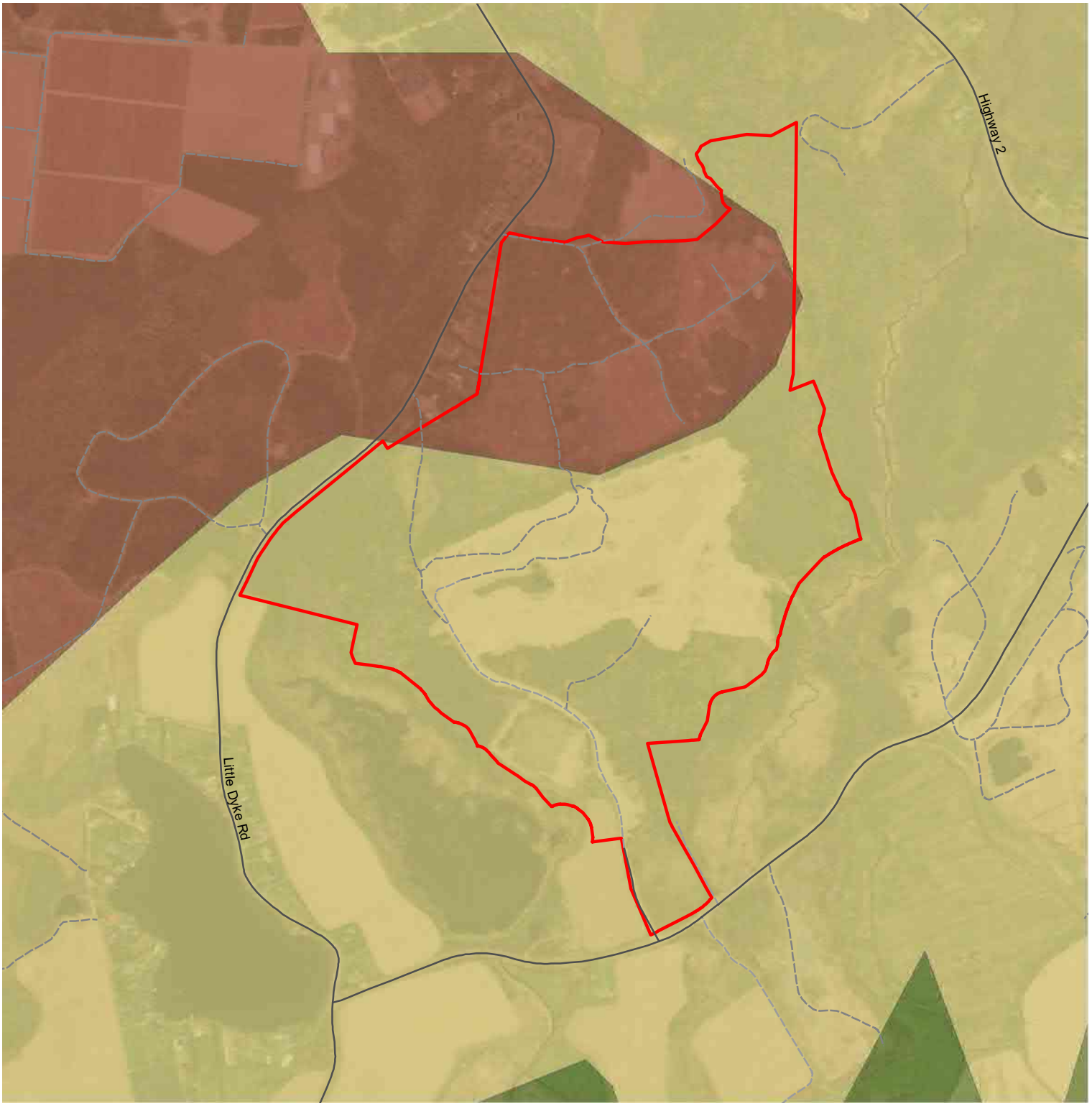
The proposed Project site is blanketed with gravel and sand that is massive to horizontally stratified with coarse to fine gradation within sections and deposits (NSDNRR, Nova Scotia Geoscience Atlas – web-based interactive map 2023). These glaciofluvial deposits date back to the Quaternary period (i.e., Early Wisconsinan to Holocene). Glacial deposits of sand and gravel are the primary sources of aggregate in Nova Scotia (NSDNR, IC ME 24). The surficial geology of the PDA and the area surrounding the Project is shown on **Figure 6.6**. The legend describes the various types of deposits in detail; in particular, the PDA is comprised of hummocky ground moraine and glaciofluvial deposits in the form of outwash fans. On the western boundary of the PDA, marine deposits of fine sand, silt and clay overlain by peat and organics (salt marsh) form intertidal mud flats (NSDNRR 2023a). The glaciofluvial deposits are from the Late Wisconsinan-age and consist predominantly of thick gravel and sand ranging between 5-30 m thick (NSDNRR 2023a).

Bedrock Geology

Bedrock underlying the study area is the Mid-Late Triassic Wolfville Formation of the Fundy Group (shown in **Figure 6.7**). The Wolfville Formation consists of fluvial sandstone and conglomerate, aeolian sandstone and minor deltaic-lacustrine deposits (NSDNR, Nova Scotia Geoscience Atlas – web-based interactive map). According to a Department of Mines, Groundwater Section Report (Hydrogeology of the Truro Area, Hennigar, T. 1972), the true thickness of these Triassic sediments is unknown, but there is at least 305 m exposed along the Debert River (located east of the PDA).

Northeast of the PDA, a small area of older (Early Carboniferous) Windsor Group strata (undivided) is found alongside faults located along the northern and eastern boundaries of this rock type, with the southern boundary representing an unconformity. The Windsor Group (undivided) in this area is described by Donohoe and Wallace (1982) as grey to tan limestone, calcareous siltstone, black to dark grey impure limestone, red siltstone and wacke.

Further north of the PDA (beyond the area shown in **Figure 6.7**) lies the deep crustal Cobequid-Chedabucto Fault System, which strikes East-West and separates the Avalon and Meguma terranes. The Cobequid Fault extends from West Advocate to a point northeast of Truro, a distance of 145 km (Hennigar, T. 1972).



OSCO AGGREGATES LIMITED

PIT NO. 4 EXTENSION

Project Development Area (Pit No. 4 Extension)

Surficial Geology Unit Description

- Glaciofluvial Deposits (Outwash Fans)
- Hummocky Ground Moraine
- Marine Deposits

SURFICIAL GEOLOGY

FIGURE 6.6

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY ESRI, GeoNova, NSDNRR

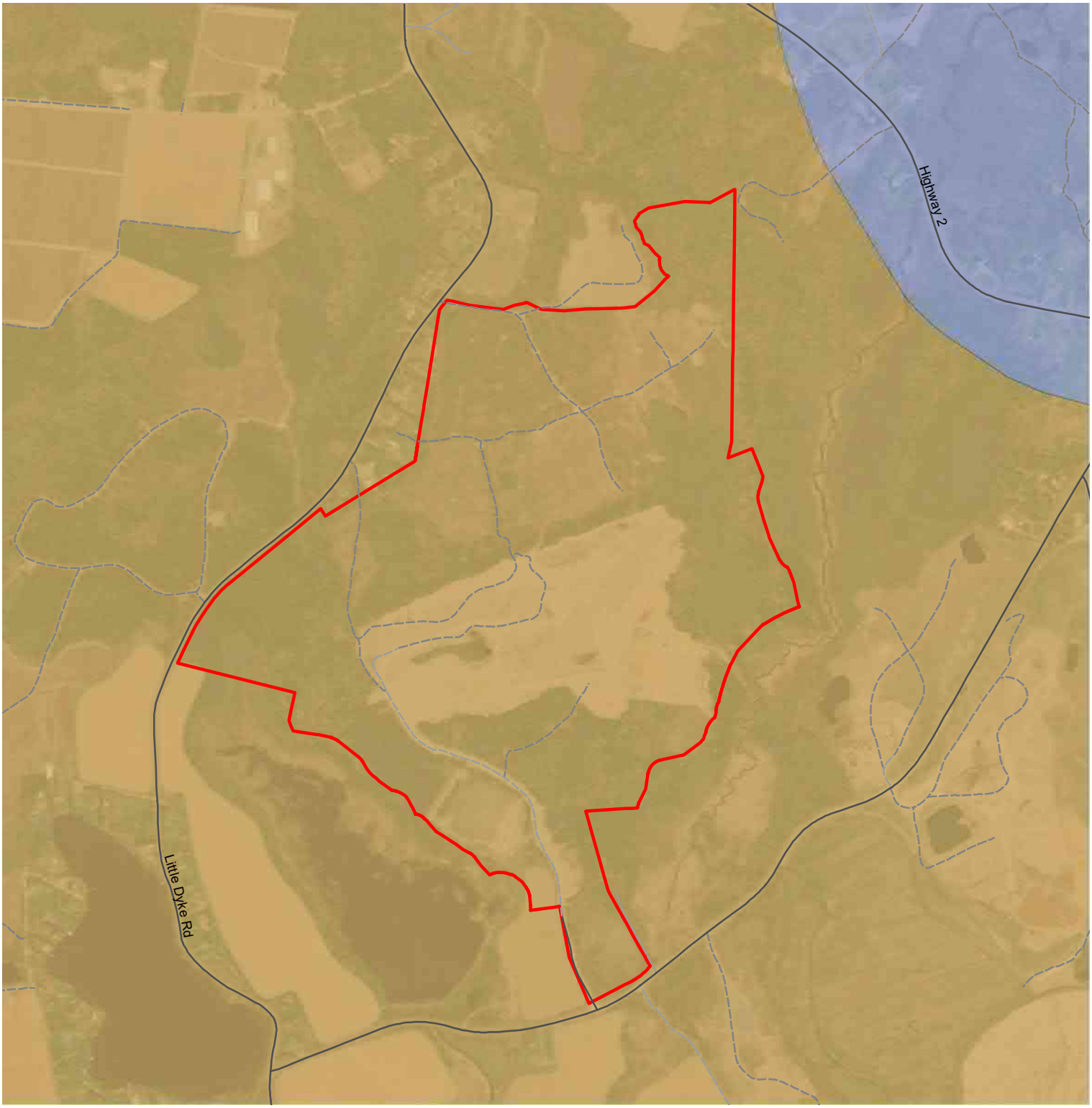
MAP CREATED BY: SCM
MAP CHECKED BY: JTO
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

N W E S

SCALE 1:10,000
0 85 170 m

PROJECT: 23-6113
STATUS: FINAL
DATE: 2024-03-08

FILE LOCATION: \\dillon.ca\DILLON_DFS_projects\GIS\2023\236113\Product\Client\EA\SubmissionFigures\Final Figures\F6_6_SurficialGeology.mxd



OSCO AGGREGATES LIMITED

PIT NO. 4 EXTENSION

Project Development Area (Pit No. 4 Extension)

Bedrock Geology Unit

- Windsor Group, Early Carboniferous (Limestone)
- Wolfville Formation, Middle - Late Triassic (Sandstone)

BEDROCK GEOLOGY

FIGURE 6.7

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY ESRI, GeoNova, NSDNRR

MAP CREATED BY: SCM
MAP CHECKED BY: JTO
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

N W E S

SCALE 1:10,000

0 85 170 m

PROJECT: 23-6113
STATUS: FINAL
DATE: 2024-03-08

FILE LOCATION: \\dillon.ca\DILLON_DFS_projects\GIS\2023\236113\Product\Client\EA\SubmissionFigures\Final Figures\F6_7_BedrockGeology.mxd

Acid Rock Drainage Potential

Acid generating rocks are mineralized materials containing various sulphides. If acid generating rock is disturbed and exposed to water, oxygen or iron-reducing bacteria, oxidization of the sulphide minerals in the rock can occur and result in the production of acid. It should be noted that the presence of iron-reducing bacteria is a catalyst for the acid producing reaction and the potential for generation of acid rock drainage (ARD). Based on available regional maps, there are no known occurrences of acid generating rocks in the Glenholme area (NSDNRR 2023a).

Groundwater Conditions

According to the NSDNR's Groundwater Atlas (web-based interactive map), the PDA is located within the Salmon/Debert Watershed (NSE designation 1DH, sedimentary bedrock) with flow direction generally towards the Bay of Fundy. A search of available well logs (within approximately 1 km of the study area boundaries) was undertaken via the Groundwater Atlas and the query generated 118 well logs (NSDEM 2023). The 118 well logs included one dug well (to 4.3 m depth, with a well yield of 45.4 L/min); the remainder were drilled wells. A summary of the 117 drilled well logs is presented in **Table 6.6** below.

Table 6.6: Summary of Well Logs (NSDEM 2023)

	Minimum	Maximum	Average
Well Depth (m)	6.1	283	33
Casing Depth (m)	6.1	54	16
Depth to Bedrock (m)	3.0	52	12
Static Water (m)	0.3	19	6.5
Well Yield (L/min)	0	681	62

The well records indicated that the majority of wells were installed for domestic purposes. One well was identified as an irrigation well (which contained the highest well yield of 681 L/min and was installed to 91.4 m depth and cased to bedrock, encountered at 15.8 m depth). Two wells were identified as industrial (both cased into bedrock and terminated at 27 and 68 m depths, with well yields of 45 and 68 L/min, respectively). Eleven wells were identified as unknown or not specified.

In relation to potential outliers, it is noted that if the shallowest well and the deepest well were removed, the minimum well depth would be 11.6 m, the maximum would be 97.4 m and the average would be 31.3 m. Also, if the irrigation well (at 681 L/min) and two domestic wells with the highest well yields (i.e., 363 L/min and 340 L/min) were removed from the data summary, the highest well yield would be 363 L/min and the average well yield would be 56 L/min. Overall, the data review infers that wells in the area are generally shallow, high producing wells drawing water from a sedimentary bedrock aquifer.

Groundwater from wells completed in the Wolfville Formation (sedimentary) bedrock is typically calcium-bicarbonate water and iron is generally not problematic (Hennigar, T. 1972). It is noted that groundwater from wells completed in the Windsor Group are generally of very poor quality, with the evaporite deposits (e.g., limestone) contributing excessive amounts of sulphates, hardness, and total dissolved solids (Hennigar, T. 1972).

OSCO conducts quarterly groundwater monitoring at four off-site potable wells and four on-site monitoring well (MW) locations for the existing Pit No. 4. In 2023, monitoring was conducted in March, June, September, and December. Regulatory criteria for the evaluation of groundwater are not specified in the existing Industrial Approval; therefore, groundwater result is evaluated against the Guidelines for Canadian Drinking Water Quality (GCDWQ) (Health Canada 2022). The groundwater quality was found to meet the GCDWQ maximum acceptable concentrations (MACs) for both on-site and off-site wells, with the following exceptions:

- Off-site potable well #1 contained higher iron in March 2023;
- Off-site potable well #3 contained higher iron and manganese in March and June 2023; as well as a low pH in June 2023;
- On-site MW3 contained manganese and a low pH in March and June 2023; and
- On-site MW4 contained manganese and a low pH in March and June 2023.

In general, the historical groundwater monitoring data for the existing Pit No. 4 indicates that the exceedances noted above are consistent with previous sampling results and likely somewhat attributed to the presence of sediment and organic matter in the samples. The exceedances are not likely a result of operations at OSCO but indicate the likely natural occurrence of these parameters in water at the site.

Groundwater quality can be influenced by many factors, such as, the degree of development around a well (e.g., domestic and industrial), the integrity of the well which can degrade over time without proper maintenance (well heads should be protected and wells should be adequately sealed to avoid surface water infiltration around the well casing), and proximity to potential sources of contamination (e.g., highway run-off, septic fields).

6.3.3 Potential Environmental Effects

The Project may interact with water resources in the following ways:

- Surface drainage patterns will be altered with the reshaping of the Project site during construction and from the creation of the open pit, and wetlands and unnamed streams are likely to be affected. These effects are expected to begin during construction and continue throughout operation and maintenance.

- Groundwater flow and quality are not expected to be impacted as the operations will stay above the water table. Further, groundwater quality of the perimeter monitoring wells for the Pit No. 4 operations was within the GCDWQ MAC (Health Canada 2022) with the exceptions noted above that are considered to be naturally occurring and not likely a result of operations at OSCO.
- Some of the wetlands on the site will either be reduced in size or result in a direct loss during the construction and operation and maintenance phases of the Project. The environmental effects assessment for wetlands is provided in **Section 6.5**.

6.3.4 Proposed Mitigation and Management Measures

Mitigation is identified for each interaction and/or effect in relation to water resources in an attempt to prevent the interaction from occurring if possible, or to reduce the severity, magnitude, geographic extent, frequency, or duration of the interaction. Best management practices (based on industry guidelines and regulatory guidance documents) have been identified as appropriate mitigation strategies. In addition, several acts, codes, regulations and guidelines may require appropriate actions be conducted as mitigation measures prior to or during the interaction. The following mitigation measures will be implemented as a part of the Project.

- Where possible, avoid construction within 30 m of watercourses or wetlands.
- The area of disturbance associated with the development of the physical components of the proposed project will be minimized to the extent possible to limit the associated environmental effects associated with such disturbance.
- Proper erosion and sediment control measures will be installed and checked regularly and prior to and after storm events to confirm they are continuing to operate properly to minimize potential effects to adjacent habitat.
- Exposed soils will be stabilized as soon as practical to minimize emissions of particulate matter, erosion, and the release of sediment-laden runoff.
- Wetlands and unnamed tributaries that are affected as a result of the construction of the Project will be compensated for under the Nova Scotia *Environment Act* and Nova Scotia Wetland Conservation Policy (NSECC 2011). Further information on potential effects to wetlands is provided in **Section 6.5**.
- An Environmental Protection Plan (EPP) will be put in place to establish procedures to minimize the potential for spills or uncontrolled releases. As part of the EPP, spill response measures will be put in place to address unplanned Project-related releases. Project-related accidents, malfunctions, and unplanned events are assessed in **Section 8.0**.
- In the unlikely event that a potable well experiences quantity or quality issues during operation and maintenance and becomes unusable, steps will be taken to provide an alternate water supply. This is usually done through the drilling of a new potable well, providing bottled water, or other means.

- Immediate response of petroleum spills is required to reduce the chance of groundwater impacts, all mobile equipment will be equipped with the spill kit for immediate still response should one occur.

6.3.5 Residual Environmental Effects

From the beginning of construction, surface water contained within wetlands and unnamed watercourses located within the PDA and LAA will be drained and may not return to current conditions with the completion of the Project. This potential residual effect is expected to be limited to the PDA, and the watercourses that extend from the PDA into the LAA. These effects are not expected to affect major watercourses due to the following factors:

- The PDA and LAA comprise a small portion (i.e., 0.82 km^2) of the McCurdy Creek watershed area (i.e., 9 km^2); and
- Current conditions on-site include a limited tree canopy due to the former forest harvesting activities; therefore, it is anticipated that surface water temperature conditions (i.e., baseline conditions) are generally warmer.

Four monitoring wells were drilled in the LAA of the existing Pit No. 4 in 2016 to establish baseline conditions on the site and to monitor changes in the water level over time. Water levels continue to be monitored through the use of pressure transducers (data loggers) that can be programmed to record water levels at set time intervals, or by taking manual water level readings at set time intervals during the Project. Based on manual measurements of the monitoring wells, water levels range from 5.0 to 21.2 metres below ground surface (m bgs) during the Q2 monitoring event and 4.9 to 19.5 m bgs during the Q3 monitoring event.

A water balance analysis was conducted to quantify the potential impacts of the Project on the surface water runoff to the surrounding watercourses. The water balance analysis was performed for the existing conditions (pre-development) and operating conditions (post-development). The technical memo with the methods, assumptions, and findings of the assessment are provided in **Appendix C**. The following assumptions and limitations were made in the preparation of the water balance analysis.

- Operating conditions assumed full development of approximately 45 hectares;
- The existing Pit No. 4 and proposed development areas (i.e., new pits) are assumed to be enclosed watersheds that do not release stormwater to the natural environment; and
- The water balance assumes that groundwater inflow is equal to groundwater outflow; therefore, groundwater recharge was not included in the water balance.

The findings of the water balance analysis under existing and operating conditions indicate that runoff volumes have the potential to decrease due to operating conditions with a range of about 0.9%-30.0%.

It is important to note that the water balance analysis does not include groundwater recharge; this conservative assumption tends to result in a larger reduction in water balance than reality.

6.3.6 Summary

Based on the above, with planned mitigation and environmental protection measures, the residual environmental effects of the Project on water resources during each phase of the Project are rated not significant, with a moderate level of confidence.

Groundwater monitoring will continue as it does for the existing Pit No. 4 operation, including water level and quality of the perimeter monitoring wells, and quarterly potable well sampling. Details of monitoring will be provided in the EPP and groundwater monitoring plan.

6.4 Fish and Fish Habitat

The potential environmental effects of the Project on fish and fish habitat are assessed in this section.

6.4.1 Scope of VEC

Fish and fish habitat includes aquatic life (such as fish and benthic macro-invertebrate species/populations) and the habitat that supports them, including mapped and unmapped (field identified) watercourses. Fish and fish habitat is considered a valued environmental component (VEC) of the environment because of their importance in supporting freshwater aquatic life as a fisheries resource for humans, as food source for other wildlife, and in providing recreational opportunities, which are of importance to the public, stakeholders, and First Nation communities.

Fish and fish habitat was selected as a VEC due to the possible environmental effects of:

- A potential change or alteration of, disruption to, or removal of aquatic (including fish) habitat as a result of the Project; and
- Effects to aquatic species listed under the federal *Species at Risk Act* (SARA) and/or the Nova Scotia *Endangered Species Act* (NS ESA).

In addition, the aquatic environment (including fish and fish habitat) is protected through the federal *Fisheries Act*. Section 35(1) of the *Fisheries Act* prohibits the harmful alteration, disruption, or destruction (HADD) of fish habitat; Section 34.4(1) prohibits the death of fish by means other than fishing; and Section 36(3) prohibits the release of a deleterious substance into waters frequented by fish.

The Project has the potential to affect fish and fish habitat through changes in hydrology, water quality and quantity, productivity, and loss of fish habitat.

6.4.1.1 Temporal Boundaries

The temporal boundaries for the Project include the following:

- **Construction**: extending for a period of approximately 1 year, anticipated to begin in the fourth quarter of 2024 (subject to the receipt of all approvals and permits required for the Project);
- **Operation and Maintenance**: beginning in approximately the second quarter of 2025, and lasting for approximately 30 years or until the mineral resource has been depleted; and
- **Decommissioning and Reclamation**: to be initiated following the completion of operations at the site, with decommissioning and reclamation of the surface facilities at the site for an anticipated duration of six months following operation.

6.4.1.2 Spatial Boundaries

The PDA is defined as the area of physical disturbance associated with the Project. The PDA consists of an area of approximately 77 ha that includes the open pit and all related surface facilities represented by the physical Project footprint.

The LAA is the maximum anticipated area within which Project-related environmental interactions can be predicted and measured with a reasonable degree of accuracy and confidence. For the fish and fish habitat, the LAA includes the PDA, as well as a 500 m buffer around the PDA that includes watercourses that extend off the property and interconnect with McCurdy Creek, including a 30 m buffer around such watercourses.

6.4.1.3 Significance Threshold

A significant adverse residual environmental effect on fish and fish habitat is one that:

- Results in an unauthorized death of fish by any means other than fishing as required in Section 32 of the *Fisheries Act*;
- Results in an unmitigated or non-compensated net loss of fish habitat as required in a *Fisheries Act* authorization;
- Results in a non-permitted contravention of any of the prohibitions stated in Sections 32-36 of SARA; or
- Alters the freshwater habitat within the assessment boundaries physically, chemically, or biologically, in quality or extent, that could include, for example, exceeding long-term Canadian Council of Ministers of the Environment (CCME) guidelines for the Protection of Freshwater Aquatic Life (FWAL) (CCME 1999) in such a way as to cause a change or decline in the distribution or abundance of a fish population that is dependent upon that habitat.

6.4.2 Description of Existing Conditions

The information regarding the presence and characterization of fish and fish habitat within the PDA and LAA was derived from several sources including existing databases and secondary information sources (i.e., desktop analysis), as well as field assessment.

6.4.2.1 Regional Setting

The proposed Project is located within the Minas Lowlands Ecodistrict of the Central Valley Lowlands Ecoregion. The ecodistrict, and areas surrounding the Project, has several major rivers and associated alluvial floodplains passing through it. Major rivers in the vicinity of the Project are the Folly and Debert Rivers. Directly to the southwest of the property is a marsh that is managed by Ducks Unlimited Canada (DUC). Further to the west beyond the neighbouring marsh (approximately 350 m from the Project property) is a small lake, Little Dyke Lake.

According to the provincial map viewer, the PDA is close to sea level with the highest elevation being appropriately 19 m above mean sea level (m amsl) (NSDNRR 2021a). The confluence of Debert and Folly River occurs approximately 1 km to the east of the proposed Project. These rivers are tidal within approximately 3 km of the coast and are bordered by salt marsh habitat. These estuary habitats at the lower reaches of the Debert and Folly Rivers before they enter the Cobequid Bay are heavily influenced by the Bay of Fundy.

The watercourses that intersect with the PDA include the reaches of one small unnamed tributary to McCurdy Creek, which is generally associated with wetland features on the Project site. One unmapped watercourse, a small first order tributary to the DUC pond, was also identified during fish habitat assessments undertaken on September 28, 2023.

Fish species which may reside in the tributaries to McCurdy Creek and the DUC pond are expected to be typical of small streams in the area including brook trout (*Salvelinus fontinalis*), American eel (*Anguilla rostrata*), and a variety of minnow species (Dillon 2017).

6.4.2.2 Desktop Analysis

As part of the fish and fish habitat assessment, and to evaluate the potential for aquatic species of conservation concern (SOCC) and/or aquatic species at risk (SAR) within the general area of the Project, readily available information from the following reputable sources was reviewed:

- Atlantic Canada Conservation Data Centre (AC CDC);
- Department of Fisheries and Oceans (DFO);
- Nova Scotia Department of Natural Resources and Renewables (NSDNRR);
- Nova Scotia Department of Environment and Climate Change (NSECC);

- The federal Species at Risk Registry;
- The provincial Species at Risk Registry;
- The Committee on the Status of Endangered Wildlife in Canada (COSEWIC);
- Publicly available GIS map layers (e.g., ecological land classification, forest inventory, Special Management Zones, watercourses, and wetlands); and
- High resolution aerial photography.

In this report, we define "species at risk" (abbreviated SAR) as are those species that are listed as "Extirpated", "Endangered", "Threatened", or "Special Concern" on Schedule 1 of the federal *Species at Risk Act* (SARA) or on the Nova Scotia *Endangered Species Act* (NS ESA). In addition, we define "species of conservation concern" (abbreviated SOCC) as are those species that are not SAR but are listed in other parts of SARA, NS ESA, by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), or are regionally rare or endangered by the Atlantic Canada Conservation Data Centre (AC CDC) (i.e., those species with AC CDC S-ranks of "Critically Imperiled" [S1], Imperiled [S2], or Vulnerable [S3] in the province of Nova Scotia).

A custom AC CDC data report (AC CDC 2023a; refer to **Appendix D**) was obtained for a 5 km radius around the PDA. According to the AC CDC records review, there is one record of an aquatic SAR and two records of aquatic SOCC that have been historically observed within 5 km of the Project. The Atlantic salmon (*Salmo salar)* inner Bay of Fundy population, a SAR, is ranked as S1 (rare) by the AC CDC and is also listed as "Endangered" by COSEWIC and SARA. American eel (*Anguilla rostrata*), an SOCC, is ranked as S3 (vulnerable) by the AC CDC and is listed as "Threatened" by COSEWIC, but not under SARA or NS ESA. Brook trout (*Salvelinus fontinalis*), an SOCC, is also ranked S3 by the AC CDC but is not listed under COSEWIC, SARA or NS ESA.

DFO aquatic species at risk mapping (DFO 2023) identified the McCurdy Creek watershed (including the DUC pond and unnamed tributaries that intersect the PDA) as critical habitat for Atlantic salmon.

6.4.2.3 Fish Habitat

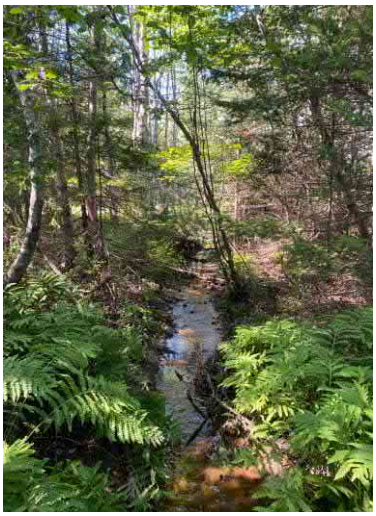
A field assessment of fish and fish habitat in the PDA was conducted in August and September 2023 by Dillon biologists experienced in conducting aquatic/fish habitat surveys. During the assessment, one mapped watercourse (identified as Watercourse 1 (WC1)) and one unmapped watercourse (WC2) were identified (**Figure 6.5**). The detailed methods and results for fish and fish habitat assessments of WC1 and WC2 are available in **Appendix E** and summarized in the following sections.
Assessment criteria for fish habitat included:

- **Dominant substrate type and embeddedness:** Dominant substrate types were described and documented by percent of relative abundance. Substrate type (e.g., gravel or silt) is especially important for fish spawning habitat;

- **Stream channel characteristics:** Stream channel characteristics including average wet width, approximate bankfull width, and average wetted depth were measured in the field; and
- **In-situ water quality:** In-situ measurements of water quality parameters (temperature, dissolved oxygen, conductivity, and pH) using a YSI Pro Plus water quality meter.

The results of the fish habitat assessments are presented in the following sections and summarized in **Table 6.7**, below.

Table 6.7: Summary of Watercourse Characteristics

Watercourse ID	Representative Photo	Average Stream Dimensions (m)	Observations
WC1 – Unnamed Tributary to McCurdy Creek		**Wet Width:** 2 m **Bankfull Width:** 2.3 m **Average Depth:** 0.2 m	Small watercourse with gravel dominant substrate. Fish were observed during the field survey.
WC2 – Unnamed (Unmapped) Tributary to the DUC Pond		**Wet Width:** 0.5 m **Bankfull Width:** 1 m **Average Depth:** 0.2 m	Small watercourse with gravel dominant substrate. Fish were not observed during the field survey.

Unnamed Tributary to McCurdy Creek – Watercourse 1 (WC1) – WC1 is a mapped watercourse determined to be a small fish-bearing stream during the field survey. The 300 m long assessed reach of the watercourse runs through predominantly softwood forest in the northeast boundary of the PDA.

The substrate in the upstream reach consisted of mostly gravel. Fish were observed during the field survey.

Unnamed Tributary to DUC Pond – Watercourse 2 (WC2) – WC2 is a small unmapped stream located in the west of the PDA. The watercourse has an average wetted width of 0.5 m and bank full width of 1 m. The surveyed portion of WC2 was approximately 300 m long through softwood dominant forest and again consisted mainly of gravel substrate. Fish were not observed during the field survey.

The portions of the watercourses that were assessed in 2023 were considered to provide generally good fish habitat; however, the watercourse, at times, may not allow for suitable fish habitat between the DUC Pond and the PDA due to insufficient water. At the time of the assessment, the water level was at a high stage. Water quality readings that were collected during the assessment are summarized in **Table 6.8**, the parameters were within Canadian Council of Ministers of Environment's (CCME) recommended guidelines for projection of freshwater aquatic life (FWAL; CCME 1999).

Table 6.8: In-situ Water Quality Assessment Summary

Parameter	Units	CCME FWAL[1]	Assessment Location	
			WC1	WC2
pH	-	6.5- 9.0	7.63	6.61
Temperature	°C	NA	15.0	19.2
Specific Conductivity	µS/cm	NA	170.6	79.9
Dissolved Oxygen	mg/L	9.5	12.74	9.86
	% Sat.	N	127.8	108.0

Notes:
[1]CCME (1999)
Assessment Date: September 19, 2023

6.4.2.4 Fish Species and Aquatic Species at Risk

One aquatic SAR (Atlantic salmon) was identified by the AC CDC (2023) report as having been historically observed within 5 km of the Project. Atlantic salmon require rivers or streams that are generally clear, cool, and well-oxygenated (COSEWIC 2010). Other fish species which may reside in tributaries to McCurdy Creek include brook trout, American eel, and a variety of minnow species (Dillon 2017). During the site visits that were conducted in August and September 2023, fish were observed throughout WC1. No aquatic SAR were observed; however, potential suitable habitat for Atlantic salmon is within watercourse 1 (i.e., predominantly gravel substrate and cool, well oxygenated water).

WC2 is ephemeral in nature and is likely to not contain water during sometimes of the year. Additionally, the watercourse forms at the outflow culvert which received drainage from farmlands and a ditch along Little Dyke Road. Although habitat conditions at the time of assessment were amenable to aquatic life (i.e., water quality parameters within the CCME FWAL guidelines), WC2 is considered to be

unlikely to provide suitable habitat for fish given the limited connection to downstream habitat and lack of suitable upstream habitat for fish.

6.4.3 Potential Environmental Effects

Without mitigation, the Project could interact with fish and fish habitat in the following ways:

- Construction and operation could result in the indirect loss of fish habitat in areas where the presence of Project-related facilities cause a change in surface water availability, with potential to alter habitat in downstream watercourse segments;
- Construction in the areas near the watercourses that will require removal of surface materials including vegetation and soils (i.e., topsoil and overburden) could increase erosion rates in proximity to the aquatic receptors; and
- A spill or fire could occur as an accident or unplanned event which could affect water quality and fish habitat.

6.4.4 Proposed Mitigation and Management Measures

The following standard mitigation measures have been identified to reduce the likelihood of occurrence or minimize potential extent of effects of the Project on fish and fish habitat. Planned standard mitigation measures for the proposed Project include the following:

- The area to be disturbed by the Project will be minimized to the extent possible to only that area which is required to accomplish the Project objectives;
- Design surface water drainage to minimize changes in drainage;
- Potential installation of watercourse crossings (culverts) will be designed as per the Nova Scotia Watercourse Alterations Standard (NSE 2015);
- Potential installation of watercourse crossings (culverts) will be permitted as per the Nova Scotia Watercourse Alterations Regulations (NSECC 2023b);
- A Request for Review (RFR) will be submitted to DFO to determine if a *Fisheries Act* authorization is required for potential watercourse crossing installations;
- Maintaining watercourses and wetlands where possible, and obtaining watercourse and wetland alteration permits for any alterations of watercourses or wetlands;
- Construction and operation activities will comply with the conditions of the permits;
- Efforts will be made to maintain as much mature vegetation that remains along the edges of the site as possible, so as to act as a tree and watercourse/wetland buffer; in particular, existing treed buffers surrounding watercourses and wetlands located on the northeastern and southwestern portions of the PDA will be maintained to the extent possible;

- Implement a water management plan that incorporates measures aimed at retaining site water in a settling pond to allow for settling of suspended sediments prior to recirculation to the electric plant;
- Proper erosion and sediment control measures will be installed and checked regularly and prior to and after storm events to ensure they are continuing to operate properly to minimize potential effects to adjacent habitat; and
- An emergency response plan (ERP) for accidental spills, emergencies, incidents or storm events will be completed and detailed in the Environmental Protection Plan (EPP), and the contractor will be required to provide spill response training to construction personnel.

6.4.5 Residual Environmental Effects

The Project has been developed to minimize the area of disturbance of the PDA to that which is required to meet the Project objectives, maintaining treed buffers around wetlands and watercourses where possible, to minimize the extent of fish habitat loss.

The Project will result in the alteration of potential fish habitat in WC2 to construct a watercourse crossing along the proposed alternate access route. An estimated area of 15 m^2 of WC2 will be affected while this watercourse crossing is being constructed; this effect will occur during construction and persist through the life of the Project. No alterations to WC1 are expected. A watercourse alteration permit will be obtained prior to conducting any work in WC2. Since WC2 is not fish-bearing, a *Fisheries Act* authorization is not expected to be required; this will be confirmed by submitting a "Request for Review" form to Fisheries and Oceans Canada (DFO) for their review.

During operation and maintenance, it is anticipated that additional indirect loss of, or alterations to, watercourses could occur from localized changes in surface water hydrology arising from the reshaping of the Project site and the storage of run-off in the settling pond. The localized changes to drainage patterns occurring on, or adjacent to, the PDA are expected to be small in magnitude (given the small size of the watercourses).

Activities during construction and operation and maintenance could result in erosion of surficial soils and corresponding sedimentation of surface run-off that, unmitigated, could affect receiving water quality. The Project will be conducted in a manner that minimizes the potential for such effects to occur, including the use of properly designed, sized, and maintained erosion and sedimentation control structures to prevent such releases. These structures will be visually inspected prior to and following major precipitation events and following the spring freshet and maintained accordingly to ensure their effectiveness. With these measures, water quality is not expected to be adversely affected. The potential failure of erosion and sedimentation control devices is assessed as an accident, malfunction, or unplanned event in **Section 8.0**.

Storage of site run-off in the settling pond during operation and maintenance may result in a localized change in surface water hydrology and a change in surface water levels in receiving waters arising from sequestering water in these features. However, given the larger size of the watersheds and the limited size of the PDA (with corresponding relatively small amounts of water to be sequestered), these effects are not expected to be measurable nor to affect fish and fish habitat.

Refuelling will be conducted a minimum of 30 m from a watercourse or wetland. As such, spills are not likely to occur for the Project as planned. Spills or releases of hazardous materials, in the unlikely event that they were to occur, would be an accident, malfunction, or unplanned event, and are assessed in **Section 8.0**.

6.4.6 Summary

In light of the potential residual effects outlined above, and with the implementation of other mitigation measures aimed at reducing or minimizing environmental effects on fish and fish habitat, the residual environmental effects of the Project on fish and fish habitat during all phases are rated not significant, with a high level of confidence. No follow-up or monitoring is proposed.

6.5 Wetlands

6.5.1 Scope of VEC

A wetland in Nova Scotia is defined as the following (Nova Scotia Wetlands Conservation Policy, revised in 2019):

> *"A marsh, swamp, fen, or bog that either periodically or permanently has a water table at or near above the surface, or that it is saturated with water and also sustains aquatic processes as indicated by the presence of poorly drained soils, hydrophytic vegetation and biological activities adapted to wet conditions."*

Wetlands were selected as a VEC because of their relationship with water resources, wildlife and wildlife habitat, and other biological and physical components addressed as VECs in this EARD. Also, wetlands are widely recognized as providing a host of ecosystem functions and benefits including, but not limited to, filtering out pollutants and heavy metals, mitigating flood events, and providing habitat to many SAR in Nova Scotia. Project activities have the potential to cause adverse environmental effects through the proposed physical destruction of some wetland habitat.

Nova Scotia's wetlands have been given specific protection pursuant to the Nova Scotia *Environment Act* and the Nova Scotia Wetland Conservation Policy (NSECC 2011). The Nova Scotia Wetland Conservation Policy and regulatory processes are guided towards the goal of achieving no net loss of wetland function (NSECC 2011). Wetland compensation for alterations of a delineated wetland is often required as a

condition of a wetland alteration permit when a net loss of wetland function occurs. In addition to the protection provided to wetlands through the Nova Scotia Wetland Conservation Policy, the Federal Policy on Wetland Conservation (Government of Canada 1991) is applicable if the Project is located on federal lands, federal funding is provided for the Project, or if federal decisions or approvals related to wetlands are required for the Project. In the case of the Project, there are no triggers for the Federal Policy on Wetland Conservation to be implemented.

6.5.1.1 Temporal Boundaries

The temporal boundaries for the Project include the following:

- **Construction**: extending for a period of approximately 1 year, anticipated to begin in the fourth quarter of 2024 (subject to the receipt of all approvals and permits required for the Project);
- **Operation and Maintenance**: beginning in approximately the second quarter of 2025, and lasting for approximately 30 years or until the mineral resource has been depleted; and
- **Decommissioning and Reclamation**: to be initiated following the completion of operations at the site, with decommissioning and reclamation of the surface facilities at the site for an anticipated duration of six months following operation.

6.5.1.2 Spatial Boundaries

The PDA is defined as the area of physical disturbance associated with the Project. The PDA consists of an area of approximately 77 ha that includes the open pit and all related surface facilities represented by the physical Project footprint.

The LAA is the maximum anticipated area within which Project-related environmental interactions can be predicted and measured with a reasonable degree of accuracy and confidence. For wetlands, the LAA includes the PDA and nearby wetlands where a portion of the wetland extends within 30 m of the PDA. This is due to the potential for altering the wetlands' hydrological regime as a result of Project-related activities that will occur within the PDA.

6.5.1.3 Significance Threshold

A significant adverse residual environmental effect on wetlands and vegetation is one where Project related activities result in a net loss of wetland function that cannot be compensated (as per the Nova Scotia Wetland Conservation Policy).

6.5.2 Description of Existing Environmental Conditions

The information regarding the presence and characterization of wetlands within the PDA and LAA was derived from several sources including existing databases and secondary information sources (i.e., desktop analysis), as well as field assessment.

6.5.2.1 Wetland Determination, Delineation, and Functional Assessment

Following a desktop analysis for the PDA and LAA, wetlands were assessed within the PDA by the implementation of the field methodologies described below. Wetlands in the LAA were surveyed and assessed by Dillon biologists certified in wetland delineation and functional assessments in Nova Scotia within the growing season (i.e., June 1-September 30) in 2023. An assessment and delineation were conducted on wetlands within the current PDA; however, the functional assessment of a few wetlands (indicated below) is planned for the spring and summer of 2024, prior to construction.

Field Wetland Determination and Delineation

The methods of wetland determination and delineation used in the wetland surveys were based upon established protocols for wetland delineation, in particular, the U.S. Army "Corps of Engineers Wetland Delineation Manual" (Environmental Laboratory 1987). Wetland delineation data sheets that were adapted from U.S. Army Corps of Engineers form for Northeast-North Central Regional Supplement for use in Nova Scotia (USACE 2012) were used to record data collected in the field. Wetland determination and delineation primarily focused on establishing the wetland-upland edge and was based on the presence of positive indicators for three parameters:

- Hydric (wet) soil conditions;
- Hydrophytic (wet adapted) vegetation; and
- Wetland hydrology.

Eight wetlands were identified within the LAA (refer to **Figure 6.5**). The delineated wetlands are summarized in **Table 6.9**, below.

Table 6.9: Summary of Wetlands in the LAA

Wetland ID	Wetland Type	Total Delineated Wetland Area (ha)*	Wetland Area in the PDA (ha)	Area (ha) of Wetland to be Altered by Project Activities
WL1	Treed bog	3.93	3.93	3.93
WL2	Fen/swamp	2.07	0	0
WL3	Bog	0.13	0.13	0.13
WL4	Bog/Treed Swamp	1.34	1.34	1.34
WL5	Swamp/Bog	1.29	1.29	0
WL6	Marsh	0.23	0	0
WL7	Treed swamp	2.15	2.15	0
WL8	Treed swamp	1.24	1.24	0.01
	Total	***12.38***	***10.08***	***5.41***

Note:
WL8 extends beyond the PDA; delineation of WL8 was only completed within the PDA.

Functional Assessment: Wetland Ecosystem Services Protocol-Atlantic Canada (WESP-AC)

Wetlands WL2, WL5, and WL6 are beyond the PDA and no Project activities are anticipated within 30 m of their delineated boundaries. As such, further assessment of their functions was not warranted. Additionally, no alterations are proposed for WL7; however, the wetland has the potential to be indirectly impacted by Project activities outside the wetland and within 30 m of the wetland, and therefore a functional assessment was included in the assessment.

Wetland functional assessments followed a standardized method for assessing natural wetland functions and benefits called the "Wetland Ecosystems Services Protocol for Atlantic Canada" (WESP-AC) (NSECC N.D.). WESP-AC represents a standardized approach to the way data is collected and interpreted to indirectly yield relative estimates of a wide variety of important wetland functions and their associated benefits. The functional assessments were completed within the growing season (approximately June 1 – September 30). The results of the WESP-AC functional assessment provided a classification for assessed wetlands based on their functionality as well as the identification of Wetland of Special Significance (WSS).

The WESP-AC scoring (i.e., 0 to 10) and ratings (i.e., "Lower", "Moderate", or "Higher") were assigned to a variety of wetland functions based on visual assessments of weighted ecological indicators (Adamus 2018). The number of ecological indicators applied to estimate a particular wetland function depended on which functions were assessed as part of the field surveys. The indicators were then combined in a spreadsheet using logic-based, mathematical models to generate the score and rating for each wetland function and benefit (NSECC N.D.). Together, this information provided a profile of functions and benefits provided by each assessed wetland.

The following sections provide a summary of the wetland functional assessment results for the wetlands located within the PDA.

WESP-AC assessment gives higher scores to wetlands with the capability to store or delay the downslope movement of surface water (e.g., wetlands that do not have surface water outlets) (NBDELG 2018).

Wetland WL1 is a treed bog without an outlet; as such, this wetland received Higher normalized ratings for hydraulic and water quality support functions. Further information on the functions of Wetland WL1 is provided in **Appendix E**.

The functions of WL3 and WL4 were previously assessed based on NovaWet (NSECC 2023c) in 2016 (Dillon 2017). WESP-AC functional assessment is planned for the spring of 2024 prior to construction. Based on the prior assessment, WL3 is characterized as a permanently saturated to seasonally flooded bog with no outlet. WL3 received Higher scores in functions related to sediment retention and carbon sequestration and a Moderate score for surface water detention. WL4 is a permanently saturated bog

and treed swamp complex. In 2016, WL4 received Higher scores for wetland functions related to carbon sequestration and nutrient transformation and a Moderate score for sediment retention and other (e.g., other than for fish, waterfowl and waterbird) wildlife habitat.

Wetlands WL7 and WL8 are associated with streams and support water cooling and nutrient export to downslope waters, these wetlands received Higher normalized scores for the aquatic support group function. The aquatic support function of a wetland determines a wetland's ability to support ecological stream functions that promote habitat health. This group considers stream flow support, aquatic invertebrate habitat, organic nutrient export and water cooling. In addition to aquatic support group functions, WL8 also received a Higher score for functions related to transition habitat support. The main function of the collective group is to evaluate the wetland's ability to support healthy habitat for birds, mammals, and native plants.

Further details of the wetland's primary and secondary indicators and attributes as well as WESP-AC functional assessment results are provided in **Appendix E**. Refer to **Figure 6.5** for delineated wetland boundaries and locations. It is important to note that the field assessment was completed for only that wetlands that are present entirely within the PDA and for the portion of wetlands that are present on the PDA for wetlands that extend to other neighbouring properties, to avoid trespassing on privately-owned property.

6.5.2.2 Assessment of Wetlands of Special Significance

The wetlands were evaluated for the potential of being a WSS in addition to functional assessment using the WESP-AC. According to provincial Wetlands Conservation Policy, the following is 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 NS–EHJV;
- wetlands known to support at-risk species as designated under the federal *Species At Risk Act* or the *Nova Scotia Endangered Species Act*; and
- wetlands in designated protected water areas as described within Section 106 of the *Environment Act*.

Of the wetlands assessed for the Project, WL7 was the only one identified as WSS as per the provincial Wetlands Conservation Policy due to supporting at risk species.

Although the excel model used for the WESP-AC assessments includes an interpretation tool to classify WSS based on wetland functionality, it is recognized that the tool currently does not consider all aspects of WSS that are considered under the provincial Wetlands Conservation Policy. As such, following completion of WESP-AC assessment, wetlands were reviewed to see if they fall under the definition of WSS per the provincial Wetlands Conservation Policy.

During the biophysical surveys for the Project between May and September of 2023, plant and songbird species at risk (SAR) were identified within Wetland WL7, making it a WSS. Black ash (Fraxinus nigra), which is designated as Threatened under both the Nova Scotia Endangered Species Act (NS ESA) and COSEWIC, was observed during wetland delineation surveys on August 1, 2023, in Wetland WL8 just outside of the property boundary. A Canada Warbler (Cardellina canadensis), which is designated as Special Concern under COSEWIC (2020) and Threatened under NS ESA, was observed in WL7 during migratory bird surveys on May 30, 2023. Although the PDA encroached within 30 m of Wetland WL7, no alterations of this wetland are proposed for Project activities.

6.5.3 Potential Environmental Effects

The Project is expected to interact with wetlands throughout each phase (i.e., construction, operation and maintenance, and decommissioning and reclamation). The primary possible effects to wetlands include direct loss of wetland area or function for those wetlands within the PDA that will be subject to Project activities such as site clearing, grubbing, and construction of infrastructure, access roads, and extraction of aggregate materials. In addition, indirect loss of wetland area or function of wetlands may occur on other wetlands located outside the PDA but within the LAA (e.g., wetlands on adjacent properties to the Project site) through changes in surface hydrology within the PDA as a result of the development of the Project site and the presence of the open pit. More specifically, the Project may interact with wetlands in the following ways:

- The construction and operation and maintenance phases of the Project will result in the alteration of approximately 5.4 ha of field-delineated wetlands within the PDA;
- The construction and operation and maintenance phases of the Project may result in the indirect loss of wetland area or function associated with wetlands on neighbouring properties to the PDA, specifically those wetlands located downstream from the wetlands and streams in the PDA;
- Construction activities (e.g., road and infrastructure development) that may occur within 30 m of wetlands have the potential to alter natural drainage patterns and increase erosion rates;
- A spill or fire could occur as an accident or unplanned event (refer to **Section7.0**) which could affect wetlands within the PDA and LAA; and
- Wetlands may interact with the Project during decommissioning and reclamation through re-establishment of wetland areas (potential for incorporation of wetlands restoration within the PDA).

6.5.4 Proposed Mitigation and Management Measures

Mitigation is identified for each interaction or effect in relation to wetlands in an attempt to prevent the interaction from occurring, if possible, or to reduce the severity, magnitude, geographic extent, frequency, or duration of the interaction. Best management practices (based on industry guidelines and regulatory guidance documents) have been identified as appropriate mitigation strategies. In addition, several acts, codes, regulations, and guidelines may require appropriate actions to be conducted as mitigation measures prior to or during the interaction. The following mitigation will be implemented as part of the Project:

- The area to be disturbed by the Project will be minimized to the extent possible (i.e., limited to the area which is required to accomplish the Project objectives);
- Surface water drainage will be designed to minimize changes in hydrological regimes within the LAA;
- An application for wetland alteration will be submitted to NSECC for approval to work within a wetland within the PDA;
- Proper erosion and sediment control (ESC) measures (i.e., check dams, silt fences, etc.) will be installed where appropriate and will be checked regularly and prior to and after storm events to confirm they are continuing to operate properly to minimize potential effects to adjacent wetlands and watercourses; and
- An Emergency Response Plan (ERP) will be developed for accidental spills, emergencies, incidents or storm events, and will be detailed in the Environmental Protection Plan (EPP), and the contractor will be required to provide spill response training to construction personnel.

6.5.5 Residual Environmental Effects

The Project will result in the direct loss of 2.43 ha of wetland within the PDA, to allow for the construction of the pit, stockpiles, settling pond, and other related surface activities. This is an unavoidable loss to accomplish the Project, which will occur during construction and persist through the life of the Project. There are no alterations proposed to wetlands of special significance (WSS) in the PDA. The Project has been developed to minimize the area of disturbance of the PDA to that which is required to meet the Project objectives, maintaining treed buffers around watercourses and wetlands to the extent possible, to minimize the net loss of wetland function.

Without mitigation, construction activities and some operation and maintenance activities could result in direct net loss of functions to existing and nearby wetlands. The implementation of the practice “avoid”, “minimize”, and/or “compensate” will be considered for potential impacts to the wetlands within the PDA and LAA. Applicable authorization (i.e., Wetland Alteration Application and associated compensation) will be secured with NSECC prior to undertaking construction activities within wetlands, will reduce the potential net loss of wetland function.

6.5.6 Summary

Based on the above, with planned mitigation, authorization (with compensation), and environmental protection measures, the residual environmental effects on the Project on wetlands during each phase of the Project are rated as not significant, with a moderate level of confidence. The implementation of water management features, water quality monitoring, groundwater level monitoring, wetland function monitoring, and other follow-up and monitoring measures to be implemented to monitor changes to wetland function arising from the Project, with adaptive management measures implemented as necessary to address those changes, will improve the confidence of this prediction.

6.6 Vegetation

6.6.1 Scope of VEC

Vegetation is included as a valued environmental component (VEC) due to the potential for interactions with rare plants and Project activities, particularly species at risk (SAR) and species of conservation concern (SOCC) as identified by the Atlantic Canada Conservation Data Centre (AC CDC; i.e., those species with AC CDC S-ranks of S1: Critically imperiled in province; S2: Imperiled in province; and S3: Vulnerable in province of Nova Scotia [AC CDC 2023b] and/or pursuant to the federal *Species at Risk Act* (SARA) and the Nova Scotia *Endangered Species Act* (NS ESA). Vegetation was selected as a VEC because of their relationship with wildlife and wildlife habitat, and other biological and physical components addressed as VECs in this environmental assessment registration document (EARD). Project activities have the potential to cause adverse environmental effects through the proposed physical destruction of terrestrial and aquatic vegetation.

The Project development area (PDA) was evaluated for presence of vegetation SAR and SOCC as well as the presence or absence of habitat used by those species. For this assessment, the following definitions apply:

- Species at risk (abbreviated SAR): SAR are those species that are listed as “Extirpated”, “Endangered”, “Threatened”, or “Special Concern” on Schedule 1 of the federal *Species at Risk Act* (SARA) or on the Nova Scotia *Endangered Species Act* Act (NS ESA); and
- Species of conservation concern (abbreviated SOCC): SOCC are those species that are not SAR but are listed in other parts of SARA, NS ESA, by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), or are regionally rare or endangered by the Atlantic Canada Conservation Data Centre (AC CDC) (i.e., those species with AC CDC S-ranks of “Critically Imperiled” [S1], Imperiled [S2], or Vulnerable [S3] in the province of Nova Scotia).

6.6.1.1 Temporal Boundaries

The temporal boundaries for the Project include the following:

- **Construction**: extending for a period of approximately 1 year, anticipated to begin in the fourth quarter of 2024 (subject to the receipt of all approvals and permits required for the Project);
- **Operation and Maintenance**: beginning in approximately the second quarter of 2025, and lasting for approximately 30 years or until the mineral resource has been depleted; and
- **Decommissioning and Reclamation**: to be initiated following the completion of operations at the site, with decommissioning and reclamation of the surface facilities at the site for an anticipated duration of six months following operation.

6.6.1.2 Spatial Boundaries

The PDA is defined as the area of physical disturbance associated with the Project. The PDA consists of an area of approximately 77 ha that includes the open pit and all related surface facilities represented by the physical Project footprint.

The LAA is the maximum anticipated area within which Project-related environmental interactions can be predicted and measured with a reasonable degree of accuracy and confidence. For vegetation, the LAA includes the PDA (i.e., area to result in loss of vegetation through clearing activities and site development) plus a buffer of 30 m.

6.6.1.3 Significance Threshold

A significant adverse residual environmental effect on vegetation is one where Project-related activities:

- Result in a non-permitted contravention of any of the prohibitions stated in Sections 32-36 of SARA; or
- Result in the unauthorized loss of a vegetation SAR that directly affects the sustainability of the population in Nova Scotia.

6.6.2 Description of Existing Environmental Conditions

The information regarding the presence and characterization of wetlands and the characterization of vegetation communities within the PDA and LAA was derived from several sources including existing databases and secondary information sources (i.e., desktop analysis) as well as field surveys. The methods conducted during the desktop analysis and field surveys are presented below in the following sections.

6.6.2.1 Regional Setting

As stated in **Section 6.4.2.1**, the PDA and LAA are located within the Valley and Central Lowlands ecoregion and, more specifically, within the Minas Lowlands ecodistrict. The Minas Lowlands Ecodistrict consists of lowland areas of the northern and southern shores of Cobequid Bay. The forests of this ecodistrict predominantly comprise softwood species, including the PDA which falls largely within the

Spruce Hemlock Pine Hummocks and Hills ecoelement. The landscape is further characterized as hummocky with well drained coarse-grained soils (NSDNR 2015).

6.6.2.2 Desktop Analysis

Prior to completing the field surveys, Dillon reviewed readily available information from reputable sources. The information was reviewed to evaluate the potential for vegetation SOCC and/or vegetation SAR within the general area of the Project and to assist in scoping/focussing efforts for the field surveys. Dillon completed a review of the following sources and data lists prior to completing the field surveys:

- A custom Atlantic Canada Conservation Data Centre (AC CDC) report (AC CDC 2023a);
- The federal species at risk (SAR) registry;
- The provincial species at risk registry;
- Publicly available Geographic Information Systems (GIS) map layers and databases;
- High resolution aerial photography;
- Nova Scotia Provincial Landscape Viewer; and
- Ecological Landscape Analysis Reports from NSNDR.

A custom AC CDC report was obtained for a 5 km radius around the PDA. The report includes lists of historical observations of species of flora, including SAR and SOCC. Based on the review of the AC CDC report (AC CDC 2023a), there were four records of three vascular SOCC and one record of one nonvascular SAR historically observed within a 5 km radius of the PDA (**Table 6.10** and the AC CDC Report in **Appendix D**), though they were not located within the PDA.

Table 6.10: Vegetation SAR and SOCC within 5 km from the Site Centre (AC CDC 2023a)

Common Name	Scientific Name	Ranking	Number of Observations	Distance from Site Centre
Plants (Vascular)				
Mountain Firmoss	*Huperzia appressa*	S3S4	18	2.6 ± 7.0
Pale-Spiked Lobelia	*Lobelia spicata*	S1	13	2.6 ± 7.0
Woods-Rush	*Juncus subcaudatus*	S3S4	25	0.5 ± 5.0
Plants (Non-Vascular)				
Blue Felt Lichen	***Pectenia plumbea***	**SARA: SC NS ESA: V COSEWIC: SC AC CDC: S3**	**184**	**2.3 ± 5.0**

Notes:
Rows in **bold** represent an SAR, others are SOCC
From AC CDC 2023b: S-rank refers to the Sub-national (Provincial) rank provided by the AC CDC and includes the following: S1 Critically Imperiled, S2 Imperiled, S3 Vulnerable, S4 Apparently Secure, S5 Secure and SU Unrankable. Rankings are frequently paired with the following breeding status qualifiers: B Breeding, N Non-breeding, and M Migrant
Conservation Status Categories: E Endangered, T Threatened, V Vulnerable, SC Special Concern

According to the Ecological Landscape Analysis for the Minas Lowlands Ecodistrict (NSDNR 2015), two species at risk were documented for the Minas Lowlands Ecodistrict as follows:

- Black ash (*Fraxinus nigra*), a SAR, is currently under consideration for SARA schedule 1 and were identified within the LAA during the field surveys conducted in August 2023 and COSEWIC. This species is ranked by the AC CDC as S1S2 (Imperilled to Critically Imperilled within the province of Nova Scotia); and
- Eastern white cedar (*Thuja occidentalis*), an SAR, is currently listed under the NS ESA as Vulnerable and ranked by the AC CDC as S2S3 (Imperilled within the province of Nova Scotia).

6.6.2.3 Vegetation Communities

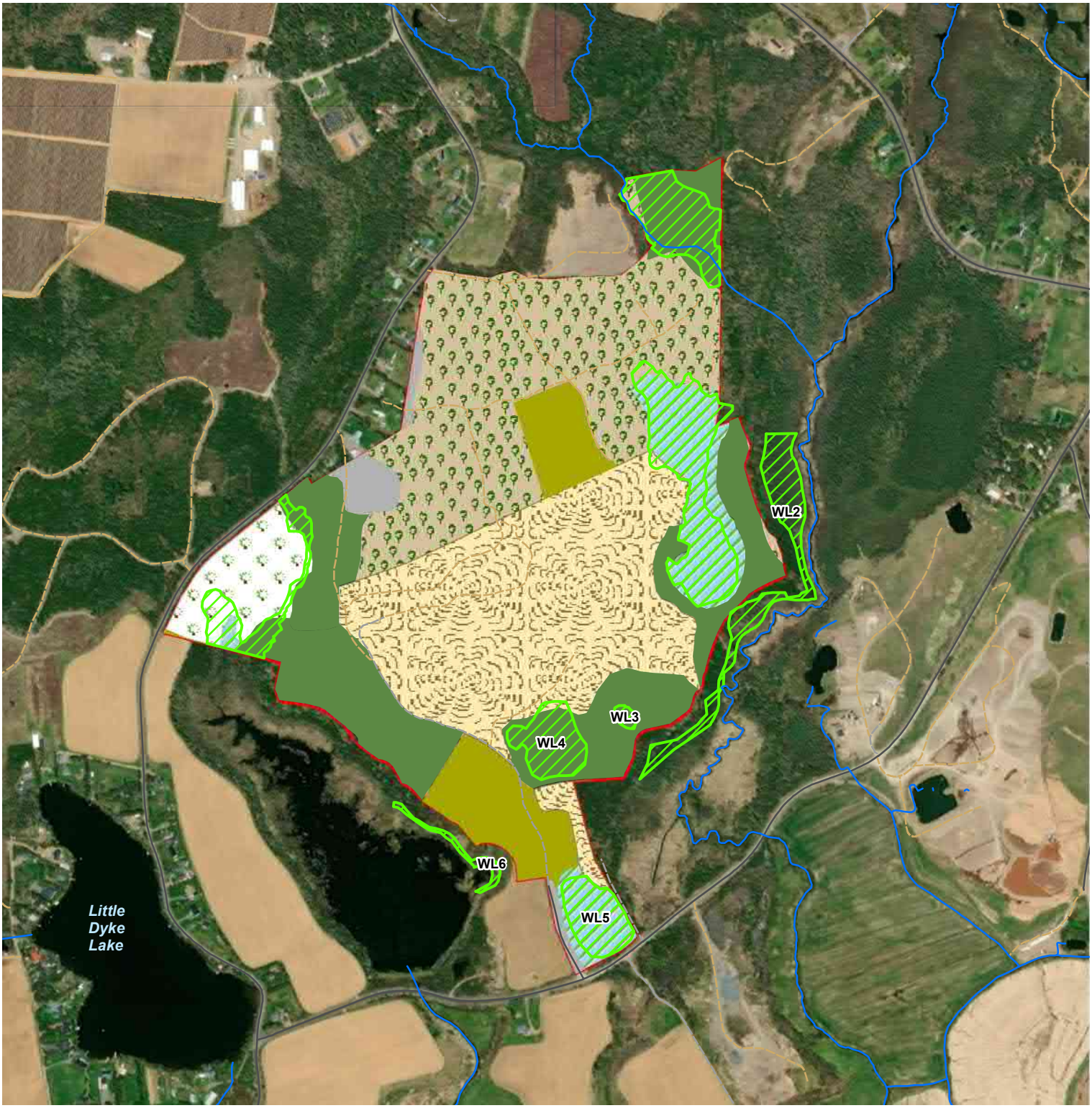
Characterization of vegetation communities were inventoried by a Dillon biologist skilled in the identification of common and rare plant species in Nova Scotia. The vascular plant inventory for the PDA was completed during site visits between August 1 and 3, 2023 (**Figure 6.8**). Additionally, a characterization of land cover was derived from the field inventories and then further refined during the compilation of plant species lists. Refer to the master plant species lists for the site provided in **Appendix E**.

The majority of the PDA (i.e., 67%) is covered by forests, including land that was cut over for logging purposes. Much of the remaining forest cover is mostly associated with wetland areas and stream buffers to the southern portions of the PDA. Roughly 23 ha (28%) of the PDA is made up of land currently used for the existing Pit No. 4 operations. The remaining land within the PDA is an agriculture field for row crops. Due to the nature and land use of the area, much of the land surrounding the PDA is residential, resource or agricultural in nature.

Although no plant SAR were identified within the LAA during the field surveys conducted in August 2023, the following plant SOCC were identified within the LAA in August 2023:

- Lesser brown sedge (*Carex adusta*), an SOCC, is considered by the AC CDC as S2S3 (Imperilled within the province of Nova Scotia); and
- Houghton's sedge (*Carex houghtoniana*), an SOCC, is considered by the AC CDC as S2S3 (Imperilled within the province of Nova Scotia).

Although there were no historical observations of SAR or SOCC identified within the PDA during the AC CDC records review, black ash (Fraxinus nigra) was encountered in the field within WC7 in a location adjacent and outside of the PDA. Black ash, an SAR, is listed as Threatened under both NS ESA and COSEWIC and is under consideration for addition to Schedule 1 of SARA. They are ranked as Vulnerable to Apparently Secure (S3S4) by the AC CDC. No alterations of WL7 are proposed as part of the Project.



OSCO AGGREGATES LIMITED

PIT NO. 4 EXTENSION

Watercourse

Project Development Area (Pit No. 4 Extension)

LandCover/Habitat Type

Forest Plantation

Past Cut Over/Regernerated Forest

Wetland (Forest Inventory)

Agricultural

Built Area/Developed

Aggregate Pit Area

Softwood Dominant Stand

Field Delineated Wetlands

TERRESTRIAL HABITATS AND VEGETATION

FIGURE 6.8

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY ESRI, GeoNova, NSDNRR

MAP CREATED BY: SCM
MAP CHECKED BY: JTO
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

N W E S

SCALE 1:10,000

0 85 170 m

PROJECT: 23-6113
STATUS: FINAL
DATE: 2024-03-08

FILE LOCATION: K:\2023\236113\Product\Client\EA\SubmissionFigures\Final Figures\F6_8_TerrestrialHabitatsandVegetation.mxd

Exotic Species

Approximately 5 percent of the plant species observed within the PDA from surveys conducted in 2016/2017 and in 2023 are not native to the province of Nova Scotia. Exotic plants identified (Hill and Blaney 2010) as potentially problematic invasive species were not observed. Most of the exotic plants identified are considered to be common and widespread throughout Nova Scotia, and none of the species identified are considered by the Nova Scotia Invasive Species Council to be invasive in the province.

6.6.3 Potential Environmental Effects

The Project is expected to interact with vegetation throughout each phase (i.e., construction, operation and maintenance, and decommissioning and reclamation). The primary possible effects to vegetation include the direct loss of vegetation communities through clearing and grubbing. More specifically, the Project may interact with vegetation in the following ways:

- Construction of the Project will result in the direct loss of vegetation communities in the PDA through clearing and grubbing;
- A spill or fire could occur as an accident, malfunction, or unplanned event (refer to **Section 8.0**) which could affect vegetation within the PDA and LAA; and
- Vegetation may interact with the Project during decommissioning and reclamation through re-establishment of vegetation communities and wetland areas (i.e., potential for incorporation of wetlands restoration within the PDA).

6.6.4 Proposed Mitigation and Management Measures

Mitigation is identified for each interaction or effect in relation to vegetation in an attempt to prevent the interaction from occurring, if possible, or to reduce the severity, magnitude, geographic extent, frequency, or duration of the interaction. Best management practices (based on industry guidelines and regulatory guidance documents) have been identified as appropriate mitigation strategies. In addition, several acts, codes, regulations, and guidelines may require appropriate actions to be conducted as mitigation measures prior to or during the interaction. The following mitigation will be implemented as part of the Project:

- The area to be disturbed by the Project will be minimized to the extent possible (i.e., limited to the area which is required to accomplish the Project objectives);
- Efforts will be made to maintain as much mature vegetation along the edges of the site; and
- An Emergency Response Plan (ERP) will be developed for accidental spills, emergencies, incidents or storm events, and will be detailed in the Environmental Protection Plan (EPP), and the contractor will be required to provide spill response training to construction personnel.

6.6.5 Residual Environmental Effects

Though much of the site has already been cleared for logging purposes or contains existing disturbance, the Project will result in the loss of immature vegetation within the PDA so that the Project facilities can be developed. There are known occurrences of SOCC on-site: lesser brown sedge (*Carex adusta*) and Houghton's sedge (*Carex houghtoniana*). Black ash was identified within wetland WL7; however, no alterations are proposed for WL7 as part of the Project. Residual effects to vegetation SAR are not anticipated as part of the Project.

6.6.6 Summary

Based on the above, with planned mitigation, authorization (with compensation), and environmental protection measures, the residual environmental effects on the Project on vegetation during each phase of the Project are rated not significant, with a high level of confidence. No follow-up or monitoring is proposed.

6.7 Wildlife and Wildlife Habitat

6.7.1 Scope of VEC

Wildlife and wildlife habitat includes wildlife (fauna) and the habitats that support wildlife species. This VEC is focused on birds, mammals, herptiles and invertebrates within terrestrial components of their lifecycle, as well as the habitats that support them. Wildlife and wildlife habitat is selected as a valued environmental component (VEC) because of potential interactions between wildlife, its habitat, and proposed Project activities. Species of conservation interest (i.e., species at risk [SAR] and species of conservation concern [SOCC]) as identified by provincial and federal regulatory agencies, are of particular focus in this assessment because they are often susceptible to changes in the environment and are therefore useful indicators of ecosystem health and regional biodiversity.

Both provincial and federal legislation provides protection to designated bird, mammal, herptile, and other species at risk. Most bird species, specifically, are protected under the *Migratory Birds Convention Act* (MBCA). The wildlife and wildlife habitat VEC has connections to the wetlands and vegetation VECs (**Section 6.5** and **6.6**, respectively) because of its relationship with vegetation, hydrology, landforms, and soil components.

The PDA was evaluated for presence of SAR and SOCC as well as the presence or absence of habitat used by those species. For this assessment, the following definitions apply:

- Species at risk (abbreviated SAR): SAR are those species that are listed as “Extirpated”, “Endangered”, “Threatened”, or “Special Concern” on Schedule 1 of the federal *Species at Risk Act* (SARA) or on the Nova Scotia *Endangered Species Act* (NS ESA); and

- Species of conservation concern (abbreviated SOCC): SOCC are those species that are not SAR but are listed in other parts of SARA, NS ESA, by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), or are regionally rare or endangered by the Atlantic Canada Conservation Data Centre (AC CDC) (i.e., those species with AC CDC S-ranks of "Critically Imperiled" [S1], Imperiled [S2], or Vulnerable [S3] in the province of Nova Scotia).

Dillon reviewed available information (AC CDC report and geographic information system [GIS] databases, etc.) to define known habitats and potential for rare species within the PDA. Using our wet-areas model (WAM), a site-specific map was developed to identify potential watercourse and wetland crossings that may not be mapped in provincial wetland and watercourse datasets. The following sources were reviewed:

- A site-specific Atlantic Canada Conservation Data Centre report (AC CDC 2023a) which included a request for potential species at risk;
- Reports from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC);
- Department of Fisheries and Oceans (DFO) Species at Risk Mapping;
- Google Earth satellite imagery;
- The Nova Scotia Wetlands Inventory (NSDNRR 2023b); and
- Publicly available geographic information systems (GIS) map layers.

High-resolution Google Earth imagery was available for the site from May 2020, September 2018, June and August 2017, August 2013, and April 2007. The imagery was primarily reviewed for recent changes in land use (e.g., logging) and to identify landscape level features (e.g., topography and changes in vegetation regime) which could indicate a wetland.

Other available background information sources and mapping reviewed to identify and assess wildlife and wildlife habitat presence at the Project location included:

- Ecological Reserves in the Maritimes;
- Environmentally Sensitive Areas database;
- Atlas of Breeding Birds of the Maritime Provinces;
- Important Bird Areas of Canada;
- Federally designated Migratory Bird Sanctuaries;
- Provincially identified deer wintering areas; and
- Identified Protected Wilderness Areas, and Nature Reserves.

Incidental observations conducted during wetland and vegetation survey efforts were used to collect information on the presence of wildlife within the LAA, with an emphasis on SAR/SOCC.

6.7.1.1 Temporal Boundaries

The temporal boundaries for the Project include the following:

- **Construction**: extending for a period of approximately 1 year, anticipated to begin in the fourth quarter of 2024 (subject to the receipt of all approvals and permits required for the Project);
- **Operation and Maintenance:** beginning in approximately the second quarter of 2025, and lasting for approximately 30 years or until the mineral resource has been depleted; and
- **Decommissioning and Reclamation:** to be initiated following the completion of operations at the site, with decommissioning and reclamation of the surface facilities at the site for an anticipated duration of six months following operation.

6.7.1.2 Spatial Boundaries

The PDA is defined as the area of physical disturbance associated with the Project. The PDA consists of an area of approximately 77 ha that includes the open pit and all related surface facilities represented by the physical Project footprint.

The LAA is the maximum anticipated area within which Project-related environmental interactions can be predicted and measured with a reasonable degree of accuracy and confidence. For wildlife and wildlife habitat, the LAA includes the PDA and areas within approximately 300 m beyond the PDA where Project-related environmental effects could be expected to occur. Beyond this radius, based on experience with similar facilities and professional judgment, emissions of air contaminants and noise from the Project (which are thought to affect wildlife through avoidance and sensory disturbance) would not likely be distinguishable from background levels.

6.7.1.3 Significance Threshold

A significant adverse residual environmental effect on wildlife and wildlife habitat is one:

- That results in a non-permitted contravention of any of the prohibitions stated in Sections 32-36 of SARA; or
- Where the population of a species is sufficiently affected to cause a decline in abundance and/or change in distribution, beyond which natural recruitment (i.e., reproduction and immigration from unaffected areas) would not return the population to its former level within several generations.

6.7.2 Description of Existing Environmental Conditions

Information regarding the use of the LAA by wildlife and presence of wildlife habitat was derived from several sources including existing databases and secondary information sources, as well as bird surveys and incidental recordings of wildlife species evidence, recorded during bird, wetland, aquatic, and vegetation surveys.

6.7.2.1 Birds

Many bird species in Nova Scotia are migratory and either breed in the province during the summer months or pass through it during the spring and fall migratory periods. Jurisdiction for many migratory birds is federal, since migratory birds cross both provincial and international boundaries. The MBCA is the federal law which protects migratory birds in both Canada and the United States. The Act prohibits killing, injuring or harassing migratory birds, their nests, or their young. Furthermore, species listed pursuant the federal SARA or NS ESA are afforded further protection as harm, the destruction of their nest, eggs, or young is prohibited. Migratory birds that are protected under the MBCA in Canada, and that are relevant to the Project, include:

- Waterfowl (e.g., ducks and geese);
- Rails (e.g., coots, gallinules, sora, and other rails);
- Shorebirds (e.g., plovers and sandpipers); and
- Songbirds (e.g., thrushes and warblers).

Birds not addressed under federal jurisdiction include grouse, quail, pheasants, ptarmigan, hawks, owls, eagles, falcons, cormorants, pelicans, crows, jays, and kingfishers. Most birds not included in this list are protected under provincial laws, most notably the Nova Scotia *Wildlife Act.* The *Wildlife Act* provides the regulatory framework for the harvest, use and protection of wildlife species in Nova Scotia.

Maritime Breeding Bird Atlas

The Maritime Breeding Bird Atlas (MBBA) database (Stewart et al. 2015) provides information on the presence of breeding bird species in counts conducted between 2006 and 2010. Within the MBBA Second Atlas, the PDA lies within Region #21 (Cobequid), within Square #20MR52 (Glenholme). During the MBBA period of 2006-2010, a total of 96 species of birds were recorded within Square #20MR52. Of these species, 56 were confirmed as breeding, 24 were probable breeders, and 16 were possible breeders. There were 6 SAR, 16 SOCC, and 4 exotic species detected during the most recent MBBA period in this square. The species at risk included: Bank Swallow (*Riparia riparia*), Barn Swallow (Hirundico rustica), Bobolink (*Dolichonyx oryzivorus*), Canada Warbler (*Cardellina canadensis*), Common Nighthawk (*Chordeiles minor*), and Olive-sided Flycatcher (*Contopus cooperi*) (Stewart et al. 2015).

Important Bird Areas

The closest Important Bird Area (IBA) to the PDA is the Cobequid Bay IBA in the Bay of Fundy (NS019) (Birds Canada 2023), which is approximately 1 km south of the PDA. The habitat in this area consists of salt marshes/brackish marshes, tidal rivers/estuaries, mud or sand flats (saline), inlets/coastal features (marine), arable and cultivated lands (Birds Canada 2023). With the high tides in the Bay of Fundy, it creates a large, open area for shorebirds to forage for invertebrates, in particular the Fundy mud shrimp (*Corophium volutator*). These areas are particularly important for shorebirds, including: Semipalmated Plovers (*Charadrius semipalmatus*), Purple Sandpiper (*Calidris maritima*), and Savannah Sparrow (*Passerculus sandwichensis*) during their fall migration, and significant numbers of Semipalmated Sandpipers (*Calidris pusilla*). Other species that use these areas for an important stopover during migration include Sanderlings (*Calidris alba*), Short-billed Dowitchers (*Limnodromus griseus*), Least Sandpipers (*Calidris minutilla*), Dunlins (*Calidris alpina*), White-rumped Sandpipers (Calidris fuscicollis), and Red Knots (Calidris canutus rufa), which are listed as Endangered pursuant to SARA, NS ESA, and COSEWIC (Birds Canada 2023).

AC CDC Species at Risk Database Review

A review of the AC CDC data as compiled in a site-specific report (AC CDC 2023a) indicated that there were 191 records of 40 vertebrate SAR or SOCC historically observed within 5 km of the PDA. Of these species, 37 are bird species. Of these bird species, nine are considered SAR, and the remainder are considered SOCC.

Ecological Landscape Analysis for the Minas Lowlands Ecodistrict (NSDNR 2015)

Although not observed by OSCO personnel in the area and unlikely to occur in the PDA and not listed by the AC CDC as reported with 5km, according to the Ecological Landscape Analysis for the Minas Lowlands Ecodistrict (NSDNR 2015), Piping Plovers (*Charadrius melodus melodus*) have been documented for the Minas Lowlands Ecodistrict. The habitat requirements and potential to occur within the PDA for piping plovers, as well as other bird SAR reported for the Minas Lowlands Ecodistrict (NSDNR 2015), is discussed in **Table 6.11**, below.

The SAR identified by the AC CDC as having been historically observed within 5 km of the Project site of within the region by the MBBA (Stewart 2015) and the nearest IBA (Birds Canada, 2023), as well as their habitat requirements and potential to occur within the PDA, are discussed in **Table 6.11**, below. Additionally, bird SAR reported during the Glenholme Pit No. 4 field surveys in 2016-2017 are considered in **Table 6.11**.

Table 6.11: Bird SAR Screening within the LAA

Species	Ranking	Habitat	Potential to Occur in PDA
Bank Swallow (*Riparia riparia*)[1,2,4]	SARA: T NS ESA: E COSEWIC: T AC CDC: S2B	Bank Swallow nests in colonies within Burrows in vertical or near-vertical faces (ECCC 2022). Nesting colonies are generally located along vertical faces of river bluffs, lakeshores, coastlines, aggregate pits, road-cuts, retaining walls and within piles of sand, gravel, or sawdust (COSEWIC 2022). Feeds primarily on flying insects (ECCC 2022).	Observed near the DUC Pond in 2016 (Dillon 2017). Suitable nesting habitat with the vertical faces of the aggregate pit.
Barn Swallow (*Hirundo rustica*)[1,2]	SARA: T NS ESA: E COSEWIC: SC AC CDC: S3B	Typically inhabit open areas near human settlements and land uses including parks, ball fields, golf courses and agricultural fields where they forage for flying insects. These birds will typically construct their nests on human-made structures, and rarely in more natural locations such as cliffs, caves, or hollowed trees (COSEWIC 2021). Feeds primarily on flying insects and may occasionally take insects from the ground or on vegetation (NatureServe Explorer 2023).	Suitable nesting habitat is not present within the PDA. Suitable habitat is adjacent to the PDA and the species could potentially forage on the PDA.
Bobolink (*Dolichonyx oryzivorus*)[1,2]	SARA: T NS ESA: V COSEWIC: SC AC CDC: S3B	Nest in lush meadows, open grassland and hayfields (Cosewic 2022). Bobolink is an obligate grassland specialist and a consumer of agricultural insects (COSEWIC 2022).	Unlikely to be present within the PDA. The agricultural field within the PDA for row crops may provide habitat for bobolink.
Canada Warbler (*Cardellina canadensis*)[1,2]	SARA: T NS ESA: E COSEWIC: SC AC CDC: S3B	Preferred breeding habitat includes wet, mixed deciduous-coniferous forests with a well-developed shrub layer but will breed in stands regenerating after natural and anthropogenic disturbances (COSEWIC 2020).	Potential to nest within cleared and forested areas of the PDA.
Common Nighthawk (*Chordeiles minor*)[1,2,4]	SARA: SC NS ESA: T COSEWIC: SC AC CDC: S3B	Common Nighthawk may nest in open gravel areas including anthropogenic clearings (COSEWIC 2007) in late June to early August. The recovery strategy (ECCC 2016) identifies potential threats to the population including factors affecting insect prey and natural succession reducing open habitats. Critical habitat has not been identified to date.	Potential to nest within cleared areas of the PDA.
Eastern Wood-Pewee (*Contopus virens*)[1]	SARA: SC NS ESA: V COSEWIC: SC AC CDC: S3S4B	Eastern Wood-pewee lives in most forest types across its range and nests in a wide variety of deciduous tree species (ECCC 2023).	Potential to nest within mature forested areas of the PDA.
Olive-sided Flycatcher (*Contopus cooperi*)[1,2]	SARA: T NS ESA: T COSEWIC: SC AC CDC: S3B	Nests in open, forested areas, often with many conspicuous perches (i.e., tall trees or snags alongside open areas) (ECCC 2016). Diet is comprised almost entirely of flying insects (NatureServe Explorer 2023).	Potential to nest within forested areas of the PDA.
Piping Plover (*Charadrius*	SARA: E NS ESA: E	Piping plovers prefer beaches in marine coastal areas for most life processes (ECCC 2022). The Piping Plover	Suitable habitat for piping plovers is not

Species	Ranking	Habitat	Potential to Occur in PDA
melodus melodus)[4]	COSEWIC: E AC CDC: S1	nests on wide sand, gravel, or cobble beaches, barrier island sandspits, or peninsulas in marine coastal areas (EC 2012).	present within the PDA and the PDA is located over 1 km from important bird habitats in Cobequid Bay.
Red Knot rufa subspecies (*Calidris canutus rufa*)[1,3]	SARA: E NS ESA: E COSEWIC: E AC CDC: S2M	Nest in the Arctic in barren habitats. Migratory stopovers and wintering grounds include tidal coastal zones, usually sandflats but sometimes mudflats (ECCC 2017).	Suitable habitat does not present within the PDA.
Red-necked Phalarope (*Phalaropus lobatus*)[1]	SARA: SC NS ESA: SC AC CDC: S2S3M	Nest in Arctic and Sub-Arctic coastal areas. While migrating and during the winter months, Red-necked Phalaropes concentrate at sea (ECCC 2023).	Suitable habitat does not present within the PDA.

Notes:
From ACCDC 2023b: S-rank refers to the Sub-national (Provincial) rank provided by the AC CDC and includes the following: S1 Critically Imperiled, S2 Imperiled, S3 Vulnerable, S4 Apparently Secure, S5 Secure and SU Unrankable. Rankings are frequently paired with the following breeding status qualifiers: B Breeding, N Non-breeding, and M Migrant
Conservation Status Categories: E Endangered, T Threatened, V Vulnerable, SC Special Concern
1. reported by AC CDC (2023a)
2. reported by Stewart et al (2015) between 2006 and 2010 within Square #20MR52 (Glenholme).
3. reported in the Cobequid Bay IBA in the Bay of Fundy (NS019) (Birds Canada 2023).
4. reported near on or the PDA in 2017 (Dillon 2017).

Field Surveys

Bird surveys were performed on-site by experienced bird specialists skilled at identifying birds by song, call, and sight. The six-point count surveys and one nocturnal survey were conducted on May 9 and August 3, 2023. Point count locations were chosen systematically within the LAA to cover the PDA as well as to be representative of the different habitat types on-site. The total number of individuals detected (i.e., heard or seen) during the ten-minute observation period were recorded at each point, along with the time of day, weather conditions, and approximate distance to the bird. Detailed methods and results of the bird surveys are included in **Appendix E** and summarized herein.

During the 2023 bird surveys, a total of 758 individual birds of 40 different species were recorded throughout the PDA/LAA. Refer to **Appendix E** for detailed observation data tables.

Resident and migrant bird species were observed during the point count surveys conducted between May 9 and 30, 2023. These surveys coincide with the spring migration, typically April 15 – May 31 according to the Second MBBA (Stewart et al. 2015). The most frequently observed birds were the White-throated Sparrow (*Zonotrichia albicollis*), Blue Jay (*Cyanocitta cristata*), and American Crow (*Corvus brachyrhynchos*). During the spring migration point counts, two SOCC were detected (i.e., American Robin [*Turdus migratorius*] and Purple Finch [*Haemorhous purpureus*], both of which have non-breeding populations in Nova Scotia that are considered vulnerable by the AC CDC) as well as one

SAR (i.e., Canada Warbler). The Canada Warbler (*Cardellina canadensis*) is listed as Threatened under Schedule 1 of SARA (Environment Canada 2016), as Special Concern under the COSEWIC (2020), as Endangered under the NS ESA (NSDNRR 2021), and its AC CDC conservation rank is listed as S3B in Nova Scotia, indicating that its breeding population in the province is Vulnerable. Canada Warblers are found breeding in Nova Scotia in forests with dense and complex understories (i.e., extensive hummocks, dense shrubs, abundant cinnamon fern, etc.) and are often associated with wetlands containing these features (Environment Canada 2016). A Canada Warbler was observed singing in wetland WL7 from Point Count Location #1 on May 20, 2023. WL7 is a mixedwood treed swamp with abundant speckled alder (*Alnus incana*) shrubs, cinnamon fern (*Osmundastrum cinnamomeum*), abundant woody debris, and hummocks which make for suitable breeding habitat for the species.

Surveys targeting the summer breeding window, which is between June 1 and July 31 (Stewart et al. 2015) were conducted on June 22 and August 3, 2023. Similar, the most common species observed was White-throated Sparrow. American Robins, which have non-breeding populations in Nova Scotia that are considered vulnerable by the AC CDC, were observed. No other SOCC or SAR birds were observed during the breeding season point count surveys.

A targeted Breeding Nightjar Survey was conducted on July 5, 2023, with special consideration given to completing this survey within seven days of the June full moon phase when nighthawks are most active and readily detectable. The peak full moon phase occurred on the night of July 3, 2023. No Common Nighthawks (*Chordeiles minor*) or Eastern Whip-poor-wills (*Antrostomus vociferus*) were observed or heard during the survey, which was conducted approximately 30 minutes before sunset until 60 or 90 minutes after sunset.

Diurnal birds, particularly raptor species, were recorded as they were observed incidentally during surveys for other VECs as part of the biophysical surveys for the Project. During the 2023 surveys, the only raptor species recorded was a Bald Eagle (*Haliaeetus leucocephalus*) observed soaring above the property at Point Count Locations #1 and #7 during the spring migration surveys.

6.7.2.2 Mammals

NNDNRR's General Status of Wild Species (NSDNRR 2023b) reports that there are 50 species of mammals known to occur within Nova Scotia. A review of the AC CDC database (AC CDC 2023a) indicated that there are no records of federally or provincially protected mammals, and that no hibernaculum has been reported to have been historically observed within 5 km of the PDA. No mammal SAR or SOCC species or evidence of their presence were observed during 2023 field visits.

The wildlife mammal species observed have apparently secure and secure populations (i.e., ranked as S4 or S5) within Nova Scotia according to the AC CDC (2023b). Several mammal species have been observed within the region and indirect observations including scat from a coyote, white-tailed deer, and a small mammal burrow were reported during the 2023 terrestrial field surveys.

AC CDC Species at Risk Database Review

A review of the AC CDC database (AC CDC 2023a) indicated that there are no records of federally or provincially protected mammals, and that no hibernaculum has been reported to have been historically observed within 5 km of the PDA. The PDA does not provide suitable deer wintering habitat due to the limited amount of canopy cover throughout most of the property.

Mainland moose (*Alces alces americana*) are known for the Cobequid Highlands, and the PDA falls within a mainland moose concentration area and within the core habitat for the Cumberland/Colchester mainland moose population (NSDNRR 2021a). Mainland Moose are listed by NS ESA as Endangered and are ranked by the AC CDC as S1 (Critically Imperilled within the province of Nova Scotia). Although these animals are wide-ranging, the potential for moose to be present within the PDA is low. Existing anthropogenic activities within and surrounding the PDA such as public roads, Highway 2, the existing Pit No. 4, and agricultural fields are likely contributing factors that reduce the likelihood of moose occupation within the LAA. Moose have, however, been observed in the region, which is connected to and is present within their core habitat (NSDNRR 2021a); therefore, it is possible for moose to travel through the LAA.

Field Surveys

Incidental observations of mammals recorded during field surveys include white-tailed deer (*Odocoileus virginianus*), red squirrel (*Tamiasciurus hudsonicus)*, and eastern coyote (*Canis latrans*) (scat).

6.7.2.3 Herptiles

NSNRR's General Status of Wild Species database (NBDNRED 2022) reports that there are 9 reptile and 13 amphibian species known to occur in Nova Scotia. A review of the AC CDC database (AC CDC 2023a) indicated that there are no records of federally or provincially protected herptiles historically observed within 5 km of the PDA. Although a couple SAR and SOCC reptiles are known to occur within the region the PDA occupies (i.e., snapping turtle, wood turtle), no turtle species or evidence of turtle presence was observed during 2023 field visits, and the habitat within the PDA is not suitable for wood turtles. A Maritime garter snake (*Thomnophis sirtalis pallidulus*) was the only herptile species observed during the field surveys.

6.7.2.4 Environmentally Sensitive Areas

A terrestrial wildlife assessment was conducted by Dillon for the Project and the following managed or protected habitats have been identified within 5 km of the PDA. Habitats identified by the Nova Scotia Department of Natural Resources (NSDNR) near the LAA as significant include:

- Core habitat for the mainland moose includes much of the Cobequid Highlands from east of Truro to the Nova Scotia/New Brunswick border. The Nova Scotia *Endangered Species Act*

Recovery Plan (NSDNR 2021) does not identify this area, including the Project area, as part of core moose habitat. Additionally, the LAA is not expected to provide key habitat for moose given the existing anthropogenic activity in the area and that moose observations have not been reported for the existing Glenholme facility.

- Cobequid Bay Important Bird Area (IBA) – an IBA is located within approximately 1 km of the coast, which includes the southern tip of the LAA. This IBA is identified as important due to the vast areas of coastal mud and sand flats and salt marshes that provide food supply for migrating shorebirds. A diversity of shorebirds use the IBA as a fall migration staging area, but the largest numbers are of Semipalmated Sandpipers. The peak staging time is in July and early August. Some shorebirds, primarily Black-bellied Plovers also stage in the IBA for spring migrations. These shorebirds are not anticipated to use the PDA.
- Lower Debert Protected Beach Significant Ecological Area (Site) (SES) as well as Lower Debert SES and Little Dyke SES are considered to be a Significant Ecological Area sites by NSDNRR for migratory birds. There areas are located over 1 km south of the PDA, along the shoreline of Cobequid Bay.
- Other significant habitat – the eastern third of the LAA is identified by NSDNRR as other habitat due to various records of Bald Eagle nests from 1993 to 2009 (pers. Comm., NSDNR GIS Analyst, 2016). Two nests were identified just north of the property (AMEC 2007), and one was evident within the LAA at the time of October 2016 field surveys. However, it is unknown if any of these nests are still active.
- Wetlands – several wetlands are identified in the NSDNR database within the riparian area of McCurdy Creek and associated with the DUC pond. Wetlands are further discussed in **Section 6.5**.

6.7.3 Potential Environmental Effects

As part of the desktop assessment, the habitat requirements of wildlife species identified as potentially occurring within and/or near the PDA were compared to the range of environmental conditions within the PDA to determine if suitable habitat was present for these taxa. Knowledge of the habitats present within the Project area was determined through an interpretation of aerial photography, topographic and geological mapping, as well as information obtained through field surveys (**Appendix E**). In instances where appropriate habitat was present for a particular species, that taxon was potentially present in the Project area, mitigation identified, and potential impacts assessed.

Several activities (i.e., vegetation clearing, grubbing, materials processing) related to the Project have the potential to interact with wildlife and wildlife habitat. Potential effects on wildlife include direct mortality, habitat loss, and fragmentation. These potential effects are discussed in this section.

6.7.3.1 Birds

The primary possible effects to birds due to the proposed Project development include habitat loss and fragmentation, destruction of nests, direct mortality due to collision, and noise disturbance. The purpose of the desktop review and field surveys aimed to refine constraints mapping by identifying protected species, habitats, or features (such as a colony tree or raptor nest) to confirm effective mitigation during construction activities in order to be compliant with federal and provincial legislation. The Project may interact with birds and bird habitat in the following ways:

- Construction activities may alter or destroy migratory bird habitat;
- Activities may destroy or alter habitat for bird SAR or SOCC;
- Noise from Project activities may deter birds from migrating into and using the Project area;
- Vegetation clearing and grubbing activities may destroy bird nests and breeding habitat (including SAR/SOCC), and result in habitat fragmentation; and
- Noise from Project activities may result in the abandonment of nests or increased rates of predation and exposure of hatchlings and eggs during temporary abandonment.

In addition, the operation and maintenance of the Project may result in sensory disturbance to, and avoidance by, birds due to noise and human activity, and incidental bird collisions with vehicles travelling on the new roads.

6.7.3.2 Mammals

The Project may interact with wildlife (fauna) and their habitat in the following ways:

- Clearing and grubbing of vegetation (habitat) during construction will cause a change in vegetation (flora) quality and/or quantity (i.e., a disturbance to wildlife habitat);
- Although much of the PDA has already been cleared for logging purposes, the PDA will cause loss of immature (and limited mature) vegetation that provide habitat for wildlife;
- Disturbance from vehicles and construction equipment may cause wildlife avoidance or disruption of wildlife activity (such as breeding and/or feeding);
- Noise, dust, combustion fuel emissions, and vibration may cause a disturbance to wildlife species during the Project;
- Mobile equipment use during the construction or operation and maintenance activities may cause direct injury or death of wildlife, particularly to small wildlife such as rodents and shrews, through collisions or destruction of dens and food sources;
- Medium and large sized mammals are unlikely to suffer direct mortality from Project activities as they would flee the area in response to human presence and noise. However, such avoidance of

behaviour could result in changes to normal movements, migrations, and other life cycle processes; and

- Following vegetation clearing, there will be local habitat fragmentation while the pit is operational, making it difficult for mammals to move from one side of the pit to the other due to lack of cover and increased risk of predation.

In addition, the operation and maintenance of the Project may result in wildlife encounters, sensory disturbance to and avoidance by wildlife due to noise and human activity, and incidental wildlife collisions.

6.7.3.3 Herptiles

The Project may interact with herptiles and their habitat (if present) in the following ways:

- Following vegetation clearing, there will be local habitat fragmentation while the pit is operational, making it difficult for herptiles to move from one side of the pit to the other due to lack of cover and increased risk of predation; and
- Loss of foraging habitat may occur from wetland alterations, should they be used for such purposes.

6.7.4 Proposed Mitigation and Management Measures

The following mitigation measures are planned to reduce environmental effects on wildlife and wildlife habitat.

6.7.4.1 Migratory Birds

- Clearing and grubbing activities will be scheduled to the extent possible outside of the normal breeding bird and migratory bird season (April 8 to August 28 for nesting zone C3) so that eggs and flightless young are not inadvertently harassed or destroyed. At a minimum, if complete avoidance of these activities during the specified timeframe is not feasible, nest searches will be undertaken by a qualified biologist and avoidance setbacks will be established around active nests. Nest searches will only be completed following consultation with Environment and Climate Change Canada (ECCC);
- No one shall disturb, move or destroy migratory bird nests. If a nest is found within the PDA, an appropriate setback will be established around the nest in which human activities will be restricted until the young fledge and leave the area or until the nest naturally fails;
- Onsite materials storage that may attract ground-nesting birds will be examined for bird nests during the nesting season, and disturbance avoided if nests are present until after the nesting season;

- On-site workers will receive reference material that will help them identify species that could be attracted to habitats created by Project operations (e.g., Common Nighthawk and Bank Swallow). If workers encounter birds that they suspect may be nesting within the PDA, a biologist will be contacted to determine whether nesting is occurring and to locate the nest. Note: nests should not be flagged since this increases the probability of predation; and,
- If a SAR is encountered, contact will be made to a Species at Risk Biologist at NSDNRR.

6.7.4.2 Mammals

- Because of past forestry activities throughout the PDA, and the residential nature of the land use surrounding the PDA, it is unlikely that species particularly sensitive to human activities currently reside in the immediate Project area. No mitigation is proposed.

6.7.4.3 Herptiles

- There is not suitable habitat for herptile SAR in the PDA, and most suitable habitat is downstream of the Project (i.e., McCurdy Creek and the DUC pond). No mitigation is proposed.

6.7.5 Residual Environmental Effects

Although much of the PDA has already been cleared for logging purposes, development of the Project will result in vegetation clearing and the loss of some immature and mature vegetation in the PDA. Although the vegetation may provide habitat for wildlife species, the Project is located within an area recently clear cut for forestry purposes, and as such, the habitat offered by the vegetation to be cut is not likely preferred by most wildlife species. Further, there exists ample vegetation and forested land in proximity to the Project for wildlife species to use as higher value habitat than that affected by the Project. Due to the residential nature of the area, there are also not expected to be species sensitive to human activities inhabiting the PDA.

Project activities are likely to result in sensory disturbance to wildlife and thus wildlife is likely to avoid the areas where Project activities are to take place, thereby limiting the potential for wildlife encounters, injury, or mortality of wildlife species. Operation of the site access road and internal roads as well as other activities (e.g., crushing) will result in some noise and likely avoidance by wildlife. Given the relatively limited area of disturbance associated with the Project, and the environmental setting of the Project including being largely on previously disturbed land, substantive interactions between the Project and wildlife and wildlife habitat are not anticipated.

Although the vegetation (and wetlands) in the PDA may provide habitat for bird species, including SAR (e.g., Canada warbler), the Project is in a larger surrounding area with ample vegetation and forested land for bird species to use as higher value habitat than that affected by the Project.

Development of the Project is likely to result in sensory disturbance to birds and thus birds are likely to avoid the areas where construction or operation activities are to take place, thereby limiting the potential for injury or mortality of bird species. Operation of the additional access roads and pit related operations will result in some noise and likely avoidance by birds. Given the relatively limited area of disturbance associated with the Project, the environmental setting, past use of the Project footprint, and implementation of the mitigation measures outlined in **Section 6.7.4**, substantive interactions between the Project and birds and bird habitat are not anticipated.

Following the completion of the operation of the Project, the PDA will be reclaimed and restored to as near natural conditions as possible, thereby returning the Project site to a state where it can, over time, provide habitat for wildlife species.

6.7.6 Summary

Assuming application of the mitigation measures described above, including conducting vegetation clearing activities outside of the ECCC recommended timing window for the Project location to facilitate compliance with the MBCA, the residual environmental effects of the Project on wildlife and wildlife habitat during each phase of the Project are rated not significant, with a high level of confidence. Based on a consideration of existing conditions and likely residual effects of the Project, no monitoring programs are currently recommended for wildlife and wildlife habitat. No follow-up or monitoring is proposed.

6.8 Socioeconomic Environment

The potential environmental effects of the Project on the socioeconomic environment are assessed in this section.

6.8.1 Scope of VEC

The Project has the potential to interact with the socioeconomic environment, which includes land and resource use, employment, and the local economy. These potential interactions are of concern to regulatory agencies, non-governmental organizations, and the general public because they can have a direct influence on the everyday lives of those living and working in the vicinity of a project.

The main components of the socioeconomic environment are defined as follows.

- Land and resource use refers to current and future uses of public and private land and resources. It includes uses such as industrial, commercial, and residential use, property ownership (including potential nuisance effects), and the use of land and resources for recreational purposes.

- Employment and economy refer to the labour market and availability, employment, employment income, business income, and their aggregate influence on the local, regional and provincial economies.

The scope of this VEC includes potential interactions of the Project with residential, agricultural, forestry recreation, and transportation land uses; and the employment and economic conditions. The scope of the assessment is based on applicable regulations and policies, anticipated issues and concerns, existing knowledge of the area, and anticipated potential interactions.

6.8.1.1 Temporal Boundaries

The temporal boundaries for the Project include the following:

- **Construction**: extending for a period of approximately 1 year, anticipated to begin in the fourth quarter of 2024 (subject to the receipt of all approvals and permits required for the Project);
- **Operation and Maintenance**: beginning in approximately the second quarter of 2025, and lasting for approximately 30 years or until the mineral resource has been depleted; and
- **Decommissioning and Reclamation**: to be initiated following the completion of operations at the site, with decommissioning and reclamation of the surface facilities at the site for an anticipated duration of six months following operation.

6.8.1.2 Spatial Boundaries

The PDA is defined as the area of physical disturbance associated with the Project. The PDA consists of an area of approximately 77 ha that includes the open pit and all related surface facilities represented by the physical Project footprint.

The LAA is the maximum anticipated area within which Project-related environmental interactions can be predicted and measured with a reasonable degree of accuracy and confidence. For the socioeconomic environment, the LAA includes the local communities of Glenholme, Little Dyke, and Lower Debert. The LAA includes the PDA and any adjacent areas along the preferred transportation route where Project-related environmental effects could be expected to occur.

6.8.1.3 Significance Threshold

Significance thresholds are defined for a change in land and resource use and a change in employment and economy, as follows.

A significant adverse residual environmental effect of the Project on land and resource use is one where the Project directly results in an uncompensated loss of land-based resource value or permanent change in regional access (current) or future opportunities to develop land-based resources.

A significant adverse residual environmental effect of the Project on employment and the local economy is one that results in a Project-related sustained long-term decreased level in employment and economic activity in the community, region, or province. A significant positive residual environmental effect of the Project on employment and the local economy is one that results in a Project-related sustained increased level of employment and economic activity in the community, region, or province.

6.8.2 Description of Existing Conditions

Existing socioeconomic conditions in the LAA are described in this section.

6.8.2.1 Population and Economy

The location of the Project is considered part of Colchester Census Subdivision A (the Parish), which resides in Colchester County (the County). According to the Statistics Canada 2021 Census Profile for Colchester Census Subdivision (i.e., the smallest census division available for the Project location), the total population in 2021 was 3,765, up 14.6% from 3,285 in 2016. The population density of the Parish is 4.3 persons per square kilometre, compared to 18.4 for the province. **Table 6.12** shows the distribution by age category for the 2016 and 2021 Census years. The age distribution of people living in Colchester for the 2021 Census indicates that the largest proportion of the population is in the 50-74 age group, followed by the 25-50 age group. While all age groups have increased between the 2021 and 2016 Census years, the number of people aged 0-24 had the largest increase (Statistics Canada 2023; 2019).

Table 6.12: Age Group Distribution for Colchester Census Subdivision for 2016 and 2021

Age Group	2016 Census Year	% of Total	2021 Census Year	% of Total	Change 2016-2021
0-24	660	20.09%	860	22.84%	+200
25-50	910	27.70%	955	25.37%	+45
50-74	1,420	43.23%	1,600	42.50%	+180
75+	295	8.98%	350	9.30%	+55
Total	***3,285***		***3,765***		***+480***

Note:
Age group totals differ from population totals.
Source: Statistics Canada (2023); Statistics Canada (2019).

The Project is located in the North Shore Economic Region which includes Colchester, Cumberland, Pictou, Guysborough, and Antigonish Counties. The town of Truro is the economic centre of the region and holds the largest population in the North Shore Region. The majority (81%) of residents who commute to their place of employment travel outside of the Parish to work, and approximately 15% commute outside of Colchester County to work. Statistics Canada employment figures for the 2021 Census indicate that the trades, transport and equipment operators and related occupations is the largest employment category for the Census Subdivision at 26%, followed by sales and service (24%), and business, finance, and administration occupations (11%) (**Figure 6.9**). When compared to provincial data, Colchester Census Subdivision A also had a significantly higher percentage of workers in trades, transport and equipment operators and related occupations (26% versus 17% for the province) (Statistics Canada 2023).

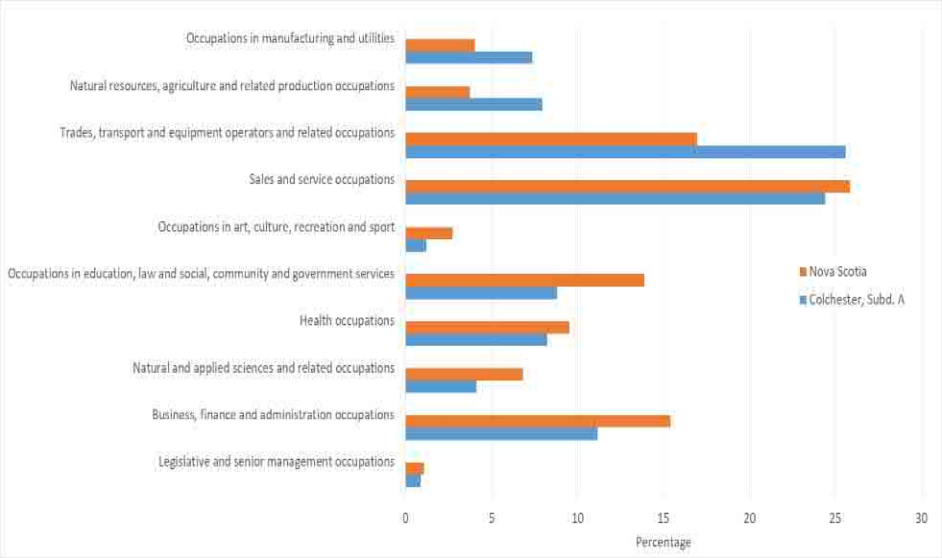


Figure 6.9: Occupations for Colchester Census Subdivision A and the Province of Nova Scotia

The total median income of households in Colchester Census Subdivision A was $63,200 during the year 2020 (**Figure 6.10**). This is lower than the provincial numbers ($71,500). The average total income for households in the census subdivision is $77,400, which is also lower than the provincial average household income of $87,900 (Statistics Canada 2023). Both average and median incomes are included in this report because they produce different numbers which represent the population's income. The average produces a number which represents the typical resident's income and is calculated by adding all values together (i.e., the income of everyone in the workforce) and dividing the sum by the total number of people in the labour force. The median income describes the middle value in a list of sorted values, which is useful for determining a single value to represent the typical income, particularly because it is not skewed by outliers (i.e., extreme, infrequent high incomes; or extreme, infrequent low incomes) in the same way that average values can. Analyzing the typical income of residents with both measurements provides well-rounded insight into the incomes.

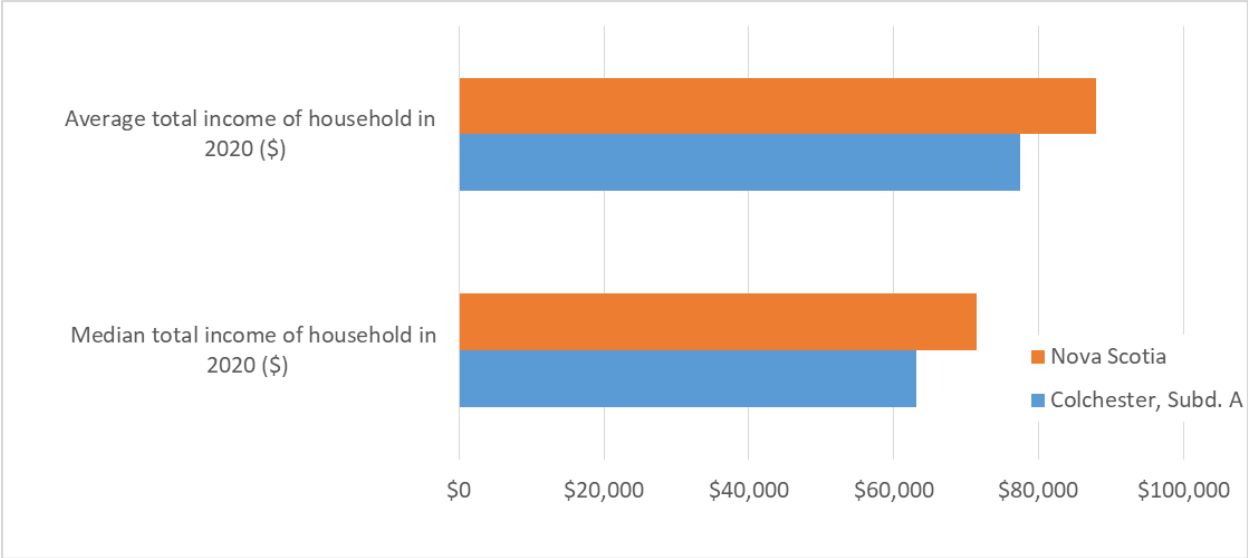


Figure 6.10: Income Statistics for Colchester Census Subdivision A and the Province of Nova Scotia (Statistics Canada 2023)

Colchester Census Subdivision A has lower post-secondary education levels compared to Nova Scotia, and a slightly higher percentage of residents in the census subdivision do not have educational certificates, diplomas, or degrees (3%) (**Figure 6.11**; Statistics Canada 2023). Colchester Census Subdivision A has a lower percentage of residents that have completed a post-secondary certificate, diploma or degree, at 47% compared to 56% for the province (Statistics Canada 2023).

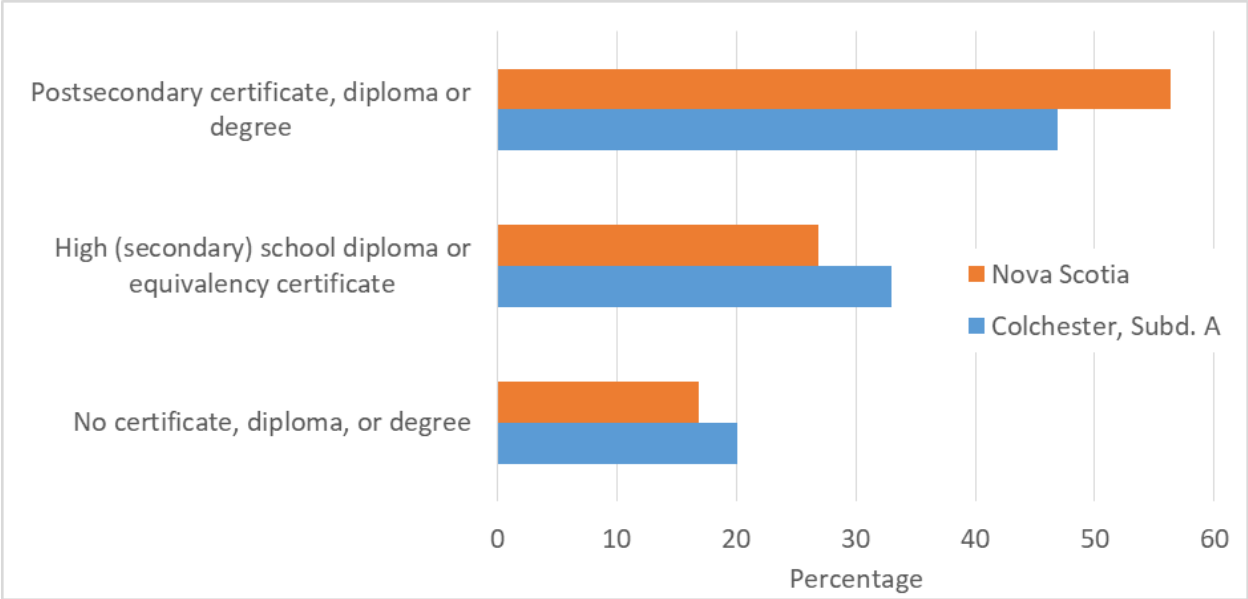


Figure 6.11: Highest Level of Education for Colchester Census Subdivision A and the Province of Nova Scotia (Statistics Canada 2023)

The Project is located near the small community of Glenholme, Colchester County, in Northern Nova Scotia (**Figure 1.1**). Like other communities in the LAA, Glenholme is a rural community with mixed land uses.

Local Government Structure

Nova Scotia is incorporated into three types of municipalities: regional municipalities (4), towns (25), and county or district municipalities (20). In addition, within the county or district municipalities there are village, local, and service commissions that are responsible for delivery of municipal services. The PDA is located within the Municipality of the County of Colchester, which contains the incorporated towns of Stewiacke and Truro as well as the Villages of Bible Hill and Tatamagouche (NSDMAH 2023).

Land Use

As stated previously, the proposed Project is located within a rural area with mixed land use. Residences are located along Little Dyke Road and Highway 2. Numerous aggregate operations occur to the north and east of the LAA. Extensive agricultural developments (i.e., dyke lands) occur south of Little Dyke Road. North of the Project, blueberry and U-pick strawberry fields occur. Various states of harvest forest resource lands also occur to the north of the Project property. Ducks Unlimited Canada (DUC) manages the pond bordering the west of the PDA for waterfowl. Hunting, fishing and all-terrain vehicle (ATV) recreational uses occur in the forests within the general area, including waterfowl hunting at the DUC pond adjacent to the Project. The water levels in the pond are actively managed to provide suitable habitat for waterfowl. Land ownership of the Project property and in the general area is private and recreational use of the current pit property is restricted (Dillon 2017).
The Great Village and District Volunteer Firefighter Hall is located at 600 – 8739 Route 2 in Great Village, approximately 5 km from the PDA. Other institutional land uses within the general vicinity are limited to local churches and community halls.

Though they have no facilities located in the LAA, policing services are provided by the Royal Canadian Mounted Police (RCMP), with the nearest detachments located in Truro. Emergency medical services are provided by Emergency Health Services with a station in Truro. Health Services are provided by the Nova Scotia Health Authority, with the nearest hospital also located in Truro.

Transportation

Route 4 and Route 2 are the primary transportation routes through the LAA. Route 4 generally runs north-south between Lower Debert and Thomson Station and connects with Highway 104. Route 2 runs east-west through the LAA and connects the communities of Springhill, Parsborro, Truro, and Waverley. The nearest operational rail line is a Canadian National (CN) Rail line which runs between Truro and Moncton. The Halifax Stanfield International Airport is located approximately 57 km south of the Project; the Debert Flight Center has a training airfield approximately 8 km to the northeast.

6.8.3 Potential Environmental Effects

Without mitigation, the mechanisms by which the Project could interact with the socioeconomic environment are discussed below. The Project is expected to interact with the socioeconomic environment throughout each phase (i.e., construction, operation and maintenance, and decommissioning and reclamation).

Effects on Land Use

Construction of the Project and extracting activities during operation have the potential to affect nearby residences as a result of light, noise, and dust generated by equipment operation. The Project may have a negative effect on residential property values due to elevated noise levels as well as perceived effects on aesthetic value of the area. Effects on the single home-based business (if in existence) are expected to be similar to those on residences in that vicinity. It is not anticipated that the effects from the proposed Project will be significantly higher than the effects from current operations. With the addition of an on-site electric plant, the Project may lead to a reduction in truck traffic which would have a net benefit effect on nearby residences.

The extension of Pit No. 4 development will result in land use change at the subject property. There is no land use zoning that would preclude aggregate development. Neighbouring properties have been operating as aggregate pits on and off for the past several decades. The PDA was recently clear-cut by the previous owner and limited additional clearing will be required for new proposed access roads. As such, interactions with forestry are not expected to be substantial. The Project may indirectly affect local agriculture if surface or groundwater resources are adversely affected because of Project activities as those water sources may be used for irrigation.
Though the PDA represents a relatively minor loss of potential land available for hunting, fishing, or trapping, the Project will result in the unavailability of the PDA for these uses, with potential returning following decommissioning and reclamation. The Project could interact with recreation if sediment-laden water was to enter nearby watercourses. Sediment deposition may alter fish habitat by affecting spawning beds, rearing habitat, winter, or summer refuge or by affecting food species.

Accidents or malfunctions associated with the Project have the potential to result in an increase in calls for the volunteer Fire Department, as well as other emergency response organizations whose geographic area of response includes the PDA. Accidents and malfunctions are assessed in **Section 8.0**.

Effects on Transportation

Traffic volumes on local roads are not expected to change significantly during the construction phase of the Project. Construction equipment will be mobilized to the site at the start of construction and will be removed once it is no longer required.

Current transportation of the aggregate from Pit No. 4 to Pit No. 2 occurs along Little Dyke Road for approximately 700 m. Access to Pit No. 4 is currently from a private access road off Little Dyke Road as

well. During operation and maintenance of the proposed Project, the traffic volume is not anticipated to change significantly from current conditions. The addition of an on-site electric plant and additional access routes may decrease traffic levels along Little Dyke Road.

Effects on Employment and Economy

As stated previously, the existing facility has made a significant contribution to the local economy with employment of approximately 15 people (full-time and seasonal) on an annual basis. A large proportion of these local earnings are expected to go directly back into the economy of the area. Through maintaining existing jobs at the local facility, with spin-off employment for third party contractors, the effect of the Project on employment and economy of the region is expected to be an overall positive one.

6.8.4 Proposed Mitigation and Management Measures

Mitigation measures to reduce the negative environmental effects of the Project on the socioeconomic environment are identified below.

Land Use

- Vehicles and equipment will be well muffled and maintained, and dust suppression will be applied to internal site roads during dry periods to minimize effects on nearby residences;
- Where possible, efforts will be made to maintain as much mature vegetation that remains along the edges of the site as possible, to act as a visual and acoustic buffer;
- A berm will be constructed along 400 m of the northwestern portion of the PIDs that are adjacent to residents. The berm will act as a sound and visual barrier, as well as to reduce dust;
- Directional lighting will be used on site with a downward lateral focus to minimize light leaving the site;
- Aside from the current OSCO operations, there are no commercial or institutional facilities within the LAA that would be expected to interact with the Project except for accidents and malfunctions, thus no mitigation is proposed. Refer to **Section 8.0** for a discussion of mitigation related to accidents, malfunctions, and unplanned events; and
- According to the NSDNRR Groundwater Atlas (NSDNRR 2021b), there are agricultural operations with groundwater wells within 1 km of the PDA. An assessment of the environmental effects and the Project design and mitigation measures planned to address Project effects on water resources is provided in **Section 6.3**.

Transportation

- Truck drivers will adhere to posted speed limits and warning signage and adjust driving to meet weather and road conditions; and

- Transportation accidents and collisions are addressed in **Section 8.4.3**.

Effects on Employment and Economy

- No mitigation proposed given that the Project will have a positive effect on local employment and the economy.

6.8.5 Residual Environmental Effects

The residual environmental effects of the Project after the application of mitigation are assessed in this section.

Land Use

The Project will result in the emission of dust, air contaminants, noise and emissions that could cause a nuisance to off-site receptors, thereby affecting residential land use. Given the nature of the Project (an expansion of current operations), and the mitigation to be employed (including notably the use of dust suppression, the maintenance of acoustic buffers, and other measures), the Project is not expected to result in the undue emission of air contaminants at nearby residential properties (**Section 6.1**).

Effects on property values are more difficult to determine, since the literature relating property values to proximity to industrial facilities is uncertain. Some studies suggest that proximity to an industrial facility may result in a decline in property values due to nuisance effects and potential damage, whereas others suggest that property values may increase if present near an industrial operation because workers tend to wish to live near where they work. As such, given this and the fact that the Project represents a continuation of current conditions, the anticipated effects of the Project on property values are described as neutral.

With respect to compatibility of land uses, there is no land use zoning that would preclude aggregate development. Pit development will result in land use change at the property temporarily until sufficient time for reclamation to be implemented. However, interactions with forestry are not expected to be substantive given the land's recently clear-cut state and limited additional proposed clearing.

No residual effects on commercial and institutional land use are expected beyond a continuation of current OSCO operations in the area. Residual effects of Project-related accidents or collisions on emergency response services, which are discussed in **Section 8.0**.

Potential effects of the project on agricultural land use are primarily focussed on groundwater and surface water quality and quantity; refer to **Section 6.4** for a discussion on residual environmental effects of the Project on water resources.

The PDA is privately-owned and represents a relatively minor loss of potential land available for hunting, fishing, or trapping relative to the terrestrial wildlife habitat in the region. Substantive interactions with

recreational land use are not expected. A return of these uses may occur after decommissioning and reclamation of the property.

Transportation

The Project may result in a modest decrease in traffic volumes on the preferred transportation route during operation. Residents located along the preferred transportation route may notice truck traffic at times, but since the highways are rated for such purposes and trucking has occurred and continues to occur on these roads, measurable impacts on transportation are not expected. Refer to **Section 8.4.3** for a discussion of the potential residual environmental effects of transportation related accidents or collisions.

Employment and Economy

The Project is expected to allow OSCO to continue operations and employ approximately 15 people (full time and seasonal) on an annual basis. Thus, a positive interaction is expected.

6.8.6 Summary

In summary, the Project will result in a change in land use of the PDA, but since the Project site was recently logged, the continued use for resource extraction activities is expected to be compatible with the surrounding area. Occasional nuisance effects to nearby residents may be possible but is not anticipated to represent a significant increase above current conditions. Substantive effects to commercial, institutional, industrial, agricultural, forestry, recreation, or transportation are not expected. Modest employment associated with the maintenance of up to 15 jobs for OSCO operations, as well as the related spin-off employment and economic activity, will result in positive effects to employment and economy.

Considering the above, and in consideration of planned mitigation and best practices aimed at reducing environmental effects, the residual environmental effects of the Project on the socioeconomic environment during all phases of the Project are rated not significant, and in the case of employment and economy, are rated as positive. These predictions are made with a high level of confidence. No follow-up or monitoring is proposed.

6.9 Archaeological, Cultural, and Historical Resources

To understand the potential for encountering archaeological resources during the lifespan of the Project, an Archaeological Resource Impact Assessment (ARIA) Screening and Reconnaissance was conducted by Cultural Resource Management Group Limited (CRM Group) in August 2023. The ARIA utilized Mi'kmaw engagement, background research, and archaeological fieldwork to search for, document, and provide management recommendations for cultural historical resources and areas with archaeological resource potential related to the Project (CRM Group, 2023). The following sections reference the findings and relevant information provided by the CRM Group in the ARIA.

6.9.1 Scope of VEC

Archaeological, cultural, and historical resources have been selected as a valued environmental component (VEC) related to the Project due to their overall importance to the people of Nova Scotia and in recognition of the provincial and federal regulatory agencies who are responsible for their management. Additionally, Indigenous people have an important interest in the preservation and management of heritage resources related to their history and culture. Archaeological, cultural, and historical resources include archaeological resources (e.g., artifacts), palaeontological resources (e.g., fossils), and built heritage resources (e.g., historic buildings or sites).

Archaeological, cultural, and historical resources, both human-made and naturally occurring, are those resources related to the past that remain to inform present and future societies of that past Archaeological, cultural, and historical resources are highly delicate features of the environment, and their integrity is susceptible to ground-disturbing activities. Project activities that include surface or subsurface ground disturbance has the potential for interaction with Archaeological, cultural, and historical resources, where they are present. Accordingly, earth moving activities represent the component of the Project with the greatest potential for interaction with archaeological, cultural, and historical resources that might be contained in surface soils or rock.

6.9.1.1 Temporal Boundaries

The temporal boundaries for the Project include the following:

- **Construction:** extending for a period of approximately 1 year, anticipated to begin in the fourth quarter of 2024 (subject to the receipt of all approvals and permits required for the Project);
- **Operation and Maintenance:** beginning in approximately the second quarter of 2025, and lasting for approximately 30 years or until the mineral resource has been depleted; and
- **Decommissioning and Reclamation:** to be initiated following the completion of operations at the site, with decommissioning and reclamation of the surface facilities at the site for an anticipated duration of six months following operation.

6.9.1.2 Spatial Boundaries

The PDA is defined as the area of physical disturbance associated with the Project. The PDA consists of an area of approximately 77 ha that includes the open pit and all related surface facilities represented by the physical Project footprint.

The LAA is the maximum anticipated area within which Project-related environmental interactions can be predicted and measured with a reasonable degree of accuracy and confidence. For archaeological, cultural, and heritage resources, the LAA is not expected to extend beyond the PDA, as an environmental effect would be related to ground disturbance/earthworks (to occur only within the PDA).

6.9.1.3 Significance Threshold

A significant adverse residual environmental effect on archaeological, cultural, and historical resources is one where Project-related activities result in the permanent disturbance or unauthorized accidental destruction of an archaeological, palaeontological, or built heritage resource, site, or object that is considered by the provincial heritage regulators to be of major importance and that cannot be mitigated.

6.9.2 Description of Existing Environmental Conditions

The Project area is located within the Minas Lowlands ecodistrict, a part of the greater Valley and Central Lowlands ecological region. This ecodistrict has an average elevation of 30 meters above mean sea level (m amsl), with only a few regions exceeding 100 m amsl. The foothills above the Folly and Debert rivers have the highest inland slopes in the ecodistrict, which extend to approximately 150 m amsl. Extensive salt marshes have been established along the level terrain, due to tidal sediments from the Bay of Fundy. The ecodistrict also contains approximately 2,300 hectares of dykeland, derived from Acadian settlers who constructed dykes to separate the salt water from farmland (Neily et al., 2017).

The Minas Lowlands are characterized by the presence of soft, red sedimentary rock, comprising sandstone, siltstone, shale, and conglomerate, along with traces of older Carboniferous period rock. The area contains extensive sandy and/or gravelly glaciofluvial deposits, which are utilized for aggregate extraction. In addition to this, alluvial deposits can be found along the many rivers within the Minas Lowlands ecodistrict (Neily et al., 2017). The Project area is associated with Acadia Series soils (ST13), which is known for wet, fine-loamy soils made up of silt loam, loam, silty clay loam, clay loam, and/or sandy clay loam texture. Soil Type 13 is known to be medium to rich in fertility, with potential to be very rich (Keys et al., 2011).

The Project area is located approximately 70 m west of McCurdy Creek which empties into the Minas Basin and is also surrounded by several other major rivers within the ecodistrict. These include the Shubenacadie, Folly, Debert, Great Village, Portapique, Bass, and Economy rivers. The rivers in this ecodistrict experience a reversal in water flow due to tidal forces from the Bay of Fundy, leading to the flooding of their banks with seawater rich in silt and clay. This has resulted in a significant plain of poorly drained mineral soil, featuring tidal creeks, agricultural ditches, and an extensive network of dykes. Most freshwater resources in the ecodistrict comes from streams and rivers (Neily et al., 2017).

The Minas Lowlands ecodistrict is dominated by softwood forests, with some sugar maple, yellow birch and beech trees located among hills with suitably drained soil. Due to poorly drained soils in the area, vegetation mainly includes forests of black spruce and some white pine. Some floodplain forests in the ecodistrict are comprised of red maple, sugar maple, white ash, and elm, due to nutrient-rich soil. These floodplain areas are also abundant with fiddlehead ferns (Neily et al., 2017).

6.9.2.1 Archaeological Resources

Cultural Heritage Elements

As part of the ARIA, the general area of the Project was examined for the presence of cultural heritage elements, including nearby cemeteries, registered archaeological sites, registered heritage properties, Crown lands and other protected areas, and cultural landscape elements. This study determined that there are no registered archaeological sites, human burials, National Historic Sites, protected areas (current, announced, or pending), or Crown lands in the area. It is recognized, however, that the area is part of Mi'kmaq traditional territory and situated within the Mi'kma'ki district of Sipekne'katik (CRM Group 2023).

Pre-Contact Land Use

Pre-contact land use was investigated in the ARIA to gain an understanding about how the Mi'kmaq peoples used the land prior to colonization. The earliest documented traces of human presence in Mi'kma'ki were discovered in the vicinity of present-day Debert, situated approximately 9.7 km east of the LAA. These habitation sites, now known as the Debert/Belmont Complex, were likely occupied approximately 12,000 to 8,500 years before present (BP; Deal 2016). In the Woodland/Ceramic Period (3,000 – 500 BP), Mi'kmaq inhabitants occupied the Mi'kma'ki territory, which was comprised of Nova Scotia including Cape Breton, Prince Edward Island, New Brunswick (north of the Saint John River), southwestern Newfoundland, the Gaspé region of Quebec, and part of Maine. Most Mi'kmaq sites are located along shorelines and watercourses (Deal, Rutherford, Murphy, & Buchanan 2006), including several registered sites within proximity to the Project site, including those which extend from the Debert/Belmont Complex, and those along the watercourses that drain into the Cobequid Bay. The LAA is situated near major bodies of water which would have been significant sources of resources and transportation for the Mi'kmaq and their ancestors and predecessors. These include the Debert River (known as *Wasoqsikek*) and the Cobequid Bay (known as *We'kopekitk*) (Ta'n Weji-sqalia'tiek Mi'kmaw Place Names Digital Atlas 2019).

Historic Land Use

During the time of European contact, the Mi'kmaq occupied the shores of virtually every freshwater and saltwater waterbody in Mi'kma'ki. Historical evidence illustrates the continued use of the land surrounding the Project site, with traditional use sites identified within a kilometre of the Project area. Historical records have noted Mi'kmaq presence in the Cobequid area, including Census records from 1881 which recorded 100 Mi'kmaq living in Colchester County (House of Commons 1882). Mi'kmaq practicing traditional activities in the area, including hunting, coopering, rustic work, basketmaking, and berry-picking was noted in twentieth century records, which may have been practiced within the Project area (House of Commons 1901).

Though initial European contact was made in the Minas Basin and Cobequid regions in 1606, there were no permanent settlements in the area until the expansion of Acadian settlements in the 1670s (Yuill

1981; Dawson 2012; Clark 1968; Patterson 1947). In 1668, Mathieu Martin was granted a seigneury of the head of Cobequid Bay, and established Saint-Mathieu, a region which encompassed the Project area. The headquarters of Saint-Mathieu was established in the present-day community of Masstown and was named La Paroisse (Webster 1930). La Paroisse was a trade-centric settlement which utilized trading with the Mi'kmaq peoples, and contained agricultural land which was converted from salt marshes (d'Entremont 2003; Dawson 2012). Other smaller Acadian settlements were established around Cobequid, including Ville de Bourg, located in the current community of Lower Debert, and Ville Nigeganish, located on the western bank of the mouth of Chiganois River (Lewis 1755; Nova Scotia Archives 1967). These settlements were agricultural in nature, and expanded and moved over time, due the being situated on and around floodplains (Murdoch 1865). La Paroisse, Ville de Bourg, and Ville Nigeganish were located within 1.8 and 11 km of the PDA, with Ville Petit Louis Longue-Epeé likely being the closest. It is possible, however, that at its most expansive, Ville de Bourg may have encroached on the Project area (CRM Group 2023).

Historical maps (Anonymous 1738-1748; Lewis 1755; Morris 1755) also show various trails throughout the region, connecting Acadian communities among the Minas Basin and across the Isthmus of Chignecto, including one located approximately 300 metres north of the Project area, which now survives in segments of Shore Road, Route 2, Great Village Lornevale Road, and Athol Road. It is likely that these trails existed pre-contact and were used by the Mi'kmaq peoples before and after European contact (Dawson 1988). Due to the location of these trails, it is likely that the sites of Ville Petit Louis Longue-Epeé, Ville de Bourg, and Ville de Nigeganish existed as Mi'kmaq encampments prior to European settlement (CRM Group 2023). During the historic period, they provided access to inland encampments in the Cobequid Hills (CRM Group 2023; Hardy 1869).

During the Deportation of 1755, the Acadian settlers in Cobequid were forced to relocate and the structures left behind were burned (Dawson 2012; Nova Scotia Archives 1967). After being abandoned for many years, the land in Cobequid was reclaimed by British settlers to make use of the agricultural land (Dawson 2012). Houses were built and townships were established on the land, while Cobequid was reinforced by the military with the erection of Fort Belcher and Fort Franklin (Nova Scotia Archives 1967). During this time, Presbyterian immigrants from Northern Ireland settled mainly along the Cobequid Bay shoreline (Colchester Historical Society 2000; Fletcher 1984; Dawson 2012). The official Township of Londonderry formed in 1775 and consisted of 53,000 acres. Though the original land grants of Londonderry did not overlap with the Project area, a transcribed version of the 1780 plan shows that the LAA was granted to James McNutt and Samuel Archibald when the Township was established (McNutt 1983).

In 1849-1850, mining operations were established in the Township of Londonderry after the discovery of iron ore. The population of Londonderry Township and Colchester County grew rapidly due to this discovery, with a significant increase by 1861. Settlements were expanded within Colchester County,

and economic activities shifted from subsistence farming to include industries like lumbering, shipbuilding, and mineral exploration (Colchester Historical Society 2000; CRM Group 2023).

Existing communities near the Project area include Little Dyke, which dates to 1828, and Glenholme, which dates to 1714 (Miller 1873; Nova Scotia Archives 1967). During this time, this land was mainly used for residential purposes, except for a church that was constructed in Glenholme (Nova Scotia Archives 1967). As of 1874, one residence was located within the LAA, with most dwellings located in Folly Village and north of the LAA. A 1905 Geological Survey of Canada Map shows a woods road intersecting with the LAA, and limestone quarry sites located approximately east of the Project, indicating resource extraction uses (CRM Group 2023). Ownership of the LAA transferred several times throughout the twentieth century and expanded in 1967 through the consolidation of adjacent properties (CRM Group 2023). Based on aerial photographs, the land encompassed by the Project area was used as a woodlot throughout the twentieth century, and into the twenty-first century. A portion of the land was later converted to farmland between 2013 and 2017 (CRM Group 2023).

Historical research indicates that no notable historic activity occurred within the Project area, due to being positioned at a considerable distance from Folly and Debert Rivers and situated south of the historic Acadian north shoreline trail. The nearest registered sites, as suggested by research, were approximately 6.5 km to the northwest and east (CRM Group 2023).

Archaeological Fieldwork

On August 3, 2023, the CRM Group conducted archaeological reconnaissance within the LAA. This included conducting four exploratory shovel tests across the Project area to investigate the depth and composition of sediment stratigraphy, and to evaluate the surficial geology and archaeological potential. These shovel tests concluded that the PDA contains upper strata of Podzolic Order soil profiles that were either stripped or intermixed. This indicates that the land has been heavily impacted due to forestry or farming activity. Shovel Tests 3 and 4 resulted in the identification of intact soil profiles but did not provide evidence of on-site Pre-contact cultural resources (CRM Group 2023).

The CRM Group also determined that the LAA consisted mainly of immature mixed type woods that had not been impacted by logging activities, as well as scrub-like regrowth in open areas. The LAA included areas with minimal slope, where the land had been artificially leveled by vehicle tracking and for farming purposes, as well as areas that were heavily sloped near low-lying wetlands (CRM Group 2023).

6.9.2.2 Built Heritage Resources

Historical mapping and aerial imagery indicated that no structures have existed within the LAA boundary throughout the twentieth and twenty-first centuries (CRM Group 2023).

6.9.2.3 Palaeontological Resources

No palaeontological resources were found during archaeological reconnaissance of the PDA (CRM Group 2023).

6.9.3 Potential Environmental Effects

As a result of the preliminary desktop assessment (including model/mapping database check for high potential resource areas), there is a low potential for heritage resources to be located within the PDA.

Should the discovery of heritage resources occur during the construction or operation and maintenance phases of the Project, it would be considered and addressed as an accidental event, as discussed in **Section 8.0**.

6.9.4 Proposed Mitigation and Management Measures

Based on these results, CRM Group offered the following management recommendations for the Project area:

1. It is recommended that the PDA be cleared of any requirement for further archaeological investigation.
2. If any further changes are made to the layout of the study area beyond the areas assessed in the ARIA, it is recommended that those proposed areas be subjected to an Archaeological Resource Impact Assessment.
3. If archaeological deposits or human remains are encountered during construction activities associated with the Project, all work in the associated area(s) should be halted and immediate contact made with the Special Places Program (John Cormier: 902-424-4542) (CRM Group 2023).

6.9.5 Residual Environmental Effects

Any ground-breaking or earth moving activity has the potential to uncover previously undiscovered heritage resources. Archaeological resources (i.e., artifacts) tend to be found in surficial soils when discovered, whereas palaeontological resources (i.e., fossils) tend to be found in bedrock. The discovery of these resources can provide valuable information about human activity or use in the distant past (in the case of artifacts), or the presence of wildlife and vegetation in earlier eras (in the case of fossils). With respect to the Project, it is possible that previously undiscovered heritage resources in the form of artifacts could be found in the surface soils (including topsoil and overburden) during construction of the Project. Moreover, it is possible that fossils could be found in the underlying gypsum rock during operation of the Project. However, based on the results of the ARIA, these resources are unlikely to be present in the LAA.

6.9.6 Summary

In summary, the PDA is unlikely to harbour significant archaeological, cultural, or historic resources based on the ARIA conducted. Considering the above, the residual environmental effects of the Project on archaeological, cultural, and historic resource during all phases of the Project are rated not significant, with a high level of confidence. No follow-up or monitoring is proposed.

6.10 Traditional Land and Resource Use

The potential environmental effects of the Project on traditional land and resource use are assessed in this section.

6.10.1 Scope of VEC

Traditional land and resource use refers to the practice of traditional activities by Indigenous persons that were carried out dating back to the Pre-Contact[1] period. These activities may have included hunting, fishing, trapping, gathering of food and medicines in pursuit of a moderate livelihood, as well as the building and settling of encampments, seasonal travel, practicing ceremonial traditions, and burial activities. Evidence of these traditional land and resource uses can generally be found in archaeological evidence (i.e., archaeological sites, burial sites, and associated objects) and through Indigenous traditional knowledge and oral histories. Traditional land and resource use has been selected as a VEC to:

- Acknowledge the lands and resources historically used for traditional purposes by Indigenous persons;
- Assess the potential environmental effects of the Project as required under the Nova Scotia *Environmental Assessment Regulations*; and
- Assist the Province in fulfilling its duty to consult with Indigenous peoples regarding the Project.

This section of the EARD is intended to provide the Crown with information about the potential environmental effects of the Project on traditional land and resource use, as well as measures taken or recommended that would mitigate such environmental effects.

6.10.1.1 Temporal Boundaries

The temporal boundaries for the Project include the following:

[1] The Pre-Contact period is defined as the time and events of Indigenous society that occurred prior to contact with non-Indigenous cultures, which began here around ca. 1500 current era (CE). The Contact period is the era between ca. 1500 and 1604 CE, when Indigenous and non-Indigenous cultures were first contacting one another intermittently across the region, which is largely unrecorded except in oral history and the archaeological record.

- **Construction:** extending for a period of approximately 1 year, anticipated to begin in the fourth quarter of 2024 (subject to the receipt of all approvals and permits required for the Project);
- **Operation and Maintenance:** beginning in approximately the second quarter of 2025, and lasting for approximately 30 years or until the mineral resource has been depleted; and
- **Decommissioning and Reclamation:** to be initiated following the completion of operations at the site, with decommissioning and reclamation of the surface facilities at the site for an anticipated duration of six months following operation.

6.10.1.2 Spatial Boundaries

The PDA is defined as the area of physical disturbance associated with the Project. The PDA consists of an area of approximately 77 ha that includes the open pit and all related surface facilities represented by the physical Project footprint.

The LAA is the maximum anticipated area within which Project-related environmental interactions can be predicted and measured with a reasonable degree of accuracy and confidence. Though development of the Project will be limited to the PDA, some areas contiguous to the PDA may be affected upon initiating construction and operation of the Project, even though they will not necessarily be physically disturbed (e.g., potential indirect effects on wetlands located on adjacent properties). In recognition of this, the LAA for traditional land and resource use consists of an area of 7,854 ha, forming a 5 km radius surrounding the PDA and contiguous areas which traditional land or resource use may have occurred or may be occurring. For this reason, the LAA was conservatively defined as representing a 5 km radius centred on the PDA to assess and consider potential biophysical and atmospheric effects from the PDA and areas where Project-related environmental effects might be expected to occur.

6.10.1.3 Significance Threshold

A significant adverse residual environmental effect on traditional land and resource use is defined as a permanent loss of the availability of, or access to, land and resources that are currently used by Indigenous persons for traditional purposes within the LAA or PDA that cannot be mitigated.

6.10.2 Description of the Existing Environment

Based on a review of available literature, the following is a brief and high-level summary of traditional land and resource use in the LAA. It is important to note that no interviews related to the history of the LAA or the properties in or around the PDA have been conducted with historical society groups or First Nations representatives for the purposes of developing this EARD, and the following information is based on literature review.

6.10.2.1 Project Context

The Project is located near the small community of Glenholme, Colchester County, in Northern Nova Scotia. Like other communities in the LAA, Glenholme is a rural community with mixed land uses.

6.10.2.2 Indigenous Community Context

Two Mi'kmaq communities have reserve lands ranging between 19 and 50 km from the PDA and belong to Millbrook First Nation and Sipekne'katik First Nation. Millbrook First Nation is located closest to the Project, with reserve lands roughly 19.8 km southeast from the PDA. Sipekne'katik First Nation's Indian Brook Reserve is located 32.1 km south of the PDA, while their Shubenacadie No. 13 is located about 50.2 km southeast of the PDA.

6.10.2.3 Population Demographics

According to the Statistics Canada 2021 Census Profile for Colchester Census Subdivision (the smallest census division available for the Project location), the total Indigenous population in 2021 was 115.

6.10.2.4 Current Use of Land and Resources for Traditional Purposes in the PDA and LAA

In the absence of feedback from Indigenous communities and organizations, the Proponent is unaware of any current use of land and resources for traditional purposes in the PDA and LAA. Presumably, however, parts of the LAA have been or continue to be used for traditional hunting, fishing, trapping, gathering, and other Indigenous traditional activities.

6.10.3 Potential Environmental Effects

Any Project activity that results in change in the amount of land available to practice current activities, or that restricts access to an area that limits the use of the resources found in that area, can affect traditional land and resource use. Activities during the construction, operation, and maintenance, and

decommissioning and reclamation phases of the Project may affect traditional land and resource use, as follows.

- Upon initiating construction, access to the portion of the PDA currently not restricted will become restricted for safety and security purposes to prevent injury to individuals while numerous construction activities are taking place on the Project site. From this time onward, access to the PDA for the purpose of carrying out traditional activities will no longer be available until following decommissioning and reclamation, although the remainder of the LAA will remain available for such purposes (as currently). These access restrictions will continue throughout the construction and operation and maintenance phases but will be restored following decommissioning and reclamation so that traditional activities can return (if desired/available).
- During construction, most of the PDA will be cleared of remaining vegetation (except for areas remaining as buffers), and as such, natural resources that may be present on-site (e.g., plants, wildlife, medicines) will no longer be available for harvesting or use. Outside the PDA, it is not expected that Project-related effects would interfere with the practice of traditional activities in the remainder of the LAA or beyond. This effect will continue throughout the construction and operation and maintenance phases but will be restored upon site decommissioning and reclamation.
- At decommissioning and reclamation, the PDA will be reclaimed and restored to as near natural conditions as possible. Vegetation would be expected to begin growing naturally over time (e.g., within one or two growing seasons), and native vegetation, hydroseed, and the planting of trees may be used to accelerate this as well as to assist in promoting regrowth and to stabilize soils to prevent erosion. As vegetation matures over the ensuing years and decades, the PDA may once again eventually harbour traditional resources of importance to Indigenous peoples, thereby allowing a potential return of traditional land and resource use activities such as hunting, trapping, and gathering in the PDA, if so desired.

6.10.4 Proposed Mitigation and Management Measures

Traditional land and resources are connected to other VECs. Discussion of the potential environmental effects on natural resources and associated mitigation measures are outlined in **Section 5.1.3** (water resources), **Section 5.1.4** (fish and fish habitat), **Section 5.1.5** (vegetation and wetlands), **Section 5.1.7** (wildlife and wildlife habitat), **Section 5.7** (agricultural land and livestock), and **Section 5.1.9** (archaeological, cultural, and historical resources). Those mitigation measures are also applicable to this VEC. In addition, the following mitigation measures through careful planning will be employed to avoid or reduce the environmental effects of the Project on traditional land and resource use within the LAA:

- Minimize the size of the PDA to that which is necessary to accomplish the Project objectives while minimizing environmental disturbance to the extent possible.

- Maintain natural vegetation along wetlands and watercourses, as well as along the property boundaries, to minimize effects on natural resources and to provide a buffer for reducing effects of the Project that could cause sensory disturbance to wildlife (i.e., noise, dust).
- Conduct ongoing engagement of Indigenous communities throughout the Project to exchange information, address concerns, and assist in the development of management and reclamation plans for the Project.
- If requested, Indigenous communities or individuals will be provided with the opportunity to harvest and gather species of importance to traditional activities on the PDA prior to construction, if the Project schedule allows. These opportunities to conduct harvesting and gathering activities should be timed where possible to coincide with the seasonality of the species of interest, if possible, given the construction schedule.
- Reclamation of the PDA will consider traditional resources including the use of native species so that the land is accessible for traditional purposes at some time in the future following closure of the Project.
- Any fish and fish habitat will be monitored to confirm water flows are appropriate to mitigate bank erosion.
- Any affected fish habitat and wetland habitat that is lost to the Project will be authorized under federal and provincial legislation and offset in accordance with DFO policies.
- Wildlife and wildlife habitats within the PDA will be re-vegetated upon closure, which will partially restore habitat conditions in the PDA, over time.

6.10.5 Residual Environmental Effects

Though located on privately-owned land, the presence of Project-related facilities and infrastructure will interact with traditional land and resource use, causing potential residual effects primarily within the PDA. Although minor effects could occur outside the PDA but within the LAA (e.g., wildlife avoidance due to human activity), effects will be greatest in the PDA.

The potential environmental effects to traditional land and resource use would begin as soon as construction activities are initiated and would continue throughout the Project life, until the site is restored to as near natural conditions as possible during decommissioning and reclamation. The greatest potential for environmental effects begins when initiating construction activities, after which time access to the PDA will be restricted for safety purposes. The resources present in the PDA (such as wildlife and fish habitats) will be lost during construction as clearing of the site and development of the open pit and ancillary facilities is conducted, resulting in such resources no longer being available for traditional purposes during construction and operation of the Project. The potential environmental effects on traditional land and resource use are thus conservatively assessed as occurring immediately when construction (site preparation) begins and continuing until ultimate closure of the site.

Ground disturbance during construction and operation and maintenance activities will result in a temporary localized loss of vegetation and potential displacement of species used for traditional purposes due to altered habitats or sensory disturbance. Where practicable, Indigenous communities and individuals will be provided with the opportunity to harvest and gather species before site preparation and construction commences if the timing of such harvesting is such that the activity does not interfere with site activities.

At closure, the pit will be abandoned, and the site will be restored to as near natural conditions as possible by allowing vegetation to re-grow naturally (supplemented by planting native vegetation, hydroseeding, and planting of trees to reduce potential erosion), with no anticipated substantive interactions between the Project and traditional land and resource use expected following reclamation. A short-term and temporary restriction in access to land and resources within the PDA would result during reclamation activities. Once decommissioning and reclamation is complete, this site restriction will be eliminated, resulting in improved access to the PDA and improvement of environmental features and other traditional purposes within the LAA.

6.10.6 Summary

The development of the Project will not result in the permanent loss of access or use of land or resources, as the site will be returned to near-natural conditions following decommissioning and reclamation.

Engagement with Indigenous communities about the Project has been initiated and is intended to support an improved understanding of the traditional land use of the PDA. Ongoing engagement with the Indigenous communities will continue to take place, and they will be provided the opportunity to support the development of management and reclamation plans and/or to support reclamation activities at the site. Nonetheless, a reduction in the use of land or the resources on the land within the PDA is unavoidable throughout the life of the Project.

In summary, subject to confirmation by Indigenous communities through engagement, it is unlikely that the Project site is important to the current practice of Indigenous traditional activities. The PDA will be inaccessible during construction and operation and maintenance for such purposes but will be restored upon closure with natural regrowth and replanting of vegetation and trees such that, at some time in the future, portions of the PDA may again provide opportunities for practicing traditional activities.

In light of the above, and with the careful implementation of environmental protection and mitigation measures, including accommodation, where reasonable, for demonstrated infringements of Aboriginal or treaty rights that might arise as a result of the Project, the residual environmental effects of the Project on traditional land and resource use during each phase of the Project are not anticipated to result in significant environmental effects on the use of land or resources by the Mi'kmaq that may

practice traditional activities in the LAA, subject to confirmation by Indigenous communities through engagement. This prediction is made with a moderate level of confidence due to the limited engagement of Indigenous communities conducted to date and the lack of specific information about potential traditional land and resource use activities that might be occurring (or have occurred) in the PDA.

7.0 Effects of the Environment on the Project

The potential effects of the environment that could occur on the Project are assessed in this section.

7.1 Scope

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

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

- climate and climate change;
- severe weather events, including wind, precipitation, floods, hail, electrical storms, and tornadoes;
- seismic activity; and
- forest fires resulting from causes other than the Project.

7.1.1 Temporal Boundaries

The temporal boundaries for the Project include the following:

- **Construction**: extending for a period of approximately 1 year, anticipated to begin in the fourth quarter of 2024 (subject to the receipt of all approvals and permits required for the Project);
- **Operation and Maintenance**: beginning in approximately the second quarter of 2025, and lasting for approximately 30 years or until the mineral resource has been depleted; and
- **Decommissioning and Reclamation**: to be initiated following the completion of operations at the site, with decommissioning and reclamation of the surface facilities at the site for an anticipated duration of six months following operation.

7.1.2 Spatial Boundaries

The PDA is defined as the area of physical disturbance associated with the Project. The PDA consists of an area of approximately 77 ha that includes the open pit and all related surface facilities represented by the physical Project footprint.

As effects of the environment on the Project relates to potential influences of the forces of nature on the Project integrity and conduct, the local assessment area (LAA) for effects of the environment on the Project is limited to the PDA.

7.1.3 Significance Threshold

A significant adverse effect of the environment on the Project is defined as one where the environment or natural forces cause:

- damage to the Project infrastructure that results in a substantial increase in risks to the health and/or safety of the public, or substantial risks of a business interruption;
- damage to the Project infrastructure that results in repairs that could not be technically or economically implemented;
- a long-term interruption in service (e.g., an interruption in operations activities such that production targets cannot be met); or
- a substantial change in the Project schedule (e.g., a delay resulting in the construction period being extended by one season).

7.2 Existing Conditions

7.2.1 Climate and Climate Change

Climate is defined as the statistical averages of precipitation, temperature, humidity, sunshine, wind velocity, and other phenomena such as fog, frost and hailstorms for a particular region and time period, generally taken over a 30-year period (NASA 2017). Climate change is an acknowledged change in climate that has been documented over two or more 30-year periods. According to the Intergovernmental Panel on Climate Change (IPCC), climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use (IPCC 2014). The United Nations Framework Convention on Climate Change (UNFCCC) makes a distinction between climate change attributed to human activities and climate variability attributable to natural causes, by defining climate change as a change of climate directly or indirectly attributed to human activity that alters the composition of the global atmosphere, and which is in addition to natural climate variability observed over comparable time periods (IPCC 2023).

The definition of climate change dictates the context in which the effects of those changes are discussed. While it is appropriate to examine the effects of projected climate change on projects with long anticipated life spans (50 to 100 years from construction into post-closure of Project), it may not always be fitting to consider the effects of climate change projections on projects which will only take place over a relatively short period of time, and to be initiated in the near future. In the case of the Project, with an anticipated lifespan of 30 years, rather than considering the effects of long-term climate

change on the Project, it is more appropriate to consider the effects of recent climatological conditions, especially the potential adverse effects of weather variability and weather extremes (e.g., change in precipitation).

The technical boundaries for the establishment of climate conditions include the spatial coverage of weather stations across Nova Scotia, the number of parameters monitored at each station, and the temporal coverage of data collection at each station. Technical boundaries for the prediction of effects of climate change relate to the inherent uncertainty of global climate models in predicting future changes in climate parameters, and specifically their application of global-scale prediction algorithms to a relatively localized scale through "downscaling". Global climate models can provide relatively useful information for predicting and preparing for global and macro-level changes in climate, but their ability to pinpoint location-specific changes to climate on a localized level is limited.

7.2.1.1 Climate Normals

Current climate conditions are generally described by the most recent 30-year period for which Environment and Climate Change Canada has developed statistical summaries. These summaries are typically referred to as "climate normals". The closest weather station to the Project with available historical data is the Debert weather station, located approximately 10 km northeast of the PDA. This period has been chosen as the most applicable period for summarizing current climate conditions for the Project (GOC 2023b). Refer to **Table 6.2** in the atmospheric VEC section (**Section 6.1.1**) for climate data.

Monthly mean wind speeds measured at the Debert weather station range from 10.1 to 14.9 km/h, with an annual mean wind speed of 12.4 km/h. The dominant wind direction throughout the year is westerly (GOC 2023b). Maximum hourly wind speeds, averaged from 1991 to 2020 for each month, range from 43 km/h to 67 km/h, while maximum wind gusts for the same period range from 79 km/h to 111 km/h.

Precipitation at the Debert station, on average, is highest from Spring to early Summer and Fall through the early Winter period. From 1991 to 2020, the reference region has received an average of 1,178.5 mm of precipitation per year. Extreme daily precipitation in the past century has ranged from 44.7 mm (January 2007) to 89.4 mm (August 1999). On average, there have been 9.1 days each year with rainfall greater than 25 mm (GOC 2023b).

The annual daily average temperature at the Debert weather station during the period of 1991-2020 was 6.2 °C, while the average daily maximum was 11.7 °C and the average daily minimum temperature recorded was 0.6 °C. The extreme maximum temperature was 34.0 °C recorded on August 18, 1987, and the extreme minimum temperature was -35.0 °C recorded January 31, 1993 (GOC 2023b).

7.2.2 Severe Weather Events

Extreme precipitation and storms can occur in Nova Scotia throughout the year but tend to be more common and severe during the winter. Winter storms generally bring high winds and a combination of snow and rain, especially in low lying areas near the Bay of Fundy.

Extreme rainfall events occur when 50 mm or more rain falls over a 24-hour period. Environment Canada issues a rainfall warning when this is forecast to occur (ECCC 2020). Significant ice storms have also affected Nova Scotia with an increased frequency. Ice buildup on power infrastructure during these storms has led to significant damage to equipment and transmission/distribution infrastructure, as well as impassable roads, wide-spread power outages, and health emergencies.

Electrical storms, or thunderstorms, which are less frequent in Nova Scotia than the rest of Atlantic Canada, occur on average 5 to 10 times a year (NAV Canada 2001). Generally, only one of these storms (per year) is extreme enough to produce hail. Thunderstorms can produce extremes of rain, wind, hail, and lightning; however, most of these storms are relatively short-lived.

Tornadoes are rare in Nova Scotia but can occur. Across Canada, tornadoes occur most frequently in two areas – from southern Alberta across southern Saskatchewan and southern Manitoba to northwestern Ontario, and from southern Ontario across southern Québec to New Brunswick. These are extensions of tornado-active areas in the United States, separated by a stabilizing low frequency area caused by the influence of the comparatively cool Great Lakes (Western University 2023).

7.2.3 Seismicity

Seismic activity is dictated by the local geology of an area and the movement of tectonic plates comprising the Earth's crust. Natural Resources Canada monitors seismic activity throughout Canada and identifies areas of known seismic activity to document, record, and prepare for seismic events that may occur. The Project area is in the Northern Appalachians Seismic Zone, which includes most of Nova Scotia and extends into the northeastern United States, as far south as Boston, Massachusetts. Historical seismic data recorded throughout this zone has identified clusters of earthquake activity. However, historical seismic activity is considered low (Natural Resources Canada 2021b). Earthquakes in Nova Scotia generally cluster around the southeastern corner of the province.

The largest recorded earthquakes in Nova Scotia were two magnitude 3.2 (on the Richter scale) events on August 11, 2006, near Bridgetown and on July 16, 2007, near Greenfield. Other moderate earthquakes in the region of the Project ranged from 1.4 to 2.7 in magnitude from 2008 to 2022 (Natural Resource Canada 2021a). The maximum credible earthquake magnitude for the northern Appalachians region is estimated to be magnitude 7.0, based on historical earthquake data and regional tectonics (Adams and Halchuk 2003). It is noted that there is potential for large earthquakes of up to an estimated magnitude 7.5 along fault zones in the St. Lawrence River region. However, such events in this region

would be almost 500 km from the Project site, and therefore the amplitude of ground motions at the Project site would be low due to attenuation over a large distance.

Based on the low probability that a major seismic event would occur in the immediate vicinity of the Project during the Project's lifespan, major Project damage or interruption to activities due to earthquakes during any phase of the Project is low. Therefore, seismicity was not carried forward for further consideration under the Effects Assessment for this Project.

7.2.4 Forest Fires

The Fire Weather Index is a component of the Canadian Forest Fire Weather Index System. The index provides a numeric rating of fire intensity and is the general index of fire danger throughout the forested areas of Canada (Natural Resources Canada 2023).

The mean Fire Weather Index in Glenholme, Nova Scotia for the month of July (i.e., normally the driest month of the year), when risk of forest fire is typically greatest, was 0-5, as shown in **Figure 7.1**, which is the lowest rating on the scale of possible fire risk. This risk is based on Fire Weather Normals data, representing the average value of a fire weather code or index over the 30-year period from 1981 to 2010 (Natural Resources Canada 2023).

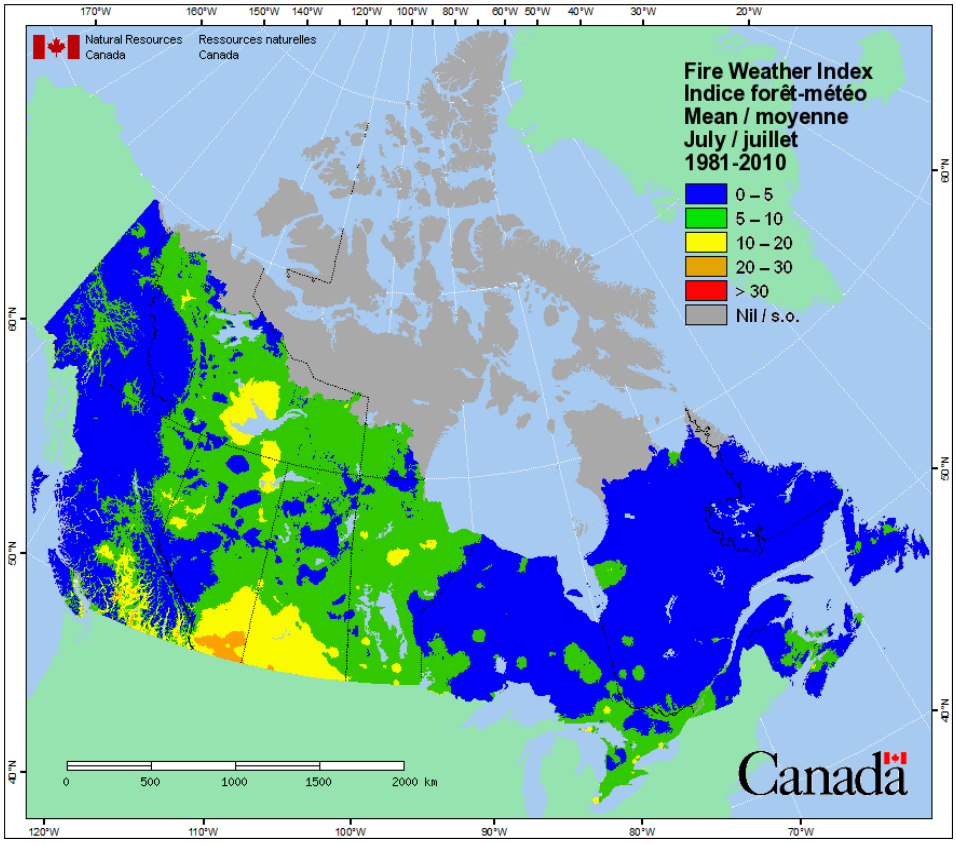


Figure 7.1: Natural Resources Canada Fire Weather Index

7.3 Effects Assessment

As a factor of safety, and a matter of responsible engineering practice, the design, and materials to be chosen for construction of the Project will be selected so that the Project will withstand environmental stressors that could occur from various natural and environmental phenomena (e.g., extreme storms, increased precipitation and other factors arising from climate change, and others). The Project will be constructed to meet all applicable safety and industry codes and standards.

The engineering design of the Project will consider and incorporate potential future changes in the forces of nature that could affect its operation or integrity (e.g., climate change), and Project components and infrastructure will be designed and built to adapt to or withstand these effects.

Design requirements address issues associated with environmental extremes including:

- storm water drainage from rainstorms and floods; and
- erosion protection of slopes, embankments, ditches, and open drains.

7.3.1 Potential Effects

7.3.1.1 Effects of Climate and Climate Change and Extreme Weather on the Project

To assess the environmental effects of climate on the Project, current climate and climate change must both be considered. Current climate conditions have been established by compiling relevant historical data and establishing a climatological background for the Project area. Climate change effects projected over the life of the Project are determined through reviewing the climate modelling research to establish the current state of understanding of likely trends in the area over the next 50 to 100 years. However, as noted in **Section 2.6**, since the Project has an anticipated lifespan of approximately 30 years, rather than placing the most emphasis on the effects of long-term climate change on the Project, it is generally more appropriate to consider the effects of recent climatological conditions, especially the potential adverse effects of weather variability and weather extremes (e.g., change in precipitation).

Numerous climate-related conditions, linked primarily to global warming, have been observed across Atlantic Canada, the entire country and globally. These changes to the climate regime will continue to accelerate over the next century, as has been the case with global temperatures over the past two decades (IPCC 2023). Several changes in conditions have been projected to affect infrastructure in Atlantic Canada in the future, including changing precipitation patterns, higher temperatures, more storm events, increasing storm intensity, erosion, and flooding.

The relatively short period of construction (1 year) and the anticipated period of operation and maintenance (about 30 years) for the Project is not considered as a period over which the effects of

future climate change can or should be considered. Rather, it is more important to consider recent climate trends (1991-2020 averages and extremes) and assess the likelihood and effect of severe and extreme weather events on the Project so that they may be accounted for in the design, construction, operation and maintenance, and eventual decommissioning and reclamation processes and timelines. The most relevant climate changes that could potentially have effects on the Project include:

- increased frequency and magnitude of heavy precipitation events; and
- increased frequency of extreme storms accompanied by heavy and/or freezing precipitation, thunderstorms, and strong winds; and increased incidence of flooding and erosion.

Each of these effects must be considered in terms of how they may adversely affect the Project if they are not planned, engineered, and designed to account for such effects. The environmental attributes described have the potential to affect the Project in several ways, including but not limited to:

- a reduction in visibility and an inability to manoeuvre construction and operational equipment;
- changes to the ability of workers to access the work site (e.g., poorly designed culverts, erosion and road washouts);
- damage to construction equipment and site infrastructure; or
- reduce the ductility of construction materials used in Project components and increase susceptibility to brittle fracture.

Extreme snowfall can also affect winter construction and operation and maintenance by causing a delay in delivery of materials and resulting in additional effort for snow clearing and removal. This additional effort, however, would not substantially change the Project schedule. Extreme snowfall contributing to unusual flooding during snowmelt and extreme rainfall events could also potentially lead to flooding and erosion. Heavy rain, snowfall and/or freezing rain events could also cause an interruption of services such as communications or on-site electrical power.

During electrical storms, fault currents (defined as a current that is several times larger in magnitude than the current that normally flows) may result from a lightning strike and could result in danger to personnel and damage to infrastructure.

Some effects, such as damage to infrastructure, can also result in consequential effects on the environment. These types of environmental effects are addressed as Accidents, Malfunctions, and Unplanned Events in **Section 8.0**.

Based on the low probability that a major seismic event would occur in the immediate vicinity of the Project during the Project's lifespan, major Project damage or interruption to activities due to earthquakes during any phase of the Project is low.

7.3.1.2 Effects of Forest Fires on the Project

With respect to the effects of forest fires on the Project, Project-related equipment and vehicles could be damaged by extreme heat. Smoke generated by forest fires could adversely affect Project personnel resulting from reduced air quality. The Project is situated within a sparsely developed region where forest fires are not common.

Aerial imagery indicates that the forests surrounding the PDA area have been subject to varying degrees of harvest and silviculture related to forest harvest practices. Fire behaviour normals mapping (Natural Resources Canada 2023) indicates that the mean rate of spread of fire in the Project area is approximately one metre per minute. The rate of spread is based on several factors including fuel type, forest health, and crown base height. The mean rate of spread for the Project area is the second lowest on the scale used by Natural Resources Canada.

Nova Scotia has a forest fire control program in place to identify and control fires, minimizing the potential magnitude and extent of forest fires, and their potential consequent effects on the Project. Local and provincial emergency response crews will provide for rapid detection and response to identified fire threats. This includes fires that could start within the Project site perimeter as well as fires approaching from outside the area (i.e., forest fires). In addition, the large open cleared area (i.e., the open pit) provides a safety and fire buffer, further decreasing the likelihood of a forest or brush fire causing substantive damage to the Project. The on-site trailers and truck scale are also situated in an open field which offers greater protection against fire damage. Structures located in open grassy fields are more easily protected by emergency personnel by use of scratch lines or fire breaks to halt the advance of a grass fire before they reach structures. Furthermore, sand and gravel are inert and non-flammable.

With respect to the effects of forest fires on the Project, the facility structures will be constructed primarily of concrete, asphalt, metal, and steel (e.g., electric plant), which are not typically affected by fire, and the majority of materials handled (e.g., topsoil, grubbings, sand and gravel) are not flammable.

7.3.2 Mitigation

Mitigation strategies for minimizing the likelihood of a significant adverse effect of the environment on the Project are inherent in the planning process being conducted, the application of engineering design codes and standards, construction practices, and monitoring. To address these environmental effects, proactive design, planning, and maintenance are required in consideration of the potential normal and extreme conditions that might be encountered throughout the life of the Project.

7.3.2.1 Mitigating Effects of Climate and Extreme Weather on the Project

- Disruption of Project activities and delays to the Project schedule will be avoided by scheduling tasks that require precise and/or timely movements for periods when the weather conditions are favourable. A disruption allowance will be considered in Project and operational scheduling.
- Extreme precipitation events are an expected work condition, and the Project schedule allows for weather conditions typical for the region. The Project will account for storm allowances (i.e., 1-in-100-year 24-hour flood event). These allowances are sufficiently conservative to account for extreme weather events and to consider increase in the frequency and/or severity of significant storm events that might arise from climate change over the life of the Project. As such, site water management features will be in place early in the construction phase to manage potential increased site run-off from precipitation events that could occur.
- Erosion because of extreme precipitation and potential flooding is not anticipated to have a substantive adverse effect on the Project due to standard mitigation measures that will be implemented (e.g., collection and management of site water, use of erosion and sedimentation control structures, construction methods that stabilize erodible soils as early as possible after ground has been disturbed). Following construction, exposed soils will be stabilized, roadways will use suitable gravel bases and sub-bases to prevent erosion, and exposed areas will be vegetated where possible to prevent surface erosion.

7.3.2.2 Mitigating Effects of Forest Fires on the Project

The Project and related infrastructure, including the facility structures will be constructed primarily of concrete, asphalt, metal, and steel which are not typically affected by fire, and most materials handled (e.g., topsoil, grubbings, sand and gravel) are not flammable. Through integrated and coordinated emergency response capabilities at the local and provincial levels, project personnel will mobilize away from the PDA if forest fires are affecting the local area, and will only return under clear and safe conditions, as determined by emergency response agencies in the province.

7.3.3 Characterization of Residual Effects

The potential effects of the environment on all Project phases will be considered in the planning and design of the Project and in the scheduling of Project activities to limit delays, prevent damage to infrastructure and the environment, and to maximize the safety of staff. Compliance with regulatory standards is expected to account for weather extremes, and forest fire threats through built-in factors of safety to prevent undue damage to infrastructure from such events. Although it is possible, even likely, for the PDA to experience extreme environmental conditions during the Project lifecycle, a substantive delay (e.g., a delay for more than one season) is not anticipated.

Further, no substantial damages to Project infrastructure are anticipated because of natural environmental conditions due to the design and type of activities proposed. Therefore, the effects of the

environment are not expected to adversely affect the Project in a manner that cannot be planned for or accommodated through design and other mitigation and adaptive management strategies. As a result, the effects of the environment on the Project are expected to be not significant.

7.4 Summary

As a matter of generally accepted engineering practice, responsible and viable engineering designs tend to consistently overestimate and account for possible forces of the environment, and thus inherently incorporate several factors of safety so that a project is designed to be safe and reliable throughout its lifetime.

For the Project, long-term environmental management, and Project longevity (approximately 30 years) are inherent considerations in the best management practices of the design and associated Project risk management. Equipment and materials that can withstand severe weather and other influences will be used. Environmental stressors, such as those that could arise because of climate change, severe weather, or other factors would more than adequately be addressed by good planning, materials selection, best practices, and engineering foresight. As will be demonstrated, while there is potential for natural forces to affect the Project, it is not likely to have a substantive effect due to planned mitigation and design.

OSCO will continue to monitor changing information regarding climate change and design, and operations will be managed adaptively so that the effects of the environment on the Project will be mitigated if new situations develop. Accordingly, the effects of the environment on the Project are considered not significant, with a high level of confidence.

8.0 Accidents, Malfunctions, and Unplanned Events

This section identifies accidents, malfunctions, and unplanned events that may occur during the proposed Project's lifespan. The assessment focuses on events that are considered credible based on the Project description and the experience of the EA team in assessing similar projects.

8.1 Approach

The general approach to assessing the potential environment effects of the selected potential accident, malfunction, or unplanned event scenarios involves the following:

- describing the potential accident, malfunction, or unplanned event;
- considering if the potential accident, malfunction, or unplanned event could occur during the life of the Project, and during which phase(s) or activity(ies);
- determining with which valued environmental component(s) (VECs) the potential accident, malfunction, or unplanned event may interact;
- describing the Project planning and safeguards established to minimize the potential for such occurrences to happen;
- considering of the contingency or emergency response procedures applicable to the event; and
- in consideration of the above, assessing the residual environmental effects of accidents, malfunctions, and unplanned events on related VECs, and determining the significance of the potential residual environmental effects of these accidents, malfunctions, or unplanned events (and their likelihood of occurrence, as applicable).

Spatial and temporal boundaries for considering residual environmental effects of potential accidents, malfunctions, and unplanned events that may arise as a result of the Project are the same as those for each VEC to which they apply, presented earlier in this document. Similarly, criteria used for determining the significance of residual environmental effects with respect to potential accidents, malfunctions, and unplanned events are the same as those for each applicable VEC.

8.2 Description of Potential Credible Accidents, Malfunctions, and Unplanned Events

Based on the nature of the Project, knowledge of the environment within which the Project is located, as well as the experience of the Proponent, the following credible accidents, malfunctions, and

unplanned events have been selected for this assessment, and are described in greater detail in the following sections.

Pit Slope Failure: A slope failure may occur due to two principal reasons: failure of working faces of the open pit due to improper design and/or operational procedures; or failure of overburden slopes above the working face. Improperly designed and operated open pits could result in a slope failure that could pose a safety hazard to workers, damage to equipment as well as negative effects to the atmospheric and socioeconomic environments during all phases of the Project.

Failure of an Erosion and Sediment Control (ESC) Measure: Failure of erosion and sedimentation control (ESC) measures designed to prevent exposed soil from mobilizing and entering undisturbed areas may occur as a result of extreme rainfall or spring run-off. This event includes a structural failure of the water management pond (settling pond) on-site. A failure of an ESC measure could result in mass wasting of soil or siltation of receiving watercourses. The discharge of sediment to watercourses during storm events or spring run-off following the failure of an ESC measure could occur during all phases of the Project.

Vehicle Accident: A vehicle accident is possible during all phases of the Project at the proposed Pit No. 4 Extension site or in transit on provincial roads. A vehicle accident includes a collision with other vehicles, pedestrians, wildlife, or structures/objects, and potentially pose a risk to the health and safety of workers, the public, or wildlife. A fire or fuel spill could also occur because of a vehicle collision, compounding the initial effects by potentially threatening surface water, groundwater, fish and fish habitat, wildlife and wildlife habitat, vegetation, and wetlands.

Accidental Release of a Hazardous Material: An accidental release of fuel used in vehicles or mobile equipment on-site may occur during refuelling of machinery or trucks as a result of human error or equipment malfunction, potentially affecting surface water, groundwater, fish and fish habitat, wildlife and wildlife habitat, vegetation, and wetlands. Loss of petroleum hydrocarbons, hazardous materials or other substances that may volatilize and adversely impact the ambient air quality.

Discovery of an Archaeological, Cultural, or Historical Resource: Previously undiscovered archaeological resources (i.e., artifacts) could be uncovered during excavation of topsoil and overburden as well as from other earth moving activities on the site during the construction phase. Similarly, if present, palaeontological resources (i.e., fossils) could be uncovered during extraction in the operation and maintenance phase of the Project as the underlying bedrock is exposed for removal.

Fire: An accidental fire could potentially be caused during all phases of the Project. Sources of potential for fire include hot exhaust or equipment, discarded cigarettes, or sparks. Wildlife including migratory birds could be killed directly and fire poses a safety risk. Surface water quality can be affected indirectly if runoff from a burned area enters a watercourse. Significant fires may result in smoke which could impact air quality.

8.3 Potential Interactions between Accidents, Malfunctions, and Unplanned Events and Related Valued Components

Based on the nature of the above credible events and the study team's knowledge of their potential to interact with the environment, the VECs with a reasonable potential to interact with these potential accidents, malfunctions, or unplanned events that could result in residual environmental effects are identified in **Table 8.1**.

Table 8.1: Potential Interactions of Accidents, Malfunctions, and Unplanned Events with Valued Environmental Components

Accident, Malfunction or Unplanned Event	Atmospheric Environment	Acoustic Environment	Water Resources (Groundwater and Surface Water)	Fish And Fish Habitat	Vegetation	Wetlands	Wildlife And Wildlife Habitat	Socioeconomic Environment	Archaeological, Cultural, and Historical Resources	Traditional Land and Resource Use
Pit Slope Failure	✓							✓		
Failure of an Erosion and Sediment Control Measure			✓	✓	✓	✓	✓			✓
Vehicle Accident	✓	✓	✓	✓	✓	✓	✓	✓		
Accidental Release of a Hazardous Material	✓		✓	✓	✓	✓	✓	✓		✓
Discovery of an Archaeological, Cultural, or Historical Resource									✓	
Fire	✓		✓	✓	✓	✓	✓	✓		✓

Legend:

✓ indicates a potential interaction

Those accidents, malfunctions, or unplanned events that may result in an interaction with a specific VEC are identified with a checkmark in the table above and are therefore carried for further assessment below.

Accidents, malfunctions, or unplanned events that are not identified with a checkmark in the table above are not expected to result in an interaction with a specific VEC or VECs. For those accidents, malfunctions, or unplanned events, the residual environmental effects of the Project with the VECs for which an interaction was not identified in the above table during each phase are not significant, with a high level of confidence.

8.4 Assessment of Potential Environmental Effects from Accidents, Malfunctions, and Unplanned Events

This section assesses the environmental effects of each of the credible accidents, malfunctions, and unplanned events for which an interaction was identified with a related VEC (or VECs) and identifies mitigation measures to address the potential residual environmental effects. The significance of potential residual environmental effects following the implementation of mitigation or consideration of emergency or contingency response procedures is also discussed.

8.4.1 Pit Slope Failure

A pit slope failure could pose a risk to workers or equipment within the working area of the Project or may lead to worker injury or possibly death as well as damage to equipment. Potential dust generated by a pit slope failure would have negative effects on the atmospheric environment. Related effects could also include interruption or suspension of extraction operations during investigations by regulating agencies. Such an interruption could cause an adverse effect on the socioeconomic environment.

8.4.1.1 Mitigation

Key mitigation to prevent a slope failure includes:

- Pit slope angles will be established using standard of practice approaches and methodologies combined with the Proponents experience with aggregate removal;
- The pit will be operated in accordance with health and safety-based requirements limiting the pit face height and defining established setbacks; and
- Pit face inspections will occur daily, and an Emergency Response Plan will be in place.

8.4.1.2 Potential Residual Environmental Effects

The risk of slope failure during the Project is expected to be low with the implementation of good working practices and preventative measures, and adherence to applicable provincial regulations and guidelines for the safe operation of aggregate pits.

With preventive and mitigation measures, safe working practices, compliance with occupational health and safety legislation, and the low probability of slope failure, the potential residual environmental effects of a slope failure on VECs during the Project are considered not significant, with a high level of confidence.

8.4.2 Failure of an Erosion and Sediment Control Measure

Erosion and sediment control (ESC) measures prevent erosion of surface soils and the resulting surface run-off from directly entering surface water bodies. A failure of an ESC measure could be a result of the measures being insufficient to manage a given run-off event (e.g., rainfall or spring run-off exceeding capacity) or the implementation was poorly constructed.

A failure of an ESC measure could affect primarily fish and fish habitat. The discharge of run-off containing sediment to watercourses during storm events or spring run-off could result in the degradation of adjacent surface water bodies, wetlands, and fish and fish habitat those environments support. The effects on fish and fish habitat could include a temporary reduction in water quality due to increased sediment load. If the release were to occur during spawning, spawning beds could be negatively affected as sediment may cover the gravel beds and suffocate the eggs. Aquatic organisms may be adversely affected by a sediment release, potentially reducing the fish's food supply.

In addition, a failure of an ESC measure could affect traditional land and resource use as a consequential environmental effect. Indigenous communities that practice traditional activities near the Project site could be affected if the fish and fish habitat affected by an ESC failure were being used for traditional purposes.

8.4.2.1 Mitigation

Key mitigation to prevent a failure of erosion or sedimentation control measures includes:

- Contingency plans will be developed for extreme rainfall or spring run-off events including:
  - monitoring of surface run-off conditions during heavy rainfall/spring run-off and operational observations to evaluate the need for improvements in surface runoff control;
  - cover will be applied to highly erodible areas;
  - clean-out of the settling pond and check dams will be conducted, and
  - provision of a stockpile of sediment and erosion control materials.
- Contingency plans may also include temporary pumping of surface water back into the pit. OSCO personnel note that temporary inflow of water to the pit floor during storm events is not an operational concern and allows for natural infiltration.

8.4.2.2 Potential Residual Environmental Effects

The installation, maintenance, and monitoring of erosion and sedimentation control structures is a routine activity on construction sites and industrial operations and is well understood by site managers and construction personnel. With daily visual monitoring of erosion and sedimentation control devices, conducting maintenance of them as necessary, periodically removing accumulated sediment, and active

water management on-site, the risk of a failure of erosion and sediment control measures occurring is expected to be low.
With the implementation of mitigation measures, contingency and emergency response procedures, and best practices, the potential residual environmental effects of a failure of an erosion and sedimentation control measure on surface water, fish and fish habitat, vegetation and wetlands, wildlife and wildlife habitat, and traditional land and resources during all phases of the Project are not significant, with a high level of confidence.

8.4.3 Vehicle Accident

A vehicle accident could affect the socioeconomic, atmospheric, and acoustic environments, water resources, fish and fish habitat, and wildlife and wildlife habitat.

Vehicles will be active across the Project site throughout the lifespan of the Project. Vehicle collisions have the potential to risk human health and safety and other property such as Project infrastructure or private property. This could have an adverse effect on the socioeconomic environment.

Consequential environmental effects of a vehicle accident could occur on the atmospheric and acoustic environment, as fires or fuel spills arising from a vehicle accident could result in a temporary and localized reduction in air and sound quality. Fuel spills resulting from a vehicle accident could adversely affect water resources or fish and fish habitat, as surface or groundwater resources may become contaminated by fuel, potentially threatening potable water supplies and fish and fish habitat. Finally, a vehicle accident could have a direct effect on wildlife in the event of direct vehicle collision, and an indirect effect in the event of a fuel spill or fire resulting from a vehicle collision.

8.4.3.1 Mitigation

Key mitigation to prevent a vehicle accident includes:

- During the construction phase, the necessary barriers and signage will be displayed to minimize the potential for vehicle accidents;
- During operation and maintenance, appropriate road design and speed limit postings will be in place to minimize the potential for vehicle accidents;
- Vehicles travelling to and from the Project site will adhere to posted speed limits, weight restrictions, and other traffic safety rules, and drivers will adjust their speed to conditions accordingly; and
- Drivers will also heed wildlife warning signs and reduce speed in areas identified as posing a potential risk of wildlife collision.

8.4.3.2 Potential Residual Environmental Effects

Though vehicle accidents may occur with any project, particular attention will be paid to conducting Project operations in a careful and safe manner so as to reduce the risk of a serious vehicle accident. With the implementation of mitigation measures, contingency and emergency response procedures, and best practices, the potential residual environmental effects of a vehicle accident on the socioeconomic, atmospheric, and acoustic environments, water resources, fish and fish habitat, and wildlife and wildlife habitat during all phases of the Project are considered not significant, with a high level of confidence.

8.4.4 Accidental Release of a Hazardous Material

The accidental release of a hazardous material through spills could affect primarily water resources and fish and fish habitat, with consequential environmental effects possible to the atmospheric environment, vegetation and wetlands, wildlife and wildlife habitat, and traditional land and resource use.

There will be a 4,500-litre diesel fuel storage tank to provide fuel for on-site mobile equipment and a 200-litre tank to store used engine oil, stored at a dedicated location. Fuel storage will be located, at minimum, more than 30 m from the nearest surface water body. Preventive maintenance will be performed on-site equipment by qualified personnel and contractors. Used oil and filters will be stored for a short time and removed from the site and disposed of in an appropriate manner. Refuelling activities will not be conducted within 30 m of any watercourse or wetland, and equipment operators will remain with the equipment during refuelling in accordance with the *Petroleum Management Regulations* of the Nova Scotia *Environment Act*.

An accidental spill of hydrocarbons or other substances during construction and operation and maintenance of the Project may contaminate air, soils, and groundwater and, through runoff, contaminate watercourses. Contaminants may adversely affect both terrestrial and aquatic habitat and migratory birds. Loss of petroleum hydrocarbons, hazardous materials, or other substances may volatilize and adversely affect ambient air quality on a temporary and localized basis.

Fuel spills may enter a watercourse directly, potentially affecting water quality and fish and their habitat, with the extent of effects depending upon the nature of the material and the quantity released. The effects could range from a small, localized spill, which is contained and remediated quickly, to a large release of a highly soluble material that affects the receiving watercourse and downstream watersheds. Possible negative effects to fish and fish habitat could include direct mortality of fish and aquatic organisms that fish feed upon, degradation of surface water quality, and potential injury or death of wildlife in the event of exposure. If natural resources affected by a spill are used for traditional purposes by Indigenous persons, a consequential environmental effect of a spill could also occur to traditional land and resource use.

Effects on vegetation and wetlands from an accidental hazardous materials release include a physical harm or death of vegetation species, a reduction or loss of wetland function as a habitat for fish and wildlife, and accretion of contaminants in wetland sediments. Contaminants are less likely to move through a wetland system at the same rate as riparian systems due to the low mobility of water and sediments. Contaminants may build up in the sediments and be released into the ecosystem over time, rather than being flushed out over a season as with a riparian system.

8.4.4.1 Mitigation

Key mitigation to prevent an accidental release of a hazardous material includes:

- A Spill Contingency Plan will be developed for various substances anticipated to be on-site during the Project;
- Fuelling or the changing of oil and lubricants will be conducted at a minimum distance of 30 m from wetlands and surface water bodies;
- Releases caused by motor vehicle accidents are addressed initially by local emergency response agencies and directed by NSECC. Subsequently, site contractors will contain the spill and remove contaminated soils and sediment for disposal;
- Additionally, all fuels on-site will be stored in accordance with all provincial regulations and emergency spill kits will be available on-site; and
- Minor spills can typically be cleaned up effectively with minimal long-term impacts, and major spills are not likely based on quantities of hydrocarbons anticipated to be on-site during construction/operation and maintenance.

8.4.4.2 Potential Residual Environmental Effects

With careful implementation of best practices of fuel storage and refuelling of equipment from mobile tankers, the risk of spills occurring during the Project is expected to be low. The risk of contamination from spills and leaks will be reduced further by preventive measures, contingency planning, spill response, and mitigation. The potential residual environmental effects of an accidental release of a hazardous material on the atmospheric environment, water resources, fish and fish habitat, vegetation and wetlands, wildlife and wildlife habitat, and traditional land and resource use during each phase of the Project are expected to be not significant, with a high level of confidence.

8.4.5 Discovery of an Archaeological, Cultural, or Historical Resource

The discovery of a heritage resource would interact with the archaeological, cultural, and historical resources VEC.

Any ground-breaking or earth moving activity has the potential to uncover previously undiscovered archaeological, cultural, or historical resources. Archaeological resources (i.e., artifacts) tend to be found in surficial soils and when discovered, whereas palaeontological resources (i.e., fossils) tend to be found in bedrock. The discovery of these resources can provide valuable information about human activity or use in the distant past (in the case of artifacts), or the presence of wildlife and vegetation in earlier eras (in the case of fossils).

With respect to the Project, it is possible that previously undiscovered archaeological, cultural, or historical resources in the form of artifacts could be found in the surficial soils (including topsoil and overburden) during construction or operation and maintenance of the Project. Moreover, it is possible (though unlikely) that fossils could be found in the underlying rock during operation and maintenance of the Project.

Based on the results of the site walkover and shovel testing conducted as part of the archaeological impact assessment (AIA) for the Project, the site generally has a generally low potential for harbouring archaeological resources. No palaeontological resources were found during archaeological reconnaissance of the PDA (CRM Group, 2023).

8.4.5.1 Mitigation

In the unlikely event that an archaeological, palaeontological, or cultural resource or artifact is discovered during the construction or operation and maintenance phases of the Project, the following procedure will be followed.

- Work will be immediately stopped, and the area will be marked to prevent further disturbance. An exclusion zone of 100 m surrounding the find will be established.
- The Site Manager will immediately contact the Special Places Program (John Cormier: 902-424-4542).
- No additional work will be permitted at the site until approval has been received from the appropriate regulatory agency to resume the work.
- If bones or human remains are found, work in the area must cease, and the RCMP shall be immediately notified.
- No one shall disturb, move, or rebury uncovered human remains.
- If the discovered resources are related to Indigenous culture, the Nova Scotia Office of L'nu Affairs will be contacted to determine how best to proceed with respect to repatriation of the resources.

8.4.5.2 Potential Residual Environmental Effects

Given the generally low archaeological potential of the Project site, the potential to encounter previously undiscovered archaeological, cultural, or historical resources during construction and operation and maintenance of the Project is believed to be low. With the implementation of mitigation measures, contingency and emergency response procedures, and best practices, the potential residual environmental effects on archaeological, cultural, and historical resources during each phase of the Project are expected to be not significant, with a moderate level of confidence.

8.4.6 Fire

An accidental fire could potentially be caused during all phases of the Project. Sources of potential for fire include hot exhaust or equipment, discarded cigarettes, or sparks. Wildlife including migratory birds could be killed directly and fire poses a safety risk. Surface water quality and fish and fish habitat can be affected indirectly if run-off from a burned area enters a watercourse. Vegetation and wetlands may also be directly impacted. Significant fires may result in smoke which could directly impact air quality. Effects on the socioeconomic environment may also occur with damage to property and/or disruption of business operations. If natural resources affected by a fire are used for traditional purposes by Indigenous persons, a consequential environmental effect of a fire could also occur to traditional land and resource use.

8.4.6.1 Mitigation

Key mitigation to prevent an accidental fire includes:

- Compliance with applicable fire bans; and
- Development of a contingency plan for fires.

Refer to **Section 8.4.6** for more information on effects of forest fires on the Project and relevant mitigation measures.

8.4.6.2 Potential Residual Environmental Effects

An accidental fire may occur with any project. Mitigation measures, contingency planning, emergency response procedures and best practices will be implemented during the Project to reduce the environmental effects. The potential residual environmental effects of a fire on the socioeconomic environment, atmospheric environment, vegetation, wetlands, water resources, fish and fish habitat, wildlife and wildlife habitat, and traditional land and resource use during all phases of the Project are expected to be not significant, with a high level of confidence.

9.0 Potential Impacts to the Mi'kmaq of Nova Scotia

The Project is located on the ancestral and traditional territory of the Mi'kmaq people. OSCO recognizes that the Mi'kmaq have a deep-rooted connection to the lands, waters, and ecosystems of Nova Scotia, and they are culturally, spiritually, and economically intertwined with the environment. This EARD seeks to examine the potential impacts the Project may have on Mi'kmaq communities, traditional territories, rights, and ways of life, while exploring ways these impacts could be minimized or mitigated. This section provides an overview of the Mi'kmaq of Nova Scotia, current land and resource uses within the Project and surrounding areas, and potential impacts to Indigenous rights.

9.1 Overview of the Mi'kmaq of Nova Scotia

The province of Nova Scotia now encompasses only a portion of what is known as Mi'kma'ki. Within the province, the Nations today include, in alphabetical order: Acadia First Nation, Annapolis Valley First Nation, Bear River First Nation, Eskasoni First Nation, Glooscap First Nation, Millbrook First Nation, Membertou First Nation, Pictou Landing First Nation, Potlotek First Nation, Sipekne'katik First Nation, Wagmatcook First Nation, and We'koqma'q First Nation.

The Project site, including the surrounding area, is located in the traditional Mi'kmaq district of Sipekne'katik. Sipekne'katik is one of the seven traditional districts across what is now known as Nova Scotia, Cape Breton, Prince Edward Island, New Brunswick, the Gaspé peninsula, northern Maine, and southern Newfoundland. The other traditional districts include: Kespukwitk, Eskikewa'kik, Unama'kik, Epekwitk aq Piktuk, Siknikt, and Kespek (Daniel Paul n.d.; CBU 2023).

9.2 Current Land and Resource Use

Two Mi'kmaq communities have reserve lands ranging between 19 and 50 km from the Project area and belong to Millbrook First Nation and Sipekne'katik First Nation. Millbrook First Nation is located closest to the Project, with reserve lands roughly 19.8 km southeast from the PDA. Sipekne'katik First Nation's Indian Brook Reserve is located 32.1 km south of the PDA, while their Shubenacadie No. 13 is located about 50.2 km southeast of the PDA.

Indigenous rights, in reference to traditional uses, are affirmed by Section 35 of the *Constitution Act, 1982,* which states:

> *"35. (1) The existing aboriginal and treaty rights of the aboriginal peoples of Canada are hereby recognized and affirmed.*

(2) In this Act, "aboriginal peoples of Canada" includes the Indian, Inuit and Métis peoples of Canada.

(3) For greater certainty, in subsection (1) "treaty rights" includes rights that now exist by way of land claims agreements or may be so acquired.

(4) Notwithstanding any other provision of this Act, the aboriginal and treaty rights referred to in subsection (1) are guaranteed equally to male and female persons. (…)"

9.3 Potential Impacts to the Mi'Kmaq of Nova Scotia

Without input from the Indigenous communities and organizations OSCO has engaged with, for the purposes of this assessment, OSCO has identified potential Indigenous rights within the Project area as well as any impacts to those rights. Information regarding Indigenous rights and potential impacts to rights is preliminary and was developed using publicly available literature and information as it relates to the Project. This information and preliminary assessment are not intended to supersede or prejudice the specific traditional land or resource use information or knowledge that may be shared as part of ongoing consultation with Indigenous communities. Rather, it is an attempt to provide information from general knowledge and secondary sources of information that is intended to complement the traditional and Indigenous knowledge that might become available from Indigenous people in this regard. OSCO anticipates that the Crown consultation process will provide an additional opportunity for Indigenous communities and organizations to confirm their rights and whether there are any potential impacts to those rights.

The foundation of Indigenous rights lies in the enduring presence of the Mi'kmaq people and their role as stewards of the land, a practice that predates contact with settlers and spans over 13,000 years in Mi'kma'ki (Canadian Encyclopedia, 2022). This stems from the fundamental concept of *Netukulimk*, encapsulating the Mi'kmaq lifestyle of responsible land stewardship, harmonizing the care for the land with the provision for the community, both in the present and for generations to come (L'nuey 2021).

Indigenous rights include rights that are affirmed by traditional practices, legislation, and the judiciary, as well as asserted by Indigenous communities. Indigenous rights to stewardship, hunting, and fishing have since been recognized and affirmed by treaties (in Mi'kma'ki, this refers to the Peace and Friendship treaties signed between Mi'kmaq, Wolastoqey [Maliseet], and Peskotomuhkati [Passamaquoddy] Nations and the British Crown between 1726 and 1761). Those Aboriginal rights are protected by Section 35 of the *Constitution Act, 1982* (also known as the Canadian Charter of Rights and Freedoms) and affirmed by the Courts. Asserted rights refers to both active land claims and claims to traditional territory (Eyford 2015).

Table 9.1 provides an overview of asserted and affirmed Indigenous rights that may be impacted by the Project, compiled through publicly available data and literature. This table also provides the historical practices, concepts, treaties, legislation, and court cases in which these rights are recognized.

Table 9.1: Asserted and Affirmed Aboriginal Rights that May be Impacted by the Project

Aboriginal Right	Definition and Basis	Sources
Hunting, Fishing, Trapping and Gathering	Applies to land-based harvesting rights including hunting, trapping, and gathering, that are of great cultural, social, and economic importance. • Rights based in traditional customs and practices • Right based in the principle of *Netukulimk* • Protected by the Peace and Friendship Treaties	CIRNAC (2015); Unama'ki Moose Harvesting According to *Netukuklimk*.
Asserted Title Claim	Derived from Indigenous people's historic use and occupancy of a particular territory.	Constitution Act, 1982. Section 35; Centre for Constitutional Studies, 2021a, b; Nova Scotia, 2018
Right to Ceremony	Includes the right to practice spiritual and cultural traditions and ceremonies. • Reinforced by Section 35 of the *Constitution Act, 1982*	Indigenous Foundations (2009); *Constitution Act, 1982*, Section 35.

The potential impacts that this Project may have on Aboriginal rights are illustrated in **Table 9.2** below and are based on desktop research and findings on potential environmental effects. Levels of impact have been classified as low or medium, depending on geographic factors such as anticipated environmental impacts, distance from the Project site, and the potential presence of traditional activities around the Project site. It is important to note that, despite efforts to engage with nearby Mi'kmaq communities and relevant Indigenous organizations, no feedback or insights have been received to date. The absence of this input presents a gap in OSCO's understanding of how Indigenous peoples interact with the land in or near the Project area, and therefore how their rights could be affected by the Project. This highlights the need for continued outreach and collaboration for a comprehensive understanding of potential impacts to Aboriginal rights.

Definition for low impact and medium impact on Aboriginal rights are as follows:

- Low Impact: Classifying an impact as low indicates that the Proponent is not aware of concerns or interests by an Indigenous group but does not imply that the impact is zero or does not exist. A low impact to rights is determined by the following criteria:
  - distance of the community from the Project site (over 100 kilometres);
  - the absence of known practicing of ceremonial rights; and

- the absence of known practicing of hunting or gathering rights.

- Medium Impact: Classifying an impact as medium does not mean that an impact is severe or should result in a pause of Project activities. Impacts are considered medium if they arise during conversations with Indigenous communities and require discussion, collaboration, or mitigation where reasonable by the Proponent in collaboration with the Indigenous communities. A medium level of impact to rights is determined by the following criteria:
  - proximity to the location of the Project, generally if a community has land that is closer than 100 kilometres;
  - the practicing of ceremonial rights near the Project site;
  - the practicing of hunting or gathering rights near the Project site; and
  - feedback shared by Indigenous communities relevant to the project (involvement of marginalized groups, employment, economic, environmental effects, etc.).

Table 9.2: Potential Impacts the Project May Have on Aboriginal Rights

Project Activity	Aboriginal Right(s)	Potential Impact	Level of Impact
Construction	Hunting, Fishing, Trapping, and Gathering	Loss of immature vegetation on the PDA and potential loss of wildlife habitat through clearing activities	Low: The Project will result in the loss of vegetation and wildlife habitat from clearing activities, which has the potential to impact hunting, trapping, and gathering activities. Additionally, Indigenous peoples that may have used the PDA for hunting, fishing, trapping, and gathering activities historically can no longer access the entirety of the PDA as it is privately owned land and for safety and security purposes. However, the Proponent is not currently aware of any of these activities occurring near PDA.
	Asserted Title Claim	Loss of access to the entirety of the PDA	Low: Indigenous peoples that may have used the PDA historically for traditional land use activities can no longer access the entirety of the PDA as it is privately owned land and for safety and security purposes. While the Project is taking place on the traditional territory of the Mi'kmaq people, the Proponent is not aware of any use of the land near the PDA.
	Right to Ceremony	Loss of access to the entirety of the PDA	Low: Indigenous peoples that may have used the PDA for ceremonial activities historically can no longer access the entirety of the PDA as it is privately owned land and for safety and security purposes. While the Project is taking place on the traditional territory of the Mi'kmaq people, the Proponent is not aware of any ceremonial activities near the PDA.
Operation and Maintenance	Hunting, Fishing, Trapping, and Gathering	Project activities may interact with wildlife through noise, vibration, or increased traffic in the area	Low: Disruption of wildlife could impact hunting, trapping, and gathering activities around the PDA. Additionally, Indigenous peoples that may have used the PDA for hunting, fishing, trapping, and gathering activities historically can no longer access the entirety of the PDA as it is privately owned and for safety and security purposes. However, the Proponent is not currently aware of any of these activities occurring near the PDA.
	Asserted Title Claim	Loss of access to the entirety of the PDA	Low: Indigenous peoples that may have used the PDA for traditional land use activities historically can no longer access the entirety of the PDA as it is privately owned land and for safety and security purposes. While the Project is taking place on the traditional territory of the Mi'kmaq people, the Proponent is not aware of any use of the land near the PDA.
	Right to Ceremony	Loss of access to the entirety of the PDA	Low: Indigenous peoples that may have used the PDA for ceremonial activities historically can no longer access the entirety of the PDA as it is privately owned land and for safety and security purposes. While the Project is taking place on the traditional territory of the Mi'kmaq people, the Proponent is not aware of any ceremonial activities near the PDA.

Project Activity	Aboriginal Right(s)	Potential Impact	Level of Impact
Decommissioning and Reclamation	Hunting, Fishing, Trapping, and Gathering	Restoration of vegetation and wildlife habitat	Low: The excavated area will be stabilized, and steps will be taken to promote vegetation. Though the PDA will remain privately owned land, the restoration of the land may encourage hunting, fishing, trapping, and gathering activities nearby. Indigenous communities will be offered to have input in the development of the reclamation plan to promote traditional land use.
	Asserted Title Claim	Loss of access to the entirety of the PDA	Low: The PDA will remain privately owned land and the Proponent is not aware of any use of the land near the PDA. Indigenous communities will be offered to have input in the development of the reclamation plan to promote traditional land use.
	Right to Ceremony	Loss of access to the entirety of the PDA	Low: The PDA will remain privately owned land and the Proponent is not aware of any use of the land near the PDA. Indigenous communities will be offered to have input in the development of the reclamation plan to promote traditional land use.

Information regarding Indigenous rights and potential impacts to rights is preliminary and was developed using publicly available literature and information as it relates to the Project. OSCO anticipates that the Crown consultation process will provide an additional opportunity for Indigenous communities and organizations to confirm their rights and whether there are any potential impacts to those rights.

9.4 Proponent Commitments

OSCO is committed to the following:

- Maintaining an open line of communication and fostering ongoing engagement with the Mi'kmaq.
- Meeting with the Indigenous communities and organizations and the public if there is a request to discuss issues or concerns related to the Project, or to learn more.
- Work with Indigenous communities and organizations to implement steps to address and mitigate any issues that may arise.
- If archaeological artifacts are encountered during construction and operation and maintenance activities associated with the Project, OSCO commits to halting all work in the associated area and will contact the Special Places Program.
- If human remains are encountered during construction and operation and maintenance activities associated with the Project, OSCO commits to halting all work in the associated area and will contact the RCMP.
- Conduct ongoing engagement of Indigenous communities throughout the Project to exchange information, address concerns, and assist in the development of management and reclamation plans for the Project.
- If requested, Indigenous communities and organizations will be provided with the opportunity to harvest and gather species of importance to traditional activities on the PDA prior to construction, if the Project schedule allows.
- If requested by Indigenous communities and organizations, a Mi'kmaq ecological knowledge study may be conducted to identify specific current traditional uses in the PDA that might require accommodation, where reasonable.

10.0 Potential Cumulative Environmental Effects

Cumulative environmental effects are changes to the environment that are caused by an action in combination with other past, present, and future human actions (GOC 2022). Specific to the nature of the undertaking, cumulative effects are combined impacts that may occur when pits and quarries or other types of projects that are in the same region. The cumulative effects are based on the effects and impacts identified in the previous sections.

The geology of the region in which the Project is located has resulted in a long of history of aggregate extraction operations in the area. There are approximately five other aggregate extraction pits within 1 km of the Glenholme area. The Glenholme Pit No. 4 Extension will be concurrent with the operation of existing Pit No. 4 operations; however, the total annual production between this facility will remain the same. The Pit No. 4 Extension aggregate source will extend the life of the operation but will not increase production at this facility as existing aggregate sources become depleted. The other common industry in the region is agriculture. Agricultural lands are quite common and are present in every direction around the subject property. Forest harvest is also anticipated to occur in the general area during the Pit No. 4 Extension development timeframe. The relative disturbance related to the pit development is small in relation to overall land disturbance in the area and temporary in nature. The relative contributions of this Project to noise are anticipated to be within regulatory criteria and local in extent.

In following the Nova Scotia Pit and Quarry Guidelines (Nova Scotia Environment and Labour, 1999), combined with the mitigative measures outlined within the assessment carried out in this EARD, no significant cumulative effects are anticipated as a result of this Project in combination with other reasonably foreseeable future projects or activities in the area.

11.0 Other Approvals Required

Federal approvals are not required for the Project. Additional provincial Approvals required include an industrial approval, water withdrawal approval, watercourse alteration permit, and wetland alteration permit and associated compensation. Monitoring plans required for the Project and approved by NSECC including environmental management plan, air monitoring plan, noise monitoring plan, and water management plan.

11.1 Industrial Approval

Industrial approvals are required for the operation, construction, or reclamation of projects that fall under Division V of the *Activities Designation Regulations*. The Project will be a pit that is larger than 2 ha where a ground disturbance or excavation is made for the purpose of removing aggregate without the use of explosives.

11.2 Water Withdrawal Approval

As described in Division I under the *Activities Designation Regulations* made under Section 66 of the *Environment Act*, a water withdrawal approval is required if surface or groundwater extraction exceeds 23,000 litres per day. The proponent is recommended to follow the guide to surface or groundwater withdrawal approvals provided by NSECC (https://novascotia.ca/nse/water/withdrawalApproval.asp).

11.3 Watercourse and Wetland Alteration Approvals

Project activities resulting in the alteration to a watercourse, water resource, wetland or the flow of water will require an Approval by the Minister of Environment.

Watercourse alterations refer to activities that alter the bed or bank of a freshwater body, such as installing a watercourse crossing. Therefore, an application will be required for the crossing of the watercourse within wetland WL8.

Wetland alterations involve activities that may impact wetland habitat, such as excavation. As stated by NSECC's *Wetland Alteration Application Approval Process*:

> *Any wetland alteration that is less than two hectares of impact to a single wetland or affects multiple wetlands or wetland complexes by less than two hectares each will require a Wetland Alteration Application to be completed. Impacts that are greater than two hectares to a single wetland or wetland complex will require an Environmental Assessment application to be completed.*

Wetlands that will be impacted by the project include WL1, WL3, and WL4. Therefore, a wetland alteration approval will be required, with compensation as applicable for the net loss of wetland function.

11.4 Rehabilitation

A rehabilitation plan is required to be submitted after receiving approval of operation. The rehabilitation should include the following components:

- surface contouring;
- establishing proper drainage;
- revegetation work;
- any work necessary to reclaim the pit; and
- security posted in the amount of $6,250 per hectare of disturbed area.

12.0 Funding

No public or government funding is involved in the execution of this undertaking. All costs will be solely funded by OSCO Aggregates Limited.

13.0 Closing

This document is submitted on behalf of OSCO Aggregates Limited.

Hans O. Klohn, PRESIDENT

MAY 27, 2024
Date of Signature

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

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This report has been prepared by a team of Dillon professionals on behalf of OSCO Aggregates Limited.

Respectfully submitted,

DILLON CONSULTING LIMITED

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Appendix A

The Nova Scotia Registry of Joint Stocks

Appendix B

Record of Engagement

Appendix C

Water Balance Analysis

Appendix D

Atlantic Canada Conservation Data Centre Report

DILLON CONSULTING

Appendix E

Biophysical Surveys