MOUNT UNIACKE QUARRY EXPANSION PROJECT

ENVIRONMENTAL ASSESSMENT REGISTRATION

NORTHUMBERLAND CAPITAL CORPORATION INC.

JULY 2023

MOUNT UNIACKE QUARRY EXPANSION PROJECT

ENVIRONMENTAL ASSESSMENT REGISTRATION

NORTHUMBERLAND CAPITAL CORPORATION INC.

WSP PROJECT NO.: 151-05369-02
DATE: JULY 19, 2023

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July 19, 2023

Environmental Assessment Branch
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Subject: Mount Uniacke Quarry Expansion Project – Environmental Assessment

To whom it may concern,

NORTHUMBERLAND CAPITAL CORPORATION INC.(NCCI) is proposing the expansion of the Mount Uniacke Quarry. The proposed Project is located on privately owned land located off Uniacke Mines Road in Mt. Uniacke, Hants County, Nova Scotia. The Project will consist of expanding the existing quarry to approximately 40.5 hectares of land. Expansion of the Project is scheduled to begin in 2023 pending receipt of all required approvals and permits.

This Project is considered to be a "Class 1 Undertaking" as defined in Schedule A of the Environmental Impact Assessment Regulations, as described by item (B) of Schedule "A" ("*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: (a) ordinary stone; (b) building or construction stone; (c) sand; (d) gravel; (e) ordinary soil*").

Regarding the *Environmental Assessment Regulations*, 9 (1A, xii), this Project will not receive any public funding for the proposed undertaking.

The following document includes a Project description, an overview of existing conditions, a screening of identified Project-Valued Environmental Component interactions, the assessment of any residual effects and their significance, and recommended mitigation measures.

Yours sincerely,

Meghan Marriott, MSc., Adv.Dip. GIS, RPBio., PBiol.
Biolo ist, Earth & Envi onmen

cc:

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EXECUTIVE SUMMARY

Northumberland Capital Corporation Inc. (NCCI) proposes to expand the footprint of its existing quarry (Industrial Approval # 2014-091797) in Mt. Uniacke, Hants County, Nova Scotia (the Project). The expansion will allow for the possibility of adjustments to the existing alignment and layout of the quarry, in addition to the continued production of an average of 30,000-50,000 tons of aggregate annually. The expansion is proposed to take place over approximately 40.5 hectares (ha) of land and is anticipated to provide sufficient aggregate for the quarry for the next 30 to 50 years based on current market demands.

The quarry expansion will exceed four hectares in total area and will therefore require environmental registration as a Class 1 Undertaking, pursuant to the Nova Scotia *Environment Act* and the associated *Environmental Assessment (EA) Regulations*. A guidance document provided by NSECC entitled "Guide to Preparing an EA Registration Document for Pit and Quarry Developments in Nova Scotia" (the Guidelines) (NSE 2009) identifies the scope of work required for pit and quarry developments in Nova Scotia.

This environmental assessment registration evaluates the potential environmental effects of the Project and identifies appropriate mitigation and monitoring to minimize these effects. The document focuses on those aspects of the environment of most concern. Components evaluated include:

- Geology;
- Surface water;
- Groundwater;
- Wetlands;
- Flora and fauna species and habitat;
- Fish and fish habitat;
- Atmospheric conditions / air quality;
- Noise levels;
- Economy;
- Land use and value;
- Transportation;
- Recreation and tourism;
- Human health;
- Cultural and heritage resources;
- Other undertakings in the area.

Environmental effects arising from the quarry expansion will include the loss of terrestrial habitat within the proposed expansion area for the quarry. The Project area does not include unique habitat; however, two avian Species at Risk (SAR) and three additional avian Species of Conservation Concern (SOCC) were observed within the Project area. The two SAR birds, the Canada Warbler and Common Nighthawk, are often associated with regenerating mixed forests, partial cuts, and shrublands, and open and semi-open habitats, and are expected to continue to occupy the Project area throughout the life of the Project.

Assuming the mitigation measures specified in this report are implemented, and the quarry is operated according to existing provincial guidelines and approvals, the majority of effects will have either no impact or minimal/minor residual impact, with limited residual impacts of medium significance. No environmental or socio-economic residual impacts of major adverse significance are expected.

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1 INTRODUCTION

Northumberland Capital Corporation Inc. (NCCI) is proposing the expansion of its existing quarry (Industrial Approval # 2014-091797) in Mt. Uniacke, Hants County, Nova Scotia (the Project). The expansion will allow for the possibility of adjustments to the existing alignment and layout of the quarry, in addition to the continued production of an average of 30,000-50,000 tons of aggregate annually. The expansion is proposed to take place over approximately 40.5 hectares (ha) of land and is anticipated to provide sufficient aggregate for the quarry for the next 30 to 50 years based on current market demands.

The quarry expansion will exceed four hectares in total area and will therefore require environmental registration as a Class 1 Undertaking, pursuant to the Nova Scotia *Environment Act* and the associated *Environmental Assessment (EA) Regulations*. A guidance document provided by NSECC entitled "Guide to Preparing an EA Registration Document for Pit and Quarry Developments in Nova Scotia" (the Guidelines) (NSE 2009) identifies the scope of work required for pit and quarry developments in Nova Scotia.

1.1 IDENTIFICATION OF THE PROPONENT

The name, address, identification of the Proponent, and additional contact persons for the Environmental Assessment of the proposed undertaking are as follows:

Table 1: Project Proponent Contact Information

Name of Project	Mount Uniacke Quarry Expansion Project
Proponent Name	Northumberland Capital Corporation Inc. (NCCI)
Proponent Executive Name and Contact Information	Andrew Rodgers, Allterrain Contracting Inc. 700 Windgate Dr. Lower Sackville, NS, B4G 0A6 Tel.: 902-222-4750 Email: arodgers@nccorp.ca
Landowner Name and Contact Information	Northumberland Capital Corporation Inc. (NCCI) 700 Windgate Dr. Lower Sackville, NS, B4G 0A6 Tel.: 902-222-4750 Email: arodgers@nccorp.ca
Consultant Contact for the Environmental Assessment	Meghan Marriott WSP Canada Inc. 1 Spectacle Lake Drive Dartmouth, NS, B3B 1X7 Tel.: 902-444-8348 Email: meghan.marriott@wsp.com

Proponent Signature — Date: Aug. 21/23.

Andrew Rodgers, Allterrain Contracting Inc.

1.2 REGULATORY OVERVIEW

Pursuant to the *Nova Scotia Environment Act* and *Environmental Assessment Regulations*, the Project requires a Class 1 provincial environmental assessment (EA) as an area greater than 4 ha is proposed for quarry extraction activities.

Provincial and federal legislation relevant to the Project have been identified in Table 2. Any permits, approvals or authorizations that are required will be obtained by NCCI before expansion of the quarry commences.

Table 2: Provincial and federal regulatory and permitting requirements for the Project

LEGISLATION & REGULATORY AUTHORITY	CONTEXT / REQUIREMENTS	AUTHORIZATION REQUIRED
PROVINCIAL		
Nova Scotia Environment Act - 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.	
Industrial Approval pursuant to Part V of the *Nova Scotia Environment Act* - NSECC	Industrial Approvals are permits that allow the operation, construction, or reclamation of projects that fall under Division V of the *Activities Designation Regulations*. These types of approvals are specific and typically cover items related to the daily operations of projects or facilities under approval.	Approval No. 2014-091797 – Amendment required prior to July 2025 – Renewal required after July 2025
Nova Scotia Environmental Assessment Regulations - NSECC	Approval is required for quarries in excess of 4 ha in area primarily engaged in the extraction of ordinary stone, building or construction stone, sand, gravel or ordinary soil.	Environmental Assessment Approval
Nova Scotia Environment Act - Activities Designation Regulations - NSECC	Any 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. Any project activities occurring in wetlands greater than 0.01 (100 m^2) hectares 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.	Watercourse Alteration Notification / Approval – Not Applicable Wetland Alteration Approvals
Nova Scotia Environment Act - Air Quality Regulations - NSECC	Standards for maximum permissible ground level concentrations of air contaminants.	Compliance required

LEGISLATION & REGULATORY AUTHORITY	CONTEXT / REQUIREMENTS	AUTHORIZATION REQUIRED
Nova Scotia Environment Act - Sulphide Bearing Material Disposal Regulations - NSECC	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.	Compliance required
Nova Scotia Environment Act - Contaminated Sites Regulations - NSECC	Specific requirements if contaminated sites are identified or managed as part of Project.	Compliance required
Nova Scotia Environment Act - Petroleum Management Regulations - NSECC	Specifies petroleum storage requirements.	Compliance required
Nova Scotia Environment Act - Environmental Emergency Regulations - NSECC	Specifies requirements in case of an environmental emergency or the release of substances into the environment.	Compliance required
Sustainable Development Goals Act - NSECC	Aims to achieve environmental goals and sustainable prosperity, focusing on climate mitigation and adaptation and the requirements of a circular economy.	None required
Nova Scotia *Endangered Species Act* (*NSESA*) - NSDNRR	Protection of species listed as Extirpated, Endangered, Threatened or of Special Concern, and habitat which supports them. The following acts are prohibited: – 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.	Species-at-Risk Permit – No SAR were identified during baseline studies.
Wildlife Act - NSDNRR	Provides protection measures for wildlife including birds, turtles, and fur-bearing mammals.	Wildlife Act Permit may be required for some species.
Forests Act and Regulations - NSDNRR	Requirements for fire suppression equipment for operations in forests.	Compliance required.

LEGISLATION & REGULATORY AUTHORITY	CONTEXT / REQUIREMENTS	AUTHORIZATION REQUIRED
Special Places Protection Act - Nova Scotia Department of Communities, Culture and Heritage (NSCCH)	Protection of all paleontological and archaeological sites. This Act applies to anyone exploring or excavating land, including land covered by water, to seek archaeological, historical or paleontological sites and remains. No person shall: – Knowingly destroy, desecrate, deface, or alter archaeological resources, or – Excavate or alter an archaeological site or remove any objects from an archaeological site without approval.	Heritage Research Permit (Reconnaissance, Research and Resource Impact Assessment) – Deemed a low potential site for archaeological resources.
Dangerous Goods Transportation Act and Regulations	Requirements for safe transport of dangerous goods.	Compliance required.
Labour Standards Codes	Labour requirements.	Compliance required.
Occupational Health and Safety Act and Regulations - Department of Labour and Advanced Education	Workplace health and safety requirements to be met. Regulations pursuant to Section 82 outline guidelines and regulations for blasting safety. Proponent personnel performing blasting during construction must do so in accordance with these regulations and be in compliance with the Act.	Activity-specific compliance required
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.	https://www.easthants.ca/government/bylaws/
FEDERAL		
Impact Assessment Act (*IAA*) - *Physical Activities Regulations* Canadian Impact Assessment Agency (the Agency)	The *IAA* and its regulations establish the legislative basis for the federal environmental assessment process. Projects that require an environmental impact assessment are set out in the *Physical Activities Regulations*.	Not required
Canadian Environmental Protection Act (*CEPA*) and Regulations - Environment and Climate Change Canada (ECCC)	Primary federal legislation for protecting the Canadian environment and human health, including prevention and management of risks posed by toxic and other harmful substances.	Compliance required

LEGISLATION & REGULATORY AUTHORITY	CONTEXT / REQUIREMENTS	AUTHORIZATION REQUIRED
Fisheries Act and Regulations - Fisheries and Oceans Canada (DFO)/ECCC	Aims to conserve and protect fish and fish habitat, including by prevention of pollution. Prohibits activities that cause death of fish, and harmful alteration, disruption and destruction (HADD) of fish habitat, unless authorized by the Minister of Fisheries and Oceans Canada. Activities occurring in fish habitat are anticipated to require an Authorization under the *Fisheries Act*. The deposit of a deleterious substance into fish-bearing waters is prohibited.	Not required
Species at Risk Act (*SARA*) - ECCC /DFO	Protection of species at the national level to prevent extinction and promote recovery of Endangered, Threatened or Extirpated species, and facilitates the management of species listed as Special Concern. Species listed under Schedule 1 of the *SARA* are federally protected within Canada through general prohibitions. If Project activities interfere with a species-at-risk and its habitat, *SARA* approvals may be required.	*SARA* permit – No SAR were identified during baseline studies.
Migratory Birds Convention Act (MBCA) and Regulations - ECCC	Protection of migratory birds, including the prohibition of disturbance or destruction of migratory bird nests and eggs in Canada, regardless of land ownership. The MBCA also prohibits the dumping of substances harmful to birds in areas and water frequented by them.	Compliance required
Canadian Navigable Waters Act (*CNVA*) - Transport Canada	Regulates works that potentially interfere with navigation on navigable waters, as defined within the Act.	Not required
Transportation of Dangerous Goods Act (*TDGA*) and *Regulations* - Transport Canada	The Transportation of Dangerous Goods Program, pursuant to TDGA, promotes public safety during the transportation of dangerous goods.	Compliance required

1.3 ENVIRONMENTAL ASSESSMENT CONCORDANCE

This document is prepared in accordance with the *Environment Act, Environmental Assessment Regulations* and associated guidance documents. A summary of concordance of this document with the required components under the *Environmental Assessment Regulations* in order to register a Class 1 undertaking in Nova Scotia is included in Table 3.

Table 3: Concordance with the Registration Requirements of the Nova Scotia *Environment Act* and *Environmental Assessment Regulations*

REQUIREMENT	DOCUMENT REFERENCE
(i) the name of the proposed undertaking	Section 1 – Introduction Section 2 – Project Description
(ii) the location of the proposed undertaking	Section 2.1 – Project Overview and Location
(iii) the name, address signature, and identification of the proponent including the name of the Chief Executive Officer and contact persons	Section 1.1 – Identification of the Proponent
(iv) the nature of the undertaking	Section 2 – Project Description
(v) the purpose and need of the undertaking	Section 2.5 – Purpose and Need for the Undertaking
(vi) the proposed construction and operation schedules	Section 2.7 – Anticipated Schedule of Activities
(vii) a description of the undertaking	Section 2.3 – Future Quarry Operations
(viii) environmental baseline information	Section 4 – Environmental Assessment Scope and Methodology
(ix) all steps taken or proposed by the proponent to identify and address the concerns of the public and aboriginal people	Section 3 – Public and Indigenous Engagement
(x) a list of all concerns regarding the undertaking expressed by the public and aboriginal people	Section 3 – Public and Indigenous Engagement
(xi) a list of approvals which will be required and other forms of authorization; and the sources of any public funding.	Section 1.2 – Regulatory Overview

2 PROJECT DESCRIPTION

The Northumberland Capital Corporation Inc (NCCI) is in the preliminary planning stages for the expansion of the existing quarry located in Mt. Uniacke, Nova Scotia (the Project). The quarry expansion will increase the quarry's total footprint from approximately four hectares in total to 40.5 ha; therefore, a Class 1 Environmental Registration is required, pursuant to the *Nova Scotia Environment Act* and the associated *Environmental Assessment (EA) Regulations*. This EA report has been compiled and has been registered with the Nova Scotia Environment (NSE).

This EA Report includes the necessary information to assess the potential environmental effects of the proposed expansion on the biophysical and socio-economic environments. The guidance document provided by NSECC entitled 'Guide to Preparing an EA Registration Document for Pit and Quarry Developments in Nova Scotia" (the Guidelines) (NSE 2009) identifies the scope of work required for Pit and Quarry Developments in Nova Scotia. The following EA Report has documented and analyzed the potential environmental impacts of the proposed expansion on the biophysical and socio-economic environments.

2.1 PROJECT OVERVIEW AND LOCATION

The NCCI quarry is located approximately 2.5 km northeast of the community of Mt. Uniacke, Hants County, Nova Scotia. The Project boundary is approximately 265 m from Uniacke Mines Road and approximately 2.4 km from the community of East Uniacke (Figure 1; 44.915°N, -63.8141°W). The proposed Project area is approximately 40.5 ha within PID 45155801; the same property on which Lot M1A, the existing quarry footprint, is located (Figure 2). Aside from the quarry itself, the remainder of the Project area is comprised of mixed wood forests, immature forests and recently harvested lands (within 1-3 years).

The Project is situated in rural East Hants County with no residences <1 km from the boundary of the proposed expansion area. The closest residence to the Project is approximately 1.7 km northwest, located on Sawdust Road. The access road to the quarry is located off Uniacke Mines Road, approximately 2.3 km northeast of intersection between Uniacke Mines Road and Trunk 1.

There are no protected or conservation areas under federal, provincial, or municipal jurisdiction (Figure 1) within the Project area, nor are there any known significant species or habitats within the Project area based on the Significant Species & Habitat databased maintained by Nova Scotia's Department of Natural Resources and Renewables (NSDNRR). The nearest conservation areas identified at a 1:50,000 scale (Figure 1) are as follows:

- Devils Jaw Wilderness Area located approximately 3.7 km northwest;
- Cockscomb Lake Provincial Park located approximately 4.0 km northwest;
- Bell Provincial Park located approximately 4.0 km south;
- Pockwock Wilderness Area located approximately 4.1 km southwest; and,
- Sackville River Wilderness Area located approximately 7.0 km southeast.

Hillsvale

Devils Jaw Wilderness Area

Cameron Lake

Cockscomb Lake Provincial Park

Lakelands

1

East Uniacke

Mount Uniacke

Bell Provincial Park

191

South Uniacke

Pockwock Wilderness Area

Sackville River Wilderness Area (Pending)

Service Nova Scotia and Internal Services

KEY MAP:

LEGEND:

- LOCATION OF EXISTING QUARRY
- EXISTING QUARRY - LOT MA1 (~4 ha)
- PROPOSED EXPANSION AREA (40.5
- PID 45155801
- PLACE NAMES
- UTILITIES

DESIGNATED

- AIRSTRIP (ruin/inactive/abandoned)
- AUTO SALVAGE YARD
- CEMETERY
- GOLF COURSE
- LAND FILL SITE (land reclamation)
- PARK (amusement & municipal)
- PILE (industrial)
- PIT

N W E S

PROJECT:

PROJECT:
MT. UNIACKE QUARRY EXPANSION

PROJECT NO.:
151-05369-02

CLIENT:
NORTHUMBERLAND CAPITAL CORPORATION INC.

FIGURE:

TITLE:
OVERVIEW
PROJECT LOCATION

FIGURE NO.:	REVISION NO.:
1	0

SCALE: 1:50,000
0 0.5 1 2 Kilometres

DATUM:	PROJECTION:
NAD 83 CSRS	UTM ZONE 20 NORTH
DRAWN BY:	CHECKED BY:
M. MARRIOTT	C. PYTLAK
CREATED DATE: (YYYY-MM-DD)	REVISION DATE: (YYYY-MM-DD)
2022-08-05	2022-08-05

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PATH: E:\GIS\2_PROJECTS\2015\151_05369_02_Mt_Uniacke_Quarry_Expansion\8_MXD\EA_Figures\20220328_151_05369_02_FIG01_Project_Overview.mxd

KEY MAP:

LEGEND:

- PROPOSED EXPANSION AREA (40.5 ha)
- EXISTING QUARRY - LOT MA1 (~4 ha)
- PID 45155801
- PROPERTY BOUNDARIES

MAPPED WATER FEATURES

- WATERCOURSES
- WATERCOURSES (INDEFINITE)
- MAPPED WATERBODIES
- MAPPED WETLANDS

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PROJECT:

PROJECT:
MT. UNIACKE QUARRY EXPANSION

PROJECT NO.:
151-05369-02

CLIENT:
NORTHUMBERLAND CAPITAL CORPORATION INC.

FIGURE:

TITLE:
PROJECT LOCATION

FIGURE NO.:	REVISION NO.:
2	0

SCALE: 1:15,000
0 200 400 800 Metres

DATUM:	PROJECTION:
NAD 83 CSRS	UTM ZONE 20 NORTH
DRAWN BY:	CHECKED BY:
M. MARRIOTT	C. PYTLAK
CREATED DATE: (YYYY-MM-DD)	REVISION DATE: (YYYY-MM-DD)
2022-08-05	2022-08-05

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2.2 EXISTING QUARRY OPERATIONS

Northumberland Capital Corporation Inc. (NCCI) proposes to expand the footprint of its existing quarry (Industrial Approval # 2014-0917) in Mt. Uniacke, Hants County, Nova Scotia. The existing quarry has a footprint of ~4 ha and produces an average of 30,000-50,000 tons of aggregate annually, which is primarily supplied to Allterrain Contracting Inc. Some aggregate is also sold to other contractors and private customers.

The Mt. Uniacke Quarry operation consists of a laydown area on the quarry floor with two aggregate crushers and screen as well as numerous aggregate stockpiles. Surface water runoff and drainage occurring on the quarry floor are directed into a settling pond located along the southwestern edge of the quarry. The settling pond is monitored monthly in compliance with the quarry's Industrial Approval. Northeast of the current quarry face a man-made ditch has been created to collect and divert surface water from flowing down the open face of the quarry, instead being directed into the wooded area to the northwest of the quarry.

Grubbing and overburden stockpiles are minimal due to the surficial geology of the area and have been positioned along the top of the quarry to reduce the likelihood of the general public accidently entering the quarry from above. The overburden provides a physical restriction in the event that the signage is ignored or goes unnoticed as the height of the quarry face is currently approximately 20 m.

There is no bulk fuel storage on site. A mobile fuel service is used to provide sufficient fuel for daily production activities, refilling equipment on a daily basis.

The following subsections provide detailed information pertaining to current operations.

2.2.1 DRILLING AND BLASTING

Blasting at the Mt. Uniacke Quarry typically occurs three to four times a year. Under the *Pit and Quarry Guidelines* (NSE 1999), no blasting is permitted within 800 m of a foundation or base of a structure located off site. The nearest residential structures to this Project site are located approximately 1,700 m away from the existing quarry.

Blasting is completed by a qualified blasting company in accordance with the *General Blasting Regulations* within the *Nova Scotia Occupational Health and Safety Act* (1996). This company is responsible for blast design, methods, and monitoring activities. There are two consistent monitoring locations located on Patrice Lane and Morning Breeze Drive in Mount Uniacke, and one occasional monitoring location located on Beamish Road, Mount Uniacke. These three locations are monitored for concussion and ground vibration to ensure that the limits defined in the Industrial Approval (IA) are not exceeded.

Climatic conditions are assessed prior to blasting to ensure no blasting occurs during a thermal inversion. Other weather conditions which can amplify the sound of the blast are avoided whenever possible (e.g., high relative humidity, dense cloud cover, high winds and temperature).

No blasting occurs on Saturdays, Sundays or Holidays, in accordance with provincial blasting regulations.

2.2.2 PROCESSING ACTIVITIES

Processing activities include crushing and screening aggregate based on demand. Different grades of aggregate (e.g., Type I and II rock, clear stone, armour rock, crusher dust, surge and blown rock) are stockpiled within designated areas on the quarry floor. A front-end loader and an excavator are used to move and load the quarry materials.

2.2.3 WATER MANAGEMENT

The majority of surface water runoff and drainage on site is directed through ditches and culverts into a settling pond to the southwest of the quarry floor. The settling pond is rock lined and has a geotextile lined berm to increase residence time and enable sediment deposition. Water drains from the southwest side of the settling pond via a small culvert and disperses as surface water down a southwest-facing slope. Surface water in the area drains into the large wetland 300 m to the south of the Project site.

The current Industrial Approval for the Mt. Uniacke Quarry requires monthly monitoring and monitoring within 48 hours of major rain events (exceeding 7 mm/hour precipitation) to ensure that water exiting the settling pond meets the specified water quality parameters. Samples are collected from the wetland downslope quarterly to monitor any changes in surface water quality. To date, no samples have exceeded the limits outlined in the current Industrial Approval (IA).

Additional settling ponds and/or water management protocols will be added and/or modified as needed during the gradual expansion of the quarry to ensure water discharge from the quarry continues to comply with exceedance limits defined in the IA.

2.2.4 WASTE MANAGEMENT

The quarry does not generate large volumes of waste material. Prior to blasting, tree clearing is completed by a qualified subcontractor who is responsible for cutting and removing all merchantable timber. Then the minimal amount of soil overlying the rock is removed and stored in the form of a berm at the top of the quarry face to deter ATV users from approaching the quarry. This soil can later be utilized during the reclamation process.

There are no waste disposal bins kept on site, with all wastes from the onsite trailer being disposed of offsite. The portable toilet at the quarry is serviced twice per week as part of a rental service.

2.2.5 HAZARDOUS WATER MANAGEMENT

There is no bulk fuel storage on site. A mobile fuel service is used to provide sufficient fuel for daily production activities, refilling equipment fuel tanks on a daily basis. There are currently no plans to store bulk fuel or any other hazardous materials, chemicals, or petroleum products at the quarry site.

All equipment used at the quarry receives regular maintenance. The used oil and filters are currently stored in containers and removed from the site as soon as possible. This practice will continue for the duration of the proposed quarry expansion operations.

Disposal of hazardous materials and refueling procedures will comply with the best management practices described in the Project's Environmental Protection Plan (EPP) (which follows the EA registration and approval) and regulatory requirements.

2.2.6 TRANSPORTATION AND PRODUCTION

Haul trucks that are loaded with aggregate from the Mt. Uniacke Quarry are comprised of company-owned and brokered tandem, twinsteer and end dump trailers. The majority of haul trucks leaving the quarry access road continue southwest on Uniacke Mines Road towards Nova Scotia Trunk 1 (Evangeline Trail), where they can travel north or south to gain access to Highway 101.

Currently, future production rates for the Mt. Uniacke Quarry are expected to remain relatively consistent with the current rates. The quarry operates 5 days per week and is, and will continue to be, in compliance with the East Hants Municipality bylaws, where applicable. The current expectation is that truck traffic will remain relatively consistent with current operations; however, production will be market driven and may vary over time.

2.2.7 NOISE MANAGEMENT

At the request of NSECC, sound levels associate with the quarry activates are monitored at the property boundaries (at main gate) in accordance with the NSE *Pit and Quarry Guidelines* (NSE 1999). Blasting is the predominant source of noise from the quarry, and as discussed in the Drilling and Blasting section above (Subsection 2.2.1), is planned to occur on days where weather conditions are less likely to amplify noise generated by blasting, which in turn will be monitored at the aforementioned locations.

Haul truck traffic also contributes to noise levels in the quarry during regular operations. Haul truck traffic is expected to remain consistent with current operations, with no anticipated increase at this time.

2.2.8 DUST MANAGEMENT

The quarry does not generate much dust; however, all haul truck loads are covered to minimize dust and contain aggregate material, and dust emissions within the quarry property will be controlled with the application of water when necessary. Should it be required by NSECC, dust emission and particulate matter will be monitored at property boundaries adjacent to the quarry, in accordance with the NSE *Pit and Quarry Guidelines* (NSE 1999).

2.2.9 VIEWSCAPE

The Mt. Uniacke Quarry is located in a rural area and is not visible from any nearby residences or public vantage points.

2.2.10 RISK MANAGEMENT

A contingency plan for the Mt. Uniacke Quarry and its expansion is the responsibility of the Proponent. The contingency plan will include, at minimum, identification of team leaders and contact information, notification procedures for emergencies, spill prevention, spill response procedures, and incident reporting procedures. This plan will be provided to NSECC as part of the EPP.

2.3 FUTURE QUARRY OPERATIONS

Both the existing quarry footprint (Lot MA1) and proposed expansion area are located on PID 45155801. Although the existing quarry has not yet reached the limits of Lot MA1, the proponent is planning for the future by initiating the environmental assessment process now. The Proponent is proposing to expand the quarry footprint to 40.5 ha over the next 30 to 50 years to allow for the continued production and supply of aggregate to the local market (30-50,000 tons per year).

The quarry expansion will exceed four hectares in total area and will, therefore, require environmental registration as a Class 1 Undertaking, pursuant to the Nova Scotia *Environment Act* and the associated *Environmental Assessment (EA) Regulations*. A guidance document provided by NSECC entitled “Guide to Preparing an EA Registration Document for Pit and Quarry Developments in Nova Scotia” (the Guidelines) (NSE 1999) identifies the scope of work required for Pit and Quarry Developments in Nova Scotia.

The expansion of the quarry will allow for continued aggregate production and stockpiling. The timing and rate of expansion and development will be market-driven; however, current production rates are expected to remain relatively consistent. If the local demand for aggregate changes, the proposed plans for expansion may also vary. However, at this time, there are not anticipated to be any changes to current quarry activities, including the amount and frequency of blasting, hours of operation, and volume of haul truck traffic at the quarry.

2.3.1 DEVELOPMENT PLAN

The Mt. Uniacke Quarry expansion is proposed to take place over 30 to 50 years within the proposed expansion area and will accommodate the quarry activates as well as supporting components such as drainage ditches, settling ponds, access roads, stockpiles and more.

Separation distances from the boundaries of the Development Area to public roads (1000 m) was the primary consideration when determining the extent and location of the expansion area.

Initial expansion of the quarry will continue northeast from the existing quarry footprint before expanding to the west, widening the quarry face. The current quarry floor sits at an elevation of 151 m above sea level and rises to natural forested land beyond the existing quarry face to the north (195 m above sea level). The proposed quarry activities will not result in excavation deeper than the existing quarry floor, but rather the additional carving of the existing quarry face into the side of the incline will occur. As the quarry expands, the quarry floor will be sloped down gradient (1-2%) in order to control runoff.

The majority of the proposed expansion area was forested prior to clearcutting, with a portion of the lands being clearcut in 2012, and the latest portion in 2020. Clearing and grubbing necessary to support the quarry expansion will be completed on an as needed basis and will be limited to minimize exposed soils and erosion.

2.3.2 QUARRY COMPONENTS

During expansion, any existing quarry infrastructure will remain in place and no new quarry infrastructure is anticipated at this time. Environmental controls such as settling ponds will be upgraded, and additional measures will be implemented in accordance with a new or amended Industrial Approval.

2.4 DECOMMISSIONING AND RECLAMATION

Decommissioning activities will include the removal of all equipment, structures, and waste from the property. Reclamation of the Mt. Uniacke Quarry will include restoring soil capability, contouring, revegetation, and the implementation of erosion and sediment controls. Prior to quarry operations the Site was undeveloped, forested land. The end land use objectives for the quarry are based on pre-development site conditions, and the reclaimed site should be able to support species previously found on site.

Where practical, progressive reclamation will occur in areas where aggregate resources are exhausted. The majority of reclamation is expected to occur in conjunction with decommissioning. Short- and long-term goals will be identified for site reclamation, such as spreading grubbing piles, sloping, contouring, establishing drainage, and hydroseeding. Reclamation activities will be completed in accordance with NSE *Pit and Quarry Guidelines* (NSE 1999) and to the satisfaction of NSECC and other regulatory departments.

A detailed reclamation plan will be submitted at the request of NSECC prior to the termination of operations at the quarry.

2.5 PURPOSE AND NEED FOR THE UNDERTAKING

The purpose of the expansion is to allow for continued aggregate production and stockpiling to meet the needs of the local aggregate market. Aggregate material is in demand and is used in a wide variety of construction and infrastructure projects.

The expansion will allow for continued employment at the quarry and in related industries where aggregate materials are used. Employment and financial gain are expected to occur in nearby rural communities, and in turn will strengthen the local economy. The Project will be an important addition to the natural resource sector in Nova Scotia.

2.6 CONSIDERATIONS OF ALTERNATIVES

The consideration of alternatives involves assessing different ways in which the objectives of the Project could be achieved. This may include considering alternate locations, extraction methods, transportation routes, or types of equipment.

The proposed expansion is located at the existing Mt. Uniacke Quarry. This area was initially selected in 2014 as an appropriate location for a quarry based on the following criteria:

- availability of suitable rock;
- the willingness of the previous landowner to sell;
- the rural setting;
- No houses within 1.7 km of existing quarry face.

Few alternatives exist for extracting and crushing aggregate. The rock type found within the Project Area is hard and mechanical extraction via ripping is unfeasible. The technique currently employed at the existing Mt. Uniacke Quarry includes drilling, blasting, crushing, stockpiling, and hauling of aggregate. These techniques have proven to be effective and will continue to be used during quarry expansion.

The project is located off Uniacke Mines Road, and the majority of haul trucks leaving the quarry access road continue southwest on Uniacke Mines Road towards Nova Scotia Trunk 1 (Evangeline Trail), where they can travel north or south to access Highway 101. The availability of multiple transportation routes allows for lower traffic on each route overall and allows for many distribution options across a broad area.

Alternatives for all Project components have been considered and the proposed development plan represents the most favorable option with regard to minimizing environmental and human health impacts, balanced with the socio-economic benefits of the Project.

2.7 ANTICIPATED SCHEDULE OF ACTIVITIES

The following schedule outlines the anticipated Project activity and completion timeline.

Table 4: Schedule of Project Activities

TASK	ANTICIPATED COMPLETION DATE
Environmental Studies	Completed 2017 - 2021
Engagement	Community Liaison Committee: since 2015 Public Open House: May 10, 2022 Engagement letters to FN: June 24, 2022; August 9, 2023
Environmental Assessment Registration	August 2023
Expected EA Decision	October 2023
Provincial Permitting (Amendment to Industrial Approval)	IA Approval No. 2014-091797 for PID # 45155801; expires on July 6, 2025. A new IA will be required prior to the quarry expanding beyond the approved ~4 ha area.
Quarry Expansion Window	2023 – 2073 (50 years)
Reclamation	Progress with quarry operations and during decommissioning.

3 PUBLIC AND INDIGENOUS ENGAGEMENT

3.1 INDIGENOUS ENGAGEMENT

Letters of invitation to participate in an engagement opportunity for the proposed quarry expansion were sent to Sipekne'katik and the Native Council of Nova Scotia on June 24, 2022, via email. As of June 19th, 2023, WSP has not yet received a response (letters are available in Appendix A). On August 8, 2023, WSP spoke with Gillian DesRoche, Senior Consultation Advisor for Nova Scotia Office of L'nu Affairs, who advised engagement letters be sent to KMKNO and Millbrook First Nation. Letter were emailed on August 9, 2023.

3.2 PUBLIC ENGAGEMENT

On May 10th, 2022, a drop-in style Open House was held at the Mt. Uniacke Fire Hall. The Open House was advertised in the Chronicle Herald on Saturday, April 30th, 2022 (see Appendix B for a copy of the ad), encouraging members of the general public, agencies and First Nations communities to participate in helping identify issues, concerns, interests and/or ideas to be addressed during the Environmental Assessment Process.

WSP prepared five information boards covering the following topics: Environmental Assessment Class I Process, Baseline Surveys for Avifauna, Plants and Wetlands, Surface Water Monitoring, Archaeological Resource Impact Assessment (ARIA) and Mi'kmaw Engagement (the posters are available in Appendix B). Comment cards with a brief description of the proposed Project were made available at the Open House and attendees were encouraged to fill out the cards while there or to send their comments and concerns to NCCI and/or WSP at a later date.

A total of 79 members of the public signed in at the Open House, with the total attendance believed to be closer to 100 individuals. Comments and concerns were received both during the Open House event and subsequently via email (refer to Appendix B). Table 5 provides a summary of all the comments and concerns received, including recurrence of the main topics. The subsequent subsections discuss in more detail how the Proponent is addressing, or will address some of these concerns.

Table 5: Summary of Public Engagement comments and concerns regarding current and future quarry activities

TOPIC OF CONCERN	RECURRENCE	SUB-TOPICS
ROADS	12 (13%)	Uniacke Mine Road is in very poor condition, and the activities of the quarry make it worse
		Would like the see the quarry use some of their gravel to repair the road (good corporate responsibility)
		Feel the road should be graded and then coated with dust suppressant at least once per month
DUST	10 (11%)	No dust control
		Dust decreases aesthetic value of properties
		Concerned about silica dust (a known carcinogen) being blown off the quarry and the trucks, and impacting the health of local residents

TOPIC OF CONCERN	RECURRENCE	SUB-TOPICS
PUBLIC RELATIONS	23 (24%)	Proponent described as defensive, aggressive, and uncommunicative
		Would like a “proper sit-down meeting” where the information is conveyed in layman’s terms, followed by a question-and-answer session
		The open house was a waste of time; solely to “check a box” in the project approval process
		NCCI isn’t being transparent (lying/hiding expansion intent with from the community representatives on the Community Liaison Committee (CLC) for many years)
		Residents don’t trust NCCI to keep them informed
		The CLC is functionally non-existent, due to the lack of transparency regarding NCCI’s operations
		Feel that NCCI is outright non-compliant with government legislation
		Unclear on WSP’s role in the project
COMMUNITY	22 (23%)	The creation of the existing quarry took an ATV trail and part of another one; driving ATVs is more dangerous now
		Fear for the safety of their domestic animals
		Increase in litter
		Ground vibrations and air concussion from the blasting (can cause damage to infrastructure, startle domestic animals, children, and the elderly)
		Not enough/no notice prior to blasting
		Some residents feel that repairs to foundations and other parts of buildings, plus the washing away of dust, should be done at the expense of the quarry
		Young parents note that the blasting scares/wakes up young children
		Residents don’t feel that the quarry contributes to the community in a positive way
		Residents are concerned that NCCI has connections with SLAM Explorations LTD and their gold mining tests (Refer to Appendix B for Uniacke Newsletter for more information)
		Residents want to know why the province needs 4 quarries in one community (Mount Uniacke, East Uniacke and Upper Rawdon)
		Concerned about the integrity and quality of their wells
		Concerned about the real estate value of their homes
		Some residents feel that the quarry doesn’t belong in a residential area
		Some residents feel that quarry operations are not occurring within the allotted time slots

TOPIC OF CONCERN	RECURRENCE	SUB-TOPICS
TRUCKS	14 (15%)	Too many trucks on the road; more trucks than many residents were led to believe; increase in truck emissions
		The trucks are too heavy for the road
		The trucks are causing too much noise for residential areas
		The trucks are driving too fast; parents are reluctant to let their children play outside for fear of the speed of the trucks and potential for serious accidents
		Some residents fear for themselves when backing out of their driveways and/or when driving because of the quarry trucks
		Some residents feel that the trucks should be scheduled to not interfere with local traffic, and that they should not operate on statutory holidays
ENVIRONMENT	8 (9%)	Concerned that the water quality of the surrounding lakes may suffer
		Concerned about the loss of wildlife in the area that will likely occur during the expansion
		Worried about the disruption or cessation of water sources, such as creeks and springs
		Concerned about the general degradation of the natural environment
		Concerned about the integrity of the headwaters of the Sackville River, as well as the Atlantic Salmon and Wood Turtles which inhabit these waters
PROVINCIAL LEGISLATION	5 (5%)	Feel very strongly that current air quality legislation is inadequate
		Feel that the Provincial Government does not act in the best interests of the environment or of the citizens of the province
		Notice of the expansion was not published in the mandatory two newspapers

3.2.1 ROADS

Uniacke Mines Road is owned and maintained by Nova Scotia Department of Public Works (NSPW). According to a letter received by the Proponent from NSPW on May 10th, 2022 (available in Appendix C), it is the mandate of NSPW "to provide a transportation network for the safe, sustainable, and efficient movement of people and goods, and to connect people and communities in which they live." The letter continues with, "In support of this mandate, Uniacke Mines Road is scheduled to be upgraded under the Gravel Road Program during the 2022 construction season. The road is designated as an intermediate route with a loading of 49,500 kg and is subject to spring weight restrictions." Following the Open House, Uniacke Mines Road has since been upgraded under the Gravel Road Program during the 2022 construction season.

To date, trucks entering and leaving the quarry have complied with the spring weight restrictions for Uniacke Mines Road, hauling at half capacity when weight restrictions are in place.

3.2.2 DUST

The quarry does not generate much dust; however, all haul truck loads are covered to minimize dust and to contain aggregate material, and dust emissions within the quarry property will be controlled with the application of water if it become necessary. Should it be required by NSECC, dust emission and particulate matter will be monitored at property boundaries adjacent to the quarry, in accordance with the NSE Pit and Quarry Guidelines (NSE 1999).

3.2.3 PUBLIC RELATIONS

The Community Liaison Committee (CLC) was established in 2015 at the direction of NSECC, and in compliance with the IA. The CLC meets twice a year, is chaired by the Proponent, and has 4 members of the community on the committee, including a representative from the Sackville River Association.

3.2.4 COMMUNITY

Blasting is completed by a qualified blasting company in accordance with the *General Blasting Regulations* within the *Nova Scotia Occupational Health and Safety Act* (1996). There are two consistent monitoring locations located on Patrice Lane and Morning Breeze Drive in Mount Uniacke, and one occasional monitoring location located on Beamish Road, Mount Uniacke, which are monitored for concussion and ground vibration to ensure that the limits defined in the Industrial Approval (IA) are not exceeded. No blasting occurs on Saturdays, Sundays or Holidays, in accordance with provincial blasting regulations.

NCCI has no affiliation with SLAM Explorations Ltd.

3.2.5 TRUCKS

Following the Open House, as a result of the community adamantly claiming that the quarry activities are causing extensive damage to Uniacke Mines Road due to “the high volume of truck traffic associated with the quarry”, NCCI commissioned a Traffic Study which was completed between Wednesday, June 8th and Sunday, June 12th (at the discursion of WSP) to collect light and heavy traffic volume data at two locations: the entrance to the quarry and at the junction of Uniacke Mines Road and Trunk 1. The data collected from the two deployed Miovision units was separated into a bi-directional breakdown at 60-minute intervals. The study found that over the four (4) day study period a total of 2,385 vehicles accessed Uniacke Mines Road (2,138 light vehicles and 247 heavy vehicles). During the same time period, a total of 232 vehicles (33 light vehicles and 199 heavy vehicles) accessed the quarry road.

The study has demonstrated the not all heavy vehicles using Uniacke Mines Road are affiliated with the quarry; and that 90% of traffic using Uniacke Mines Road are light vehicles.

Table 6 provides a summary of the data collected from the traffic study, refer to Appendix D for the letter report.

Table 6: Summary of traffic study data collected June 8-12, 2022

UNIT LOCATION	LIGHT VEHICLES	HEAVY VEHICLES	TOTAL
Uniacke Mines Rd. / Trunk 1	2138	247	2385
Quarry Access Rd.	33	199	232

3.2.6 ENVIRONMENT

The current Industrial Approval for the Mt. Uniacke Quarry requires monthly monitoring and monitoring within 48 hours of major rain events (exceeding 7 mm/hour precipitation), to ensure that water exiting the quarry settling pond meets the specified water quality parameters. Samples are also collected four times a year from the wetland downslope to monitor for any changes in surface water quality. To date, no samples have exceeded the limits outlined in the current industrial approval.

3.2.7 PROVINCIAL LEGISLATION

NCCI are currently compliant with all legislation applicable to quarry activities within the province and cannot be held to account for perceived issues with said legislation.

Notice of the registration of this environment assessment document will be advertised in the Chronicle Herald within 7 days of registration, in compliance with the Environmental Assessment Regulations 10(1) (NSE 2022), and a notice of the upcoming registration will be advertised in the Uniacke Newsletter in July 2023.

4 ENVIRONMENTAL ASSESSMENT SCOPE AND METHODOLOGY

4.1 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

The environmental assessment scope and methodologies for the Project have been developed to satisfy the regulatory requirements of the Province of Nova Scotia. The proposed Project must be registered for an EA as a Class 1 Undertaking pursuant to the *Environmental Assessment Regulations* of the Nova Scotia *Environment Act*. This document fulfills the requirements for Project registration under this legislation and as outlined in *A Proponent's Guide to Environmental Assessment* (NSE 2018).

The approach used in this report has evolved from methods proposed by Beanlands and Duinker (1983), who stressed the importance of focusing the assessment on environmental components of greatest concern to society or as indicators of environmental health. In general, the methodology is designed to produce an Environmental Impact Statement (EIS) document that:

- Focuses on issues of greatest concern;
- Addresses regulatory requirements;
- Addresses issues raised by the public and other stakeholders;
- Integrates engineering design and mitigation and monitoring programs into a comprehensive environmental management planning process, and
- Integrates cumulative effects assessment (CEA) into the overall assessment of residual environmental effects.

The environmental assessment methodology for this Project includes an evaluation of the potential effects, including cumulative effects, of each Project phase, as well as malfunctions and accidents, with regard to each valued environmental component and valued socio-economic component (collectively referred to as VECs). Project-related effects are assessed within the context of boundaries established for the assessment.

4.1.1 SCOPE

The scope of the Project addressed by the EA includes those components and activities described in Section 2. The assessment encompasses the construction, operation, and decommissioning phases of the Project as presented in Table 7, as well as accidental and unplanned events.

Table 7: Summary of Project Phases and Activities

PROJECT PHASE	WORKS AND ACTIVITIES
Construction (Expansion)	Vegetation clearing
	Grubbing
	Grading, levelling, and contouring
	Wetland alterations
	Construction of storage areas
	Removal and stockpiling of topsoil and overburden
	Construction of and/or upgrades to drainage channels and ponds

PROJECT PHASE	WORKS AND ACTIVITIES
Operation	Drilling and blasting
	Processing (crushing, screening)
	On-site transportation, storage, loading, off-site transportation
	Water management
Decommissioning	Removal of equipment, structures, and waste
	Reclamation (soils, contouring, re-vegetation)
	Closure
Accidental and Unplanned Events	Failure of erosion and sediment control measures
	Spills (chemicals, petroleum, oils, lubricants)

4.1.2 VALUED ENVIRONMENTAL COMPONENTS AND EFFECTS MANAGEMENT

Valued environmental and socio-economic components (referred to as VECs) are environmental, biophysical, or human features that are of value or interest and which may be affected by the Project. The potential VECs for this assessment (Table 8) have been identified because they may be of value or interest to regulatory agencies, the Mi'kmaq of Nova Scotia, key stakeholders, and the general public. Other criteria for their selection included existing site-specific environmental conditions, features and functions in the Project area, and the study team's experience and professional judgement.

Table 8: Valued Environmental Components

VEC	FACTORS CONSIDERED
Atmospheric Environment	Air Quality
	Noise
Aquatic Environment	Groundwater Resources (Quantity and Quality)
	Surface Water Resources (Quantity and Quality)
	Fish and Fish Habitat
	Aquatic Species at Risk
Terrestrial Environment	Vegetation and Habitat
	Plant Species at Risk
Wetlands	Wetland Functions
	Wetland Types and Protection Status
Terrestrial Wildlife	Wildlife Habitat
	Wildlife Species at Risk
Avifauna	Migratory Birds
	Breeding Birds
	Raptors
	Avian Species at Risk
Land Use	Existing Land Use
	Planned Land Use
Traditional Use of Lands and Resources	Traditional Use of Resources (e.g., Hunting, Country Foods)
	Traditional Use of Land (e.g., Burial Grounds, Hunting Camps)
Archaeology and Cultural Heritage	Features and Artefacts of Scientific, Historical and / or Heritage Significance

4.1.3 PROJECT – ENVIRONMENT INTERACTIONS

Potential interactions between the Project components and VECs were identified, based on the effects' pathways for activities associated with construction (expansion), operation, decommissioning, and accidents and malfunctions (Table 9). Potential interactions were identified based on knowledge of the Project and the environmental characteristics of the area.

Table 9: Potential Project-VEC interactions

WORKS AND ACTIVITIES	Atmospheric Environment - Air Quality	Atmospheric Environment - Noise	Aquatic Environment	Terrestrial Environment	Wetlands	Terrestrial Wildlife	Avifauna	Land Use	Traditional Use of Lands and Resources	Archaeology and Cultural Heritage
Construction (Expansion)										
Vegetation clearing	X	X	X	X	X	X	X	X	X	X
Grubbing	X	X	X	X	X	X	X	X	X	X
Grading, levelling, and contouring	X	X	X	X	X	X	X	X	X	X
Watercourse and wetland alterations	X	X	X	X	X	X	X	X	X	X
Construction of storage areas	X	X		X	X	X	X	X	X	X
Removal and stockpiling of topsoil and overburden	X	X	X	X	X	X	X	X	X	X
Construction of drainage channels and ponds	X	X	X	X	X	X	X	X	X	X
Operation										
Drilling and blasting	X	X	X	X		X	X	X		
Processing (crushing, screening)	X	X	X	X		X	X			
On-site transportation, storage, loading, off-site transportation	X	X	X	X		X	X	X	X	X
Water management			X	X	X	X	X	X	X	
Decommissioning										
Removal of equipment, structures, and waste	X	X	X	X		X	X	X	X	
Reclamation (soils, contouring, re-vegetation)	X	X	X	X	X	X	X	X	X	
Closure			X	X	X	X	X	X	X	
Accidental and Unplanned Events										
Erosion and sediment control failure	X		X	X	X	X				
Spills	X		X	X	X	X	X	X	X	

4.1.4 SPATIAL AND TEMPORAL BOUNDARIES

VEC-specific spatial and temporal boundaries were determined for the geographical areas and time periods within which the VECs may interact or are likely to be influenced by the Project. Each identified environmental effect, either direct or indirect, was evaluated within these boundaries. VEC-specific spatial and temporal boundaries are presented in Section 6.

4.1.4.1 SPATIAL BOUNDARIES

The spatial boundaries for this EA are defined by the footprint of the proposed quarry expansion area (Figure 2), as well as the surrounding lands where indirect interactions between Project activities and VECs may occur.

4.1.4.2 TEMPORAL BOUNDARIES

The temporal boundaries identify the duration or timing of environmental effects to the identified VECs during the construction (expansion), operation, and decommissioning and closure phases of the Project which are anticipated to take place over 30 – 50 years.

Similar to spatial boundaries, temporal boundaries may be different for each VEC. For natural features, the assessment considers the ecological variability, sensitivities, and interactions over the course of a full year (e.g., sensitivities associated with migratory time periods, bird nesting or fish spawning time periods). Project activities will be scheduled to avoid potentially adverse interactions with valued components during sensitive periods (e.g., migratory bird nesting periods; fish spawning times) as described in mitigation measures and in compliance with permits and conditions of approvals.

4.2 EFFECTS ASSESSMENT

The analytical methodology employed for the environmental effects assessment represents accepted practice to meet the requirements of the NS Environmental Assessment Regulations as outlined in A Proponent's Guide to Environmental Assessment (NSE 2018). The environmental effects assessment considers any positive and negative environmental effects that the Project may cause. It addresses potential effects associated with routine, planned Project activities, as well as accidents and unplanned events. The process of assessing environmental effects includes the following steps:

- Prediction and assessment of Project-related environmental effects, including both positive and negative effects;
- Identification of mitigation measures to be incorporated in the Project, including avoidance (through design), mitigation via best practice, and compensation; and
- Determination of residual effects and their significance; and
- Proposed mitigation/control measures, including ongoing assessment of their effectiveness.

4.2.1 VEC DESCRIPTION AND BOUNDARIES

A description of each VEC, its ecological and/or socio-economic context and rationale for selection is provided. VEC-specific spatial and temporal boundaries have been determined for geographical areas and time periods within which the VECs may interact or are likely to be influenced by the Project.

4.2.2 SIGNIFICANCE DEFINITION

To determine whether an environmental effect is significant, significance criteria or thresholds are defined for each VEC. These thresholds constitute a measure or standard beyond which residual environmental effects (those remaining after implementation of mitigation and controls) would be significant. Thresholds are quantitative, where possible, and based on: concerns identified during scoping of the Project; existing information regarding the characteristics and state of the VEC (such as its persistence within the Project area); applicable legislation, standards, policies and guidelines; stakeholder input, and professional judgement.

4.2.3 ENVIRONMENTAL EFFECTS ANALYSIS

The potential effects resulting from interactions with the Project, either directly or indirectly, are identified and described for each VEC. The effects analysis includes effects from interactions associated with the construction (expansion), operation and decommissioning phases of the Project, as well as for potential accidents and unplanned events.

Further analysis will not be conducted for noted interactions that are determined not likely to result in an effect, based on existing knowledge. The effects assessment involves both qualitative and quantitative analyses using existing knowledge, professional judgment, and analytical tools (e.g., computer modelling) where appropriate and feasible.

4.2.4 MITIGATION MEASURES

Mitigation measures to reduce or eliminate potential environmental effects are identified. These include environmental protection measures, best management practices, industry standards, and habitat compensation or off-setting projects.

Where possible, mitigation measures have been incorporated into the Project design and implementation in order to eliminate or reduce potential adverse effects. A hierarchical approach has been taken to mitigation options, where mitigation at the source of the effect is deemed most preferable (design or engineering controls); mitigation at the receptor end was considered only if avoidance was deemed not feasible or not sufficiently effective. In instances where an adverse effect is unavoidable and cannot be mitigated to non-significant levels, options for compensation were investigated. For interactions where positive effects are anticipated, opportunities were considered for maximizing the positive effects.

4.2.5 SIGNIFICANCE OF RESIDUAL EFFECTS

Residual effects are environmental effects that will remain after the successful application of proposed mitigation measures. They have been evaluated for the Project construction (expansion), operation and decommissioning phases, as well as for potential accidents and unplanned events.

Significant environmental effects are those adverse effects that will cause a change in the VEC that will alter its status or integrity beyond an acceptable level. The residual effects classification is based on the magnitude, geographic extent, duration/frequency, reversibility and ecological context, and is used to describe residual effects predicted for the Project. These criteria are used to describe the nature and type of an effect on VECs. The residual effects classification is then used to determine the environmental significance of Project effects on VECs. The definitions of the criteria are presented below:

Magnitude is a measure of the intensity of a residual effect or the degree of change cause by a Project on a VEC relative to the existing conditions. Geographic extent and duration of an effect is important in classifying magnitude for a VEC. For magnitude, the criteria are defined as follows:

> **High:** A residual environmental effect affecting a whole stock, population, habitat or ecosystem, outside the range of natural variation that may be near or exceed the resilience limits of a population or community, such that communities do not return to pre-Project levels for multiple generations. For social environment VECs, the residual effect is expected to substantially enhance or interfere with existing conditions in communities in the local area and beyond.
>
> **Moderate:** A small, measurable residual environmental effect affecting a portion of a population or habitat, or ecosystem, returns to pre- Project levels in one generation or less, rapid and unpredictable change, temporarily outside range of natural variability. For social environment VECs, the residual effect is noticeable and may be potentially beneficial or detrimental to individuals and communities in the local area but not beyond.
>
> **Low:** A negligible residual environmental effect affecting a specific local group, habitat, or ecosystem, returns to pre-Project levels in one generation or less, within natural variation. For social environment VECs, the residual effect is limited to a slight positive effect or nuisance to individuals or communities in the local area.
>
> **Nil:** No discernable change to a VEC.
>
> **Unknown:** A residual environmental effect affecting an unknown portion of a population or group or where the changes in a specific parameter are unknown.

Geographic extent refers to the spatial extent of the area affected and is related to the spatial distribution and movement of a VEC. When considering geographic extent in the determination of magnitude, it is important to understand that local scale effects are less severe than those that extend to the regional scale or beyond. Geographic extent is broken into local, regional, and beyond regional as defined as follows:

> **Local scale** effects are those largely associated with direct effects from the Project footprint (i.e., removal of vegetation for construction of project components) and project specific small-scale indirect changes (i.e., within the Local Assessment Area).
>
> **Regional scale** effects are those that are associated with incremental and cumulative changes from the Project and other developments but are restricted to within the Regional Assessment Area.
>
> **Beyond regional** includes cumulative residual effects from the Project and other developments that extend beyond the Regional Assessment Area.

Frequency refers to how often a residual effect will occur but is not to be confused with the frequency of the activity that causes a residual effect. Frequency is explained by identifying when the source of change and residual effect occurs. Frequency is broken into the following categories:

> **Infrequent:** isolated or confined to a discrete period.
>
> **Frequent:** occur repeatedly over the assessment period.
>
> **Continuous:** occurs continuously over the assessment period.

Duration is defined as the amount of time from the beginning of a residual effect to when that effect on a VEC is reversed. Duration is the results of two factors, the amount of time between the start and end of a Project activity that causes stress on a VEC, and the time required for the effect to be reversible. The duration of individual Project activities and the period in which the residual effect may occur are considered. Some effects are reversible shortly after the stress has been removed (e.g., changes in the distribution of some wildlife species following the removal of noise after decommissioning and abandonment), while others may take longer to be reversed (e.g., the change in abundance of some species until revegetation has occurred). In some cases, a prediction of duration may be well beyond the temporal boundary of the Project, it is not known when those effects may be reversed, and a VEC may never return to a state that was unaffected by the Project. In these cases, the likelihood of reversibility is so low that the effect is classified as irreversible. Therefore, duration is broken into the following categories:

> **Short-term:** the residual effect is reversible at the end of construction
>
> **Medium-term:** the residual effect is reversible at the end of operation of the project
>
> **Long-term:** the residual effect is reversible within a defined period of time following decommissioning and abandonment
>
> **Permanent:** the residual effect is predicted to influence a VEC indefinitely. This is applied when an effect is determined to be irreversible.

Reversibility is considered the likelihood that the Project will no longer affect a VEC, as well as the ability of a VEC to return to an equal or improved condition once the interaction with the Project has ended. Reversibility has two alternatives, reversible or irreversible. Reversible is applied to short- medium- and long-term duration residual effects where the Project no longer causes changes to a VEC. Irreversible is applied when the residual effect is predicted to influence a VEC indefinitely or the duration of an effect is unknown.

Ecological and socio-cultural context includes the sensitivity, disturbance, and change to the current status of the VEC. This evaluates residual effects on a larger scale within the surrounding landscape and communities. The ecological and socio-cultural context is evaluated on the level of disturbance to the existing conditions present within and around the Project lands.

The adverse residual effects have been evaluated in the following categories:

> **Low disturbance:** Potential impacts are unlikely to result in landscape-level alterations or community-wide disturbances. Impacts are anticipated to be localized and not affect the local community at large.
>
> **Medium disturbance:** Potential impact could result in moderate landscape-level changes of ecological conditions, such as habitat fragmentation and resulting edge effects. Socio-cultural impacts at this level may cause temporary disruptions to businesses and residents (i.e., road closures).
>
> **High disturbance:** Potential impacts resulting in a high level of disturbance may significantly alter the landscape, such as removal of large swaths of natural habitat and wildlife corridors. The socio-cultural impacts resulting in high disturbance may include long term disruptions, such as a permanent increase in noise for residents or permanent road closures affecting access to local businesses.

For adverse **Residual Effects**, the evaluation for the individual criteria was combined into an overall rating of significance as follows:

> **Major:** Potential impact could jeopardize the long-term sustainability of the resource, such that the impact is considered sufficient in magnitude, areal extent, duration and frequency, as well as being considered irreversible. Additional research, monitoring, and/or recovery initiatives should be considered.

Medium: Potential impact could result in a decline of a resource in terms of quality/quantity, such that the impact is considered moderate in its combination of magnitude, areal extent, duration and frequency, but does not affect the resource's long-term sustainability (that is, it is considered reversible). Additional research, monitoring, and/or recovery initiatives may be considered.

Minor: Potential impact may result in a localized or short-term decline in a resource during the life of the Project. Typically, no additional research, monitoring, and/or recovery initiatives are considered.

Minimal: Potential impact may result in a small, localized decline in a resource during the construction phase of the Project and should be negligible with respect to the overall baseline status of the resource.

4.3 EFFECTS OF THE ENVIRONMENT ON THE PROJECT

The effects assessment also considers how the proposed Project could be affected by environmental conditions, such as climate change or seismic activity. This includes a discussion of extreme weather events, the potential consequences for the Project and environmental components, and the identification of mitigation requirements. The determination of significance follows the same general approach as applied in the assessment of effects associated with planned activities.

5 DESCRIPTION OF THE ENVIRONMENT

5.1 PHYSICAL ENVIRONMENT

5.1.1 TOPOGRAPHY

The Project is situated in the Eastern Interior Ecodistrict (440). The proposed expansion area (Study Area) is located at a local high point in elevation, with the southern portion of the area sloping southwest towards Sackville River. In general, the highest elevation present within the Study Area is in the northern extents of the proposed expansion area (185 m asl), and the lowest point is located within the existing quarry footprint (~145 m asl). There are additional areas of higher elevation which also exist adjacent to the proposed quarry expansion (~195 m asl – to the east).

5.1.2 GEOLOGY AND SOILS

The geology beneath the Study Area is comprised of surficial stony till plain, drumlins, and bedrock of the Goldenville Formation. The soils in this Ecodistrict are comprised of moderately well drained, gravelly sandy loam soils which have derived from underlying slates. Loam has also been noted on quartzitic till veneers which are found along the ridges and flats associated with bedrock outcrops (Webb and Marshall 1999).

5.1.2.1 SURFICIAL GEOLOGY

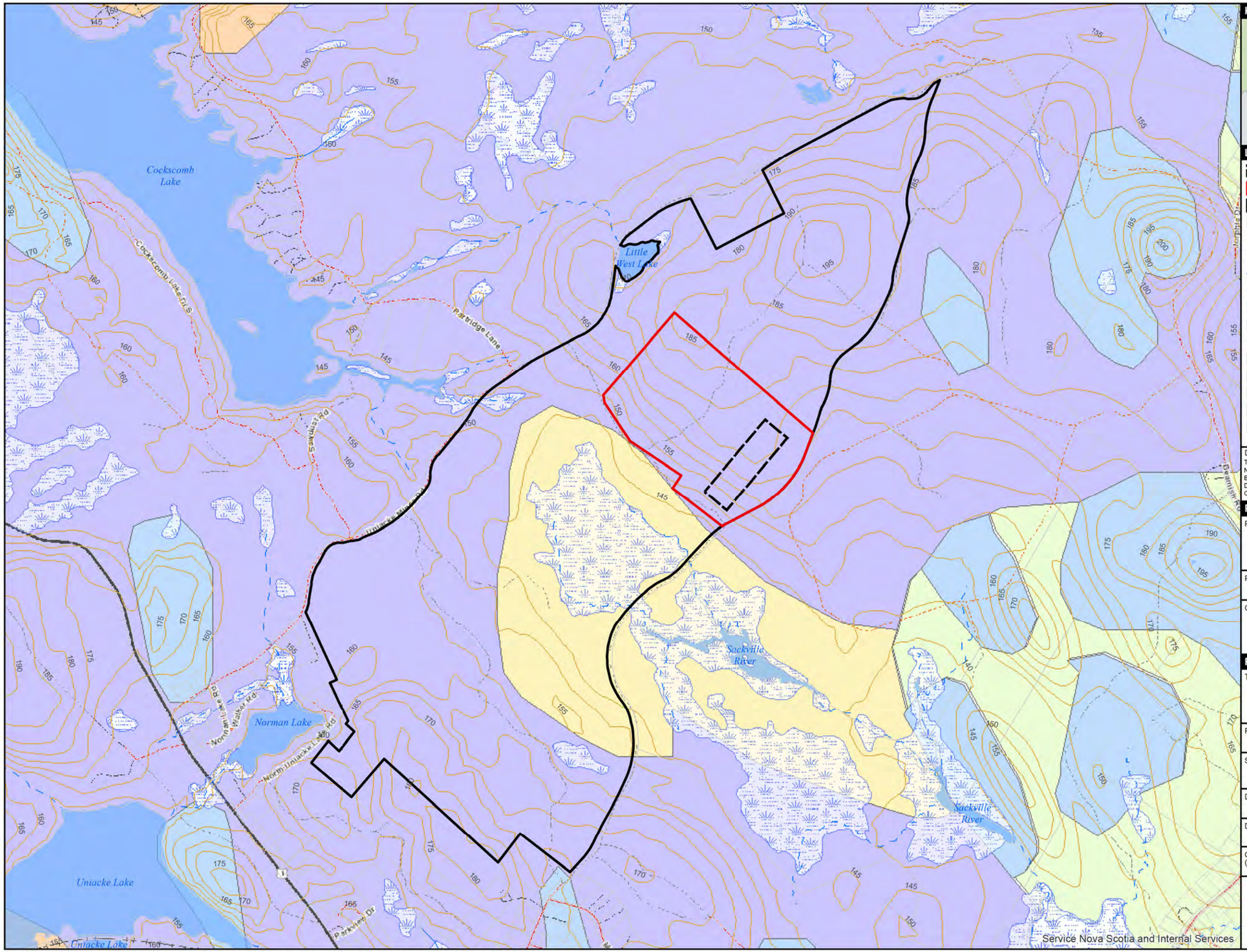
The underlying surficial geology of the Study Area consists of stoney till plain (Stea *et al.* 1992) (Figure 3). The plain is from stony, sandy matrix material derived from bedrock sources; the drumlin facies comprised of siltier till deposits due to the erosion and incorporation of older till deposited during the last Wisconsinan glaciation. The topography of the plain is described as flat to rolling with many surface boulders. The general area is described as stoniness with rapid drainage and a high water table. The acid rain buffer capacity of the area is poor due to shallow metamorphic bedrock (Stea *et al*. 1992). Stony Till Plain has moderate limitations to crop use due to stoniness, rapid drainage and erodibility, and for construction due to shallowness, stoniness and a high water table (Horne *et al*. 2009).

5.1.2.2 BEDROCK GEOLOGY

The underlying bedrock geology of the Study Area is the Goldenville Formation (Horne *et al*. 2009, Keppie 2000; Figure 4). The Goldenville Formation, which is composed of greenish-grey metasiltstone with minor interbedded, grey metasiltstone and dark grey to black slate (Horne *et al*. 2009).

5.1.2.3 ACID ROCK DRAINAGE (ARD)

Exposing and physically disturbing sulphide bearing rocks can result in acid rock drainage which can negatively impact the environment, human health, and infrastructure. Acidic runoff can result in pH levels as low as 3, which can be harmful for aquatic habitats and can increase the mortality rates of aquatic life. The ARD can contaminate drinking water supplies and increase the availability of carcinogenic heavy metals (NSDNRR 2021a). In Nova Scotia, bedrock groups including the Goldenville Formation are more likely to be comprised of acid producing rock, and therefore have the potential to produce ARD. Sub-Topics , respectively. The acid producing potential for the samples were 0.1, 0.1, and <0.1 kg H_2SO_4/t, respectively. Results of this test can be found in Appendix G.



KEY MAP:

LEGEND:

- EXISTING QUARRY - LOT MA1 (~4 ha)
- PROPOSED EXPANSION AREA (40.5 ha)
- PID 45155801
- PROPERTY BOUNDARIES
- CONTOURS (5m)

MAPPED WATER FEATURES

- WATERCOURSES
- WATERCOURSES (INDEFINITE)
- MAPPED WATERBODIES
- MAPPED WETLANDS

SURFICIAL GEOLOGGY UNIT

- BEDROCK
- ORGANIC DEPOSITS
- SILTY DRUMLIN
- SILTY TILL PLAIN
- STONY TILL PLAIN

N W E S

PROJECT:

PROJECT:
MT. UNIACKE QUARRY EXPANSION

PROJECT NO.: **151-05369-02**

CLIENT:
NORTHUMBERLAND CAPITAL CORPORATION INC.

FIGURE:

TITLE:
SURFICIAL GEOLOGY

FIGURE NO.:	REVISION NO.:
3	0

SCALE: 1:15,000
0 200 400 800 Metres

DATUM:	PROJECTION:
NAD 83 CSRS	UTM ZONE 20 NORTH
DRAWN BY: M. MARRIOTT	CHECKED BY: C. PYTLAK
CREATED DATE: (YYYY-MM-DD) 2022-08-05	REVISION DATE: (YYYY-MM-DD) 2022-08-05

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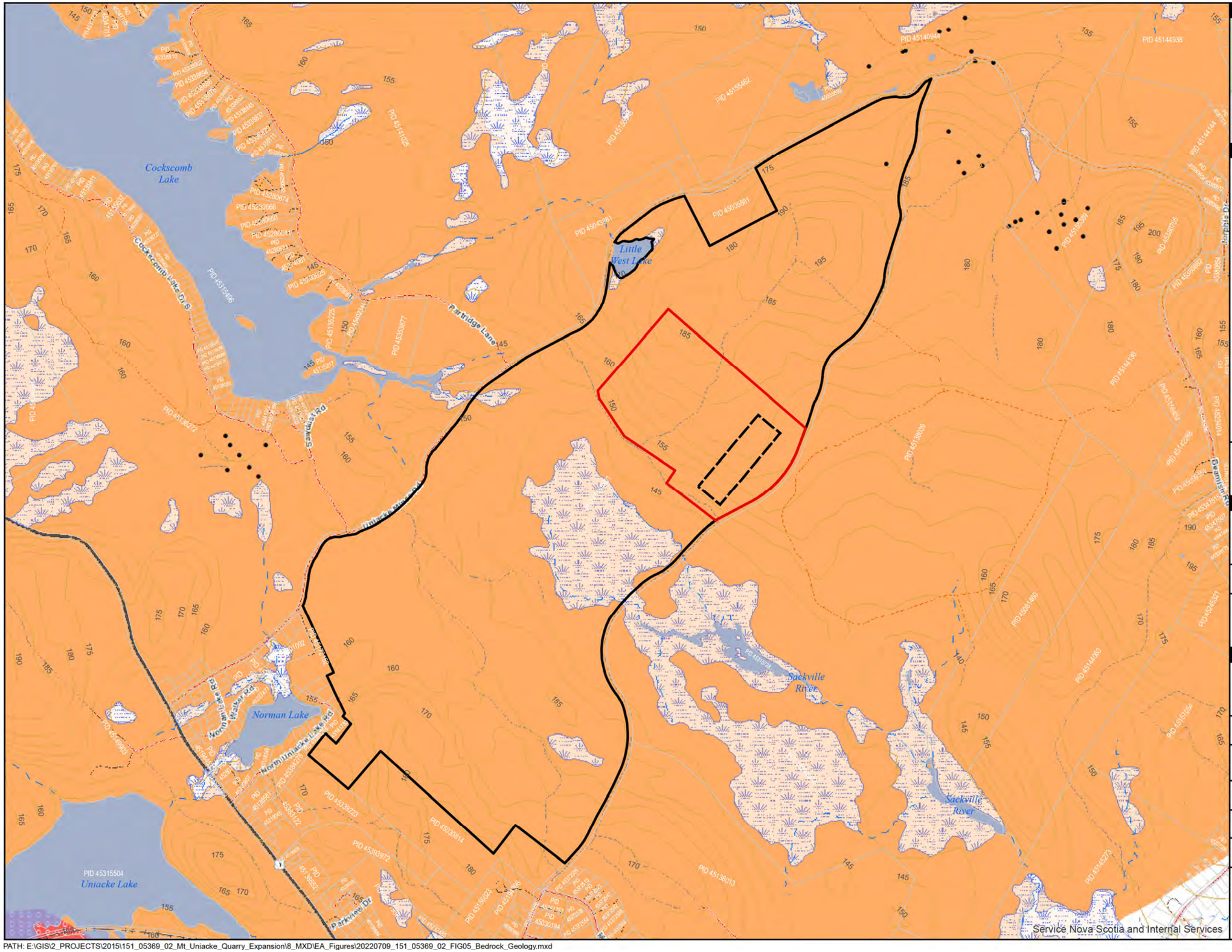

KEY MAP:

LEGEND:

- EXISTING QUARRY - LOT MA1 (~4 ha)
- PROPOSED EXPANSION AREA (40.5 ha)
- PID 45155801
- PROPERTY BOUNDARIES
- CONTOURS (5m)

MAPPED WATER FEATURES

- WATERCOURSES
- WATERCOURSES (INDEFINITE)
- MAPPED WATERBODIES
- MAPPED WETLANDS

GEOLOGICAL UNITS (d147cmgb)

- GRANODIORITE - medium grained
- GOLDENVILLE FORMATION
- DRILLHOLES (d147cmdh)
- DRILLHOLE DATABASE

N W E S

PROJECT:

PROJECT:
MT. UNIACKE QUARRY EXPANSION

PROJECT NO.:
151-05369-02

CLIENT:
NORTHUMBERLAND CAPITAL CORPORATION INC.

FIGURE:

TITLE:
BEDROCK GEOLOGY

FIGURE NO.:	REVISION NO.:
4	0

SCALE: 1:15,000
0 200 400 800 Metres

DATUM:	PROJECTION:
NAD 83 CSRS	UTM ZONE 20 NORTH
DRAWN BY:	CHECKED BY:
M. MARRIOTT	C. PYLTAK
CREATED DATE: (YYYY-MM-DD)	REVISION DATE: (YYYY-MM-DD)
2022-08-05	2022-08-05

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5.1.3 GROUNDWATER

The Project is located within the metamorphic groundwater region of Nova Scotia. Wells located within the metamorphic rocks tend to be less fractured resulting in lower yields in this groundwater region (Horne *et al*., 2009). According to the Nova Scotia Well Logs Database (NSE 2019b), 16 drilled wells are located within 1 km of the proposed quarry expansion area (Figure 5), though none are located within the proposed expansion area, and none are associated with residential properties. Well depths range from 8.4 – 26.6 m, with yields ranging from 1.4 – 22.7 gallons per minute (estimated at the time of construction).

Provincial wet areas mapping (WAM) rasters are the result of a model which predicts where water will naturally flow and/or accumulate in the landscape based on digital elevation (DEM) data and the known location of surface water bodies and wetlands. In essence, WAM is a "cartographically derived depth-to-water index" (NSDNRR 2021b). Based on the WAM for the Project area (Figure 6) groundwater depths are likely greater than 10 m throughout the majority of the proposed expansion area with the northeastern quadrant predicted to have ground water between 2 – 10 m.

5.1.4 SURFACE WATER

The Study Area is located on the upper extent of the Sackville River secondary watershed, within the Sackville primary watershed (Figure 7). A review of aerial imagery identified one waterbody and one watercourse within 1 km of the Project site. The waterbody, Little West Lake, is situated 250 m north, and the Sackville River is located approximately 220 m south of the Study Area. No natural watercourses or other water features were noted within the proposed quarry expansion area during field investigations. The forestry operations carried out previously within the site appear to have altered surface water hydrology, with current conditions consisting of sporadic unconsolidated overland flow without the presence of incised channels.

5.1.5 CLIMATE AND WEATHER

Nova Scotia has a modified continental climate, with local climate variations which are influenced by changes in elevation and proximity to the coast. Daily temperature and weather condition fluctuations are common, particularly in the spring and fall seasons. The province’s weather and climate are affected by westerly winds and the movement of air masses that produce frequent storms and result in regular fluctuations between moderate and stormy weather.

Long term meteorological data (1981 to 2010) collected by Environment and Climate Change Canada (ECCC) at the Mount Uniacke station (44°54' N, 63°50' W) has been used to characterize and describe the climate and weather within the Study Area and surrounding landscape (ECCC 2022).

5.1.5.1 TEMPERATURE

The seasonal range of temperatures is relatively wide compared to elsewhere in the province with warm and humid summers contrasted with cold winters. The coldest average daily temperature is -6.5°C (January) and the warmest average daily temperature is 18.2°C (July). The annual average daily temperature is 6.0°C. The region also has an average of 115 frost free days.

KEY MAP:

LEGEND:

- EXISTING QUARRY - LOT MA1 (~4 ha)
- PROPOSED EXPANSION AREA (40.5 ha)
- PID 45155801
- 1 KM BUFFER AROUND PROPOSED EXPANSION AREA
- PROPERTY BOUNDARIES
- BUILDING LOCATIONS

NS WATER WELL LOGS

- DRILLED
- DUG

MAPPED WATER FEATURES

- WATERCOURSE
- WATERCOURSE (INDEFINITE)
- MAPPED WATERBODIES
- MAPPED WETLANDS

N S E W

PROJECT:

PROJECT:
MT. UNIACKE QUARRY EXPANSION

PROJECT NO.: **151-05369-02**

CLIENT:
NORTHUMBERLAND CAPITAL CORPORATION INC.

FIGURE:

TITLE:
BUILDINGS AND WELLS WITHIN 1 KM

FIGURE NO.: 5	REVISION NO.: 0
SCALE: 1:15,000 (0 200 400 800 Metres)	
DATUM: NAD 83 CSRS	PROJECTION: UTM ZONE 20 NORTH
DRAWN BY: M. MARRIOTT	CHECKED BY: C. PYTLAK
CREATED DATE: (YYYY-MM-DD) 2022-08-05	REVISION DATE: (YYYY-MM-DD) 2022-08-05

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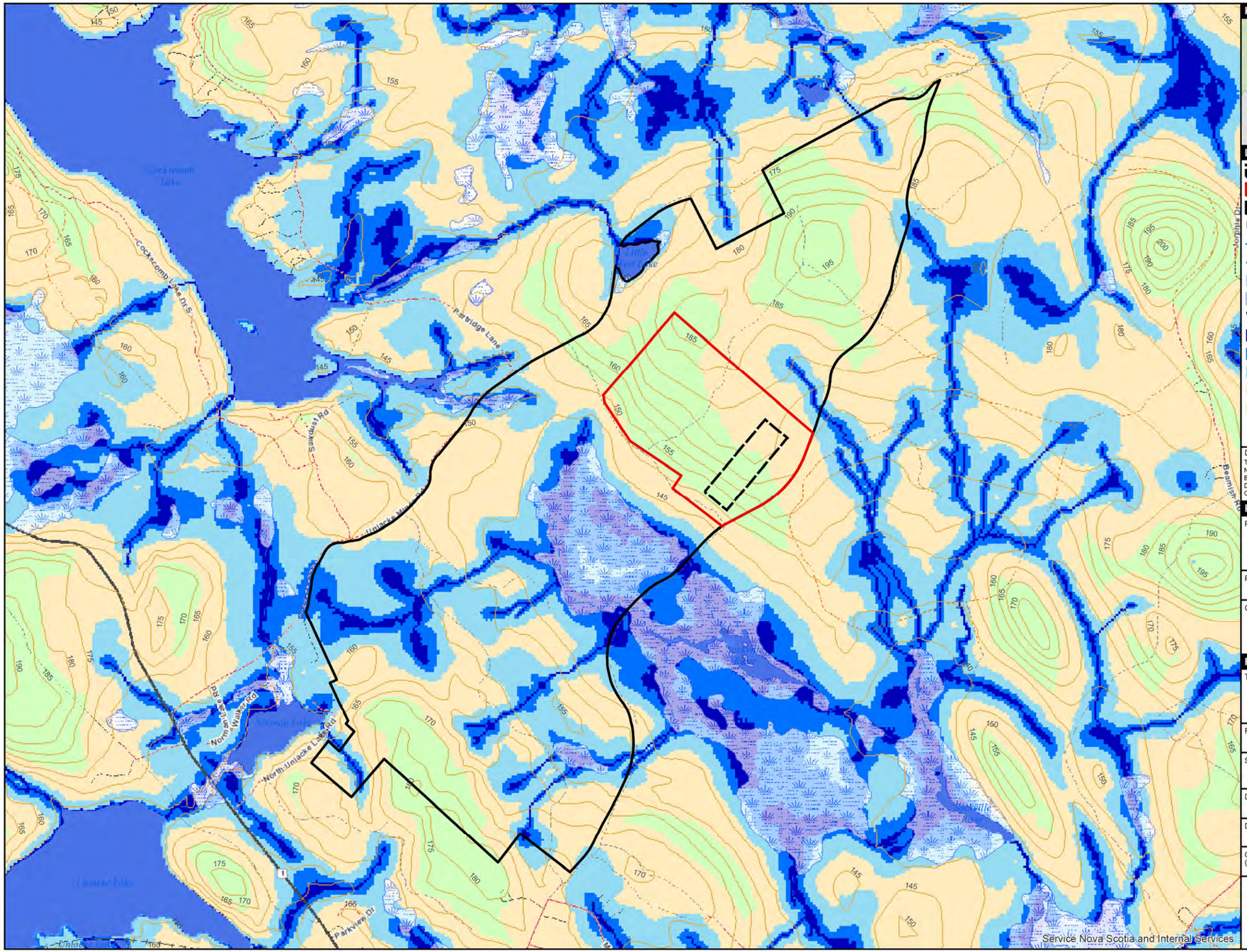

KEY MAP:

LEGEND:

- EXISTING QUARRY - LOT MA1 (~4 ha)
- PROPOSED EXPANSION AREA (40.5 ha)
- PID 45155801

MAPPED WATER FEATURES

- WATERCOURSES
- WATERCOURSES (INDEFINITE)
- MAPPED WATERBODIES
- MAPPED WETLANDS

WET AREAS MAPPING (DEPTH TO WATER)

- 0 - 0.10 m
- 0.11 - 0.50 m
- 0.51 - 2 m
- 2.01 - 10 m
- > 10 m

N W E S

PROJECT:

PROJECT:
MT. UNIACKE QUARRY EXPANSION

PROJECT NO.:
151-05369-02

CLIENT:
NORTHUMBERLAND CAPITAL CORPORATION INC.

FIGURE:

TITLE:
WET AREAS MAPPING

FIGURE NO.:	REVISION NO.:
6	0

SCALE: 1:15,000
0 200 400 800 Metres

DATUM:	PROJECTION:
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CREATED DATE: (YYYY-MM-DD)	REVISION DATE: (YYYY-MM-DD)
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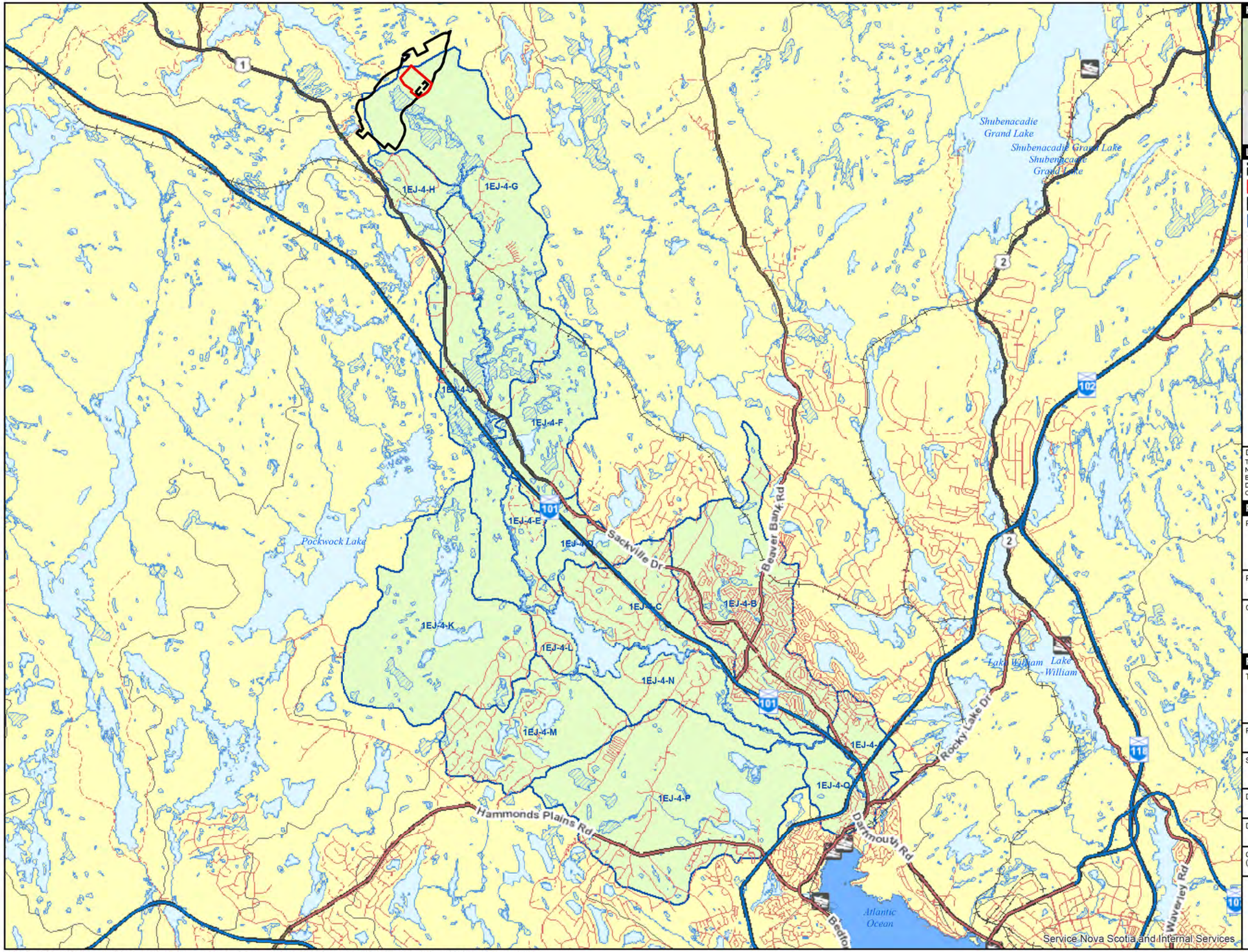

KEY MAP:

LEGEND:

- EXISTING QUARRY - LOT MA1 (~4 ha)
- PROPOSED EXPANSION AREA (40.5 ha)
- PID 45155801
- TERTIARY_WATERSHEDS

SECONDARY WATERSHEDS

- OTHER WATERSHEDS
- SACKVILLE RIVER

N W E S

PROJECT:

PROJECT: MT. UNIACKE QUARRY EXPANSION

PROJECT NO.: 151-05369-02

CLIENT: NORTHUMBERLAND CAPITAL CORPORATION INC.

FIGURE:

TITLE: WATERSHEDS

FIGURE NO.:	REVISION NO.:
7	0

SCALE: 1:100,377

0 1 2 4 Kilometers

DATUM:	PROJECTION:
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CREATED DATE: (YYYY-MM-DD) 2022-08-05	REVISION DATE: (YYYY-MM-DD) 2022-08-05

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5.1.5.2 PRECIPITATION

Precipitation remains relatively stable throughout the year. The winter months (November to March) see the highest monthly precipitation with average monthly totals ranging between 99.5 mm to 149.4 mm. The summer months (June to September) are drier, with average monthly totals of 101.4 mm. Annual average precipitation is 126.5 mm, with an average annual rainfall amount of 103.6 mm and average annual snowfall of 22.6 cm. The area generally receives less rainfall during the summer months compared to elsewhere in the province.

5.1.5.3 CLIMATE CHANGE

ECCC and Climate Change Nova Scotia have used the Canadian Global Climate Model to estimate possible future climate conditions across the province. The models are based on a 30-year baseline period (1961 – 1990), with future projections based on 30-year time periods: 2020s, 2050s, and 2080s. The closest climate data station is located within the Kentville region, where the average annual temperature is anticipated to increase by approximately 1.2°C during each 30 -year period. By the 2080s period, the average annual precipitation may increase by approximately 83.5 mm compared with the baseline data period. The climate forecast for the region predicts more days with rain (increase of 19) but fewer days with snow (decrease of six). Additionally, the growing season (mean daily temperature > 5°C) is anticipated to increase by 46 days by the 2080s (180 days to 226 days). However, the water deficit is forecasted to increase from 36 mm to 58 mm during the same time period (CCNS 2014).

5.1.6 AIR QUALITY

The Air Quality Management System (AQMS) is a federal air quality management system which was implemented by the Canadian Council of Ministers of the Environment (CCME) to guide work on air emissions across Canada. The AQMS is a collaborative approach by federal, provincial, and territorial governments to reduce emissions and pollutants and improve air quality (Canadian Council of Ministers of the Environment, 2022). The primary components to AQMS include:

- Establishment of Canadian Ambient Air Quality Standards (CAAQS) to define the standards and air quality objectives across Canada;
- Air zone management within provinces and territories which permit management actions tailored to specific or unique air quality characteristics (i.e., pollutant sources, meteorological patterns, population density) that influence ambient air concentrations;
- Establishment of base-level industrial emission requirements for new and existing major industrial sectors;
- Six regional airsheds covering the entirety of Canada and allow for joint coordination and action involving the movement of air pollutants across provincial/territorial and international borders; and,
- Improvement to existing federal and provincial initiatives to address emissions from transportation sector.

The CAAQS for Fine Particulate Matter ($PM_{2.5}$), Ozone (O_3), Sulphur Dioxide (SO_2), and Nitrogen Dioxide (NO_2) are described in Table 10.

Table 10: Canadian ambient air quality standards

POLLUTANT	AVERAGING TIME	STANDARDS			METRIC
		2015	2020	2025	
Fine Particulate Matter ($PM_{2.5}$)	24-hour	28 µg/m^3	27 µg/m^3		The 3-year average of the annual 98th percentile of the daily 24-hour average concentrations
	Annual	10.0 µg/m^3	8.8 µg/m^3		The 3-year average of the annual average of the daily 24-hour average concentrations
Ozone (O_3)	8-hour	63 ppb	62 ppb	60 ppb	The 3-year average of the annual 4th highest of the daily maximum 8-hour average ozone concentrations
Sulphur Dioxide (SO_2)	1-hour	-	70 ppb	65 ppb	The 3-year average of the annual 99th percentile of the SO_2 daily maximum 1-hour average concentrations
	Annual	-	5.0 ppb	4.0 ppb	The average over a single calendar year of all 1-hour average SO_2 concentrations
Nitrogen Dioxide (NO_2)	1-hour	-	60 ppb	42 ppb	The 3-year average of the annual 98th percentile of the daily maximum 1-hour average concentrations
	Annual	-	17.0 ppb	12.0 ppb	The average over a single calendar year of all 1-hour average concentrations

$PM_{2.5}$: Particulate matter less than 2.5 micrometres (µm) in diameter; µg/m^3: micrograms per cubic metre; ppb: parts per billion

In addition to the defined CAAQS listed in Table 10, Nova Scotia has also developed its own Air Quality Regulations under Section 25 and 112 of the Environment Act. The Air Quality Regulations define the maximum permissible ground level concentrations for six compounds. Table 11 lists the provincial Air Quality Regulations.

Table 11: Air Quality Regulations in Nova Scotia

POLLUTANT	AVERAGING TIME	MAXIMUM PERMISSIBLE GROUND LEVEL CONCENTRATION	
		µg/m3	pphm
Carbon Monoxide (CO)	1-hour	34 600	3000
	8-hours	12 700	1100
Hydrogen Sulphide (H2S)	1-hour	42	3
	24-hours	8	0.6
Nitrogen Dioxide (NO2)	1-hour	400	21
	Annual	100	5
Ozone (O3)	1-hour	160	8.2
Sulphur Dioxide (SO2)	1-hour	900	34
	24-hours	300	11
	Annual	60	2
Total Suspended Particulate (TSP)	24-hours	120	-
	Annual	70*	-

** geometric mean; µg/m³: micrograms per cubic metre; pphm: parts per hundred million*

As a method for managing air quality across jurisdictional boundaries, the CCME created an Air Zone Management Framework (AZMF) to categorize provincial regions by existing air quality and management goals and actions. The Project is located within Nova Scotia's Central Air Zone, which is categorized as 'yellow', indicating the associated management actions are to prevent air quality deterioration from the increase of Ground-level Ozone (GLO) and $PM_{2.5}$ levels. Yellow level regions are the second lowest level of air quality management (NSE 2019a).

5.1.6.1 MONITORING AND EMISSIONS

The Central Air Zone has two monitoring stations for calculating CAAQS, with the nearest station to the Project located at Lake Major. The Lake Major station monitors for Nitrogen Oxide, Nitric Oxide, Nitrogen Dioxide, Ground-level Ozone, and Fine Particulate Matter.

The most recent annual NSE air quality report, representing data from 2020, identified the GLO metric for an 8-hour time period was 50 ppb, which is a slight decrease from previous years. The GLO level is below the 62 ppb CAAQ standard for 2020 and the 60 ppb goal for 2025 (NSE 2019a).

The 2020 $PM_{2.5}$ measurements at Lake Major were recorded at 9 µg/m3 for the mean 24 hour period, and 4.7 µg/m3 for the annual mean. Both of these levels are below the 2020 CAAQ standards of 27 µg/m3 and 8.8 µg/m3 respectively and have decreased over the previous five years.

The SO_2 1-hour average was 6 ppb in 2020, with an annual value of 0.3 ppb. The 1-hour NO_2 level was recorded at 21 ppb, and an annual NO_2 level was recorded as 3.3. The SO_2 and NO_2 levels were below the CAAQ standards. These metrics were not previously recorded at the Lake Major station within the previous five years.

5.1.7 ACOUSTIC ENVIRONMENT (NOISE)

NSECC's Guidelines for Environmental Noise Measurement and Assessment defines noise as "unwanted sound" (NSE 1990). Excess noise can disrupt daily activities and affect the quality of life in the surrounding areas. The intensity (or volume) of sound is measured using a logarithmic system called decibels (dB). To measure and evaluate ambient noise, A-Weighted decibel (dBA) is used, as this compensates for the human ear's varying ability to detect very high or low-pitched sounds. Examples of the varying levels of sound intensity and their effects on human health are listed in Table 12.

Table 12: Examples of Noise Sources and Human Responses by Noise Level

SOUND SOURCE	SOUND INTENSITY (DBA)	EFFECTS ON HUMAN HEALTH
Airplane takeoff heard from about 50 m	140	Unbearable pain
Jackhammer, pneumatic tool	130	Threshold of pain
Emergency vehicle siren, airplane takeoff heard from 300 m	120	Beginning of pain
Loud concert, club	110	Bearable for short period of time; maximum vocal effort to be heard
Drill, chainsaw, motorcycle	100	Risk of hearing loss if greater than one hour per day
Lawnmower, alarm, subway	90	Very annoying
Alarm clock, noisy restaurant, factory	80	Difficult to have conversation
Busy street, vacuum cleaner	70	Interferes with telephone conversation
Normal conversation	60	Mild disturbance
Moderate rain, washing machine	50	Quiet, beginning of disturbance
Library, refrigerator, or a quiet street at night	40	Peaceful area
Low voice conversation	30	Sense of calmness
Light wind in trees	20	Deep sense of calmness
Normal breathing	10	Barely audible
No perceptible sound	0	Lowest threshold of human hearing

(Gouvernement du Québec 2021)

5.1.7.1 SENSITIVE RECEPTORS

Noise Sensitive Areas (NSA) and representative locations within the Study Area were considered as receptors. The Nova Scotia Guidelines for Environmental Noise Measurement and Assessment require identification and quantification of those areas where people normally live, work, or partake in recreation. Generally, outdoor living areas such as the backyard of a house, are considered as the most impacted from environmental noise. Therefore, for the assessment of acoustic environment and sensitive receptors, NSA include specific land uses, provided they have an associated outdoor living area (OLA). The following OLAs were considered to be NSAs: private dwellings and private individual family units with an OLA, educational facilities and daycare centres with OLAs for students, hospitals and nursing homes with OLAs for patients, campgrounds providing overnight accommodations and motels with communal OLAs for visitors.

No noise receptors were identified within 1.15 km of the proposed quarry expansion area.

5.2 BIOLOGICAL ENVIRONMENT

5.2.1 TERRESTRIAL HABITAT

5.2.1.1 GENERAL HABITAT AND VEGETATION

The current available terrestrial habitat in the proposed expansion area consists mainly of cleared or early succession regenerating areas. Pockets of unaltered medium to mature conifer stands are present in a strip along the northern project boundary. Total approximated area of intact forest habitat is 10.1 ha, which is ~25% of the proposed expansion area.

Some of the identified wetland areas offer medium-aged conifer habitat; however, these areas are fairly small (< 0.5 ha) and are typically surrounded by previously cleared areas.

Regenerating habitats at the site consist of pioneer species such as Balsam Fir (*Abies balsamea*), Red Maple (*Acer rubrum*), Pin Cherry (*Prunus pensylvanica*), and pockets of Grey Alder (*Alnus incana*).

A small deciduous dominant mid-aged forest is found in the area of Wetland 8, consisting mainly of Red Maple. Several of the wetland areas identified consisted mainly of graminoid species such as sedges and rushes.

Very little aquatic habitat was noted throughout the site, with the only surface water feature being the settling pond approximately 370 m^2 in area.

A roadway is present along the southern Project boundary, and currently a ~4 ha quarry is operating in the south-east corner of the Project site.

5.2.1.2 TERRESTRIAL WILDLIFE

Observers noted species of terrestrial fauna found within the proposed expansion incidentally during other focused surveys. These species include:

- White-Tailed Deer (*Odocoileus virginianus*)
- American Porcupine (*Erethizon dorsata*)
- Red Squirrel (*Tamiasciurus hudsonicus*)
- North American Deer Mouse (*Peromyscus maniculatus*)
- Snowshoe Hare (*Lepus americanus*)

Additional species that were not observed but have potential to be present based on habitat, forage, and predation opportunities within the proposed expansion area include:

- Eastern Coyote (*Canis latrans*)
- Raccoon (*Procyon lotor*)
- Red Fox (*Vulpes vulpes*)
- Meadow Vole (*Microtus pennsylvanicus*)
- American Black Bear (*Ursus americanus*)
- Striped Skunk (*Mephitis mephitis*)
- Short-Tailed Weasel (*Mustela erminea*)

As previously described, there is very little aquatic habitat available on site. This reduces the potential for aquatic and semi-aquatic fauna. It is anticipated that some generalist amphibian species may utilize habitat infrequently and are listed below:

- Spring Peeper (*Pseudacris crucifer*)
- Eastern Red-Backed Salamander (*Plethodon cinereus*)
- Eastern American Toad (*Anaxyrus americanus*)

5.2.1.3 AVIFAUNA

Avian surveys have been undertaken at the proposed expansion areas during the breeding and spring migratory seasons in 2017 and 2021. Additional targeted surveys were completed for nocturnal owl species and Common Nighthawk (*Chordeiles minor*). A total of 53 species, representing 583 individual birds, were recorded during the surveys (Table 13). The avian community within the proposed expansion areas consists primarily of common and widespread songbird species with a preference for softwood and mixed wood forests and shrub habitats.

Five (5) of the recorded species are priority species, two of which are designated as provincial SAR. Priority species, as defined by the Guide to Addressing Wildlife Species and Habitat in and EA Registration Document (NSE 2005), include:

- A SAR is any species which is listed as Endangered, Threatened or of Special Concern under the federal *Species at Risk Act* (*SARA*) and any species listed as Endangered, Threatened or Vulnerable under the provincial Nova Scotia *Endangered Species Act* (NS *ESA*).
- A SOCC is any species listed as S1-S3S4 (provincial rarity rankings) by the Atlantic Canada Conservation Data Centre (ACCDC)

The following priority species were observed during bird surveys (see shaded cells in Table 13, Figure 8):

- American Kestrel (*Falco sparverius*)
- Canada Jay (*Perisoreus canadensis*)
- Canada Warbler (*Cardellina canadensis*)
- Common Nighthawk
- Pine Siskin (*Spinus pinus*)

Of the priority species, Canada Warbler and Common Nighthawk are designated as provincial and federal SAR.

The Canada Warbler is designated as “Threatened” under Schedule 1 of the *SARA* and as “Endangered” under NS *ESA*. ACCDC ranks the Canada Warbler as a SOCC, specifically the breeding (S3B) population within the province, which is ranked as “Vulnerable”. Most of the Canada Warbler’s breeding range is within Canada, extending from the Maritime provinces across the Northern Forests and patchily down the Appalachians. In the Maritimes, the Canada Warbler is widely distributed. The species is associated with mature cedar swamps and other wet habitats such as beaver ponds and forested wetlands, as well as with complex, mature or regenerating mixed forests, partial cuts, and shrublands. Forest structural diversity appears to be more important than tree species composition. Factors associated with the decline of the Canada Warbler include forestry practices that reduce available understorey, as well as the degradation or loss of forested wetlands (Stewart *et al*. 2015). One single individual observed was located near the settling pond, and another individual was observed off-site.

KEY MAP:

LEGEND:

- PROPOSED EXPANSION AREA (40.5 ha)
- EXISTING QUARRY - LOT MA1 (~4 ha)
- PID 45155801
- 1 KM BUFFER AROUND PROPOSED EXPANSION AREA
- PROPERTY BOUNDARIES

BIRD SURVEY STATION LOCATIONS

- NIGHT OWL (2021)
- MIGRATORY BIRD (2021)
- COMMON NIGHT HAWK (2019)
- BREEDING BIRD (2017)

N W E S

PROJECT:

PROJECT:
MT. UNIACKE QUARRY EXPANSION

PROJECT NO.:
151-05369-02

CLIENT:
NORTHUMBERLAND CAPITAL CORPORATION INC.

FIGURE:

TITLE:
AVIFAUNAL SURVEYS

FIGURE NO.:	REVISION NO.:
8	0

SCALE: 1:15,000
0 200 400 800 Metres

DATUM:	PROJECTION:
NAD 83 CSRS	UTM ZONE 20 NORTH
DRAWN BY:	CHECKED BY:
M. MARRIOTT	C. PYTLAK
CREATED DATE: (YYYY-MM-DD) 2022-08-05	REVISION DATE: (YYYY-MM-DD) 2022-08-05

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PATH: E:\GIS\2_PROJECTS\2015\151_05369_02_Mt_Uniacke_Quarry_Expansion\8_MXD\EA_Figures\20220719_151_05369_02_FIG08_Avifaunal_Surveys.mxd

The Common Nighthawk is designated as "Threatened" under Schedule 1 of *SARA* and the NS *ESA*. The ACCDC rank for Common Nighthawk is S3B, indicating its population status as "Vulnerable." The Common Nighthawk is widespread throughout North America and the Maritimes. The species prefers open and semi-open habitats, which includes clear-cuts to gravel rooftops in urban areas. It can also be found in regenerating forests and wetlands. Within the Maritimes, this species is most commonly seen throughout Nova Scotia's eastern and western ecoregions and central New Brunswick, where managed logging operations create suitable open and semi-open habitats. Speculated factors contributing to the decline of this species include pesticide use, decrease of nest sites on gravel rooftops, and re-growth of open habitats (Stewart *et al*. 2015). Six observations of Common Nighthawk were made throughout the Project area during the dedicated evening surveys in 2019, and one additional overhead sighting of a Common Nighthawk in transit during the 2021 fall migration survey, near Station 3.

Table 13: List of avian species detected during avian surveys (2017 - 2021)

COMMON NAME	SCIENTIFIC NAME	#	SURVEY PERIOD[1]	COSEWIC[2]	NS ESA	S-RANK[3]
Alder Flycatcher	*Empidonax alnorum*	13	B	-	-	S5B
American Black Duck	*Anas rubripes*	1	FM	-	-	S5B, S5N
American Crow	*Corvus brachyrhynchos*	18	B, SM, FM	-	-	S5
American Goldfinch	*Spinus tristis*	35	B, SM, FM	-	-	S5
American Kestrel	*Falco sparverius*	1	B	-	-	S3B, S4S5M
American Redstart	*Setophaga ruticilla*	3	B	-	-	S5B
American Robin	*Turdus migratorius*	28	B, SM, FM	-	-	S5B, S3N
Black-and-white Warbler	*Mniotilta varia*	12	B, FM	-	-	S5B
Black-capped Chickadee	*Poecile atricapillus*	20	B, SM, FM	-	-	S5
Black-throated Green Warbler	*Setophaga virens*	31	B	-	-	S5B
Blue Jay	*Cyanocitta cristata*	17	B, CN, SM, FM	-	-	S5
Blue-headed Vireo	*Vireo solitarius*	6	B, FM	-	-	S5B
Canada Goose	*Branta canadensis*	1	SM	-	-	SUB, S4N, S5M
Canada Jay	*Perisoreus canadensis*	2	B, FM	-	-	S3
Canada Warbler	*Cardellina canadensis*	2	B	SC	END	S3B
Cedar Waxwing	*Bombycilla cedrorum*	3	B, FM	-	-	S5B
Common Grackle	*Quiscalus quiscula*	2	B, SM	-	-	S5B
Common Loon	*Gavia immer*	3	B	NAR	-	S4B
Common Nighthawk	*Chordeiles minor*	7	CN, FM	SC	THR	S3B
Common Raven	*Corvus corax*	1	FM	-	-	S5
Common Yellowthroat	*Geothlypis trichas*	51	B, CN, FM	-	-	S5B
Dark-eyed Junco	*Junco hyemalis*	21	B, SM, FM	-	-	S4S5

COMMON NAME	SCIENTIFIC NAME	#	SURVEY PERIOD[1]	COSEWIC[2]	NS ESA	S-RANK[3]
Downy Woodpecker	*Dryobates pubescens*	2	SM	-	-	S5
Golden-crowned Kinglet	*Regulus satrapa*	11	B, FM	-	-	S5
Hairy Woodpecker	*Dryobates villosus*	3	B, FM	-	-	S5
Hermit Thrush	*Catharus guttatus*	27	B, CN, SM	-	-	S5B
Lincoln's Sparrow	*Melospiza lincolnii*	1	B	-	-	S4B, S5M
Magnolia Warbler	*Setophaga magnolia*	36	B	-	-	S5B
Mallard	*Anas platyrhynchos*	3	NO, SM	-	-	S5B, S5N
Mourning Dove	*Zenaida macroura*	13	B, SM	-	-	S5
Nashville Warbler	*Leiothlypis ruficapilla*	1	B	-	-	S4B, S5M
Northern Flicker	*Colaptes auratus*	17	B, SM, FM	-	-	S5B
Northern Parula	*Setophaga americana*	2	B	-	-	S5B
Ovenbird	*Seiurus aurocapilla*	10	B	-	-	S5B
Palm Warbler	*Setophaga palmarum*	31	B, SM, FM	-	-	S5B
Pileated Woodpecker	*Dryocopus pileatus*	1	FM	-	-	S5
Pine Siskin	*Spinus pinus*	2	B	-	-	S3
Purple Finch	*Haemorhous purpureus*	4	B, SM, FM	-	-	S4S5B, S3S4N, S5M
Red-breasted Nuthatch	*Sitta canadensis*	2	B, FM	-	-	S4S5
Red-eyed Vireo	*Vireo olivaceus*	22	B, FM	-	-	S5B
Red-tailed Hawk	*Buteo jamaicensis*	1	SM	-	-	S5
Ruby-throated Hummingbird	*Archilochus colubris*	1	FM	-	-	S5B
Ruffed Grouse	*Bonasa umbellus*	12	B, NO, SM	-	-	S5
Song Sparrow	*Melospiza melodia*	4	SM, FM	-	-	S5B
Swainson's Thrush	*Catharus ustulatus*	9	B	-	-	S4B, S5M
Swamp Sparrow	*Melospiza georgiana*	2	B	-	-	S5B
Unidentified Woodpecker	*Picidae sp.*	2	SM	-	-	-
White-breasted Nuthatch	*Sitta carolinensis*	1	FM	-	-	S4
White-throated Sparrow	*Zonotrichia albicollis*	69	B, CN, SM, FM	-	-	S4S5B, S5M
Winter Wren	*Troglodytes hiemalis*	9	B, NO, SM	-	-	S5B

COMMON NAME	SCIENTIFIC NAME	#	SURVEY PERIOD[1]	COSEWIC[2]	NS ESA	S-RANK[3]
Yellow-bellied Flycatcher	*Empidonax flaviventris*	3	B	-	-	S4B, S5M
Yellow-rumped Warbler	*Setophaga coronata*	2	B	-	-	S5B
Yellow Warbler	*Setophaga petechia*	2	CN	-	-	S5B

1: Survey period codes – B: Breeding; CN: Common Nighthawk, FM: Fall Migration, NO: Nocturnal Owl, SM: Spring Migration
2: Species at Risk statuses – END: Endangered, THR: Threatened, SC: Special Concern, VUL: Vulnerable, NAR: Not At Risk
3: S-Rank is an indicator of species commonness or rarity within the province of Nova Scotia, with S5 being the most common, and S1 being the least common. Breeding status qualifiers include B: breeding population status, N: nonbreeding population status, and M: migrant species status.

Following an update in 2022 to the federal Migratory Bird Regulations (MBR), Pileated Woodpecker is now listed under Schedule 1, which provides increased nest protections to all Schedule 1 species, regardless of nest occupancy. If a project proponent wishes to remove or harm a nest belonging to a Pileated Woodpecker, the nest must be unoccupied for 36 consecutive months. The current available terrestrial habitat in the proposed expansion area consists mainly of cleared or early succession regenerating areas, with pockets of unaltered medium to mature conifer stands present in a strip along the northern project boundary. This habitat is not considered critical for the Pileated Woodpecker as it does not meet the requirements of the presence of snag trees suitable for nesting and foraging activities.

5.2.2 WETLANDS

Fieldwork was conducted in summer of 2021 by WSP Canada Inc. The presence of wetlands was evaluated in accordance with the US Army Corps of Engineers Wetlands Delineation Manual and the Northcentral and Northeastern Interim Regional Supplement Version 2.0 (USACE 2012). They were classified using the Canadian Wetland Classification System (NWWG 1997). Refer to Figure 9, as well as Appendix F for photographs of the delineated wetlands and the wetland delineation datasheets.

WL-1 is classified as a Graminoid / Forested Swamp and has an approximate size of 0.2855 ha. Dominant species found within the tree stratum were Red Maple (*Acer rubrum*), and Balsam Fir (*Abies balsamea*). The dominant species in the shrub stratum were Red Maple and Speckled Alder (*Alnus incana*), and White Birch (*Betula papyrifera*). Dominant species in the herbaceous stratum were Wool-Sedge (*Scirpus cyperinus*) and Canada Manna-grass (*Glyceria canadensis*). The soil profile within the wetland was organic (0-25 cm) and was considered a histosol, a restrictive layer (rock) was hit at 25 cm. Hydric soil indicators included Histosol (A1). Observed hydrology indicators included Saturation (A3). WL-1 Coordinates: 435797 m E, 4973791 m N.

WL-2 is classified as a Graminoid / Shrub Swamp and has an approximate size of 0.05 ha. The dominant species in the tree stratum was Gray Birch (*Betula populifolia*). Dominant species in the shrub stratum was Red Maple. Dominant species in the herbaceous stratum was Canada Mannagrass. The soil profile within the wetland was organic (0-20 cm) and was considered a histosol; a restrictive layer (rock) was hit at 20 cm. Hydric soil indicators included Histosol (A1). Observed hydrology indicators included Saturation (A3). WL-2 Coordinates: 435565 m E, 4973754 m N.

KEY MAP:

LEGEND:

- LOT MA1 (4.6 ha)
- PROPOSED EXPANSION AREA (40.5 ha)
- PID 45155801
- PROPERTY BOUNDARIES

MAPPED WATER FEATURES

- WATERCOURSE
- WATERCOURSE (INDEFINITE)
- MAPPED WATERBODIES
- MAPPED WETLANDS
- FIELD IDENTIFIED WETLANDS

N W E S

PROJECT:

PROJECT:
MT. UNIACKE QUARRY EXPANSION

PROJECT NO.:
151-05369-02

CLIENT:
MARITIME AGGREGATES

FIGURE:

TITLE:
WETLAND DELINEATIONS

FIGURE NO.:	REVISION NO.:
9	0

SCALE: 1:4,000
0 50 100 200 Metres

DATUM:	PROJECTION:
NAD 83 CSRS	UTM ZONE 20 NORTH
DRAWN BY:	CHECKED BY:
M. MARRIOTT	B. LEIGHTS
CREATED DATE: (YYYY-MM-DD)	REVISION DATE: (YYYY-MM-DD)
2022-07-19	2022-07-19

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PATH: E:\GIS\2_PROJECTS\2015\151_05369_02_Mt_Uniacke_Quarry_Expansion\8_MXD\EA_Figures\20220329_151_05369_02_FIGXX_Wetland_Delineation.mxd

WL-3 is classified as a Graminoid / Shrub Swamp and has an approximate size of 0.10 ha. The dominant species in the tree stratum was Balsam Fir. Dominant species in the shrub stratum were Red Maple, and Gray Birch. Dominant species in the herbaceous stratum were Canada Mannagrass, Bristly Dewberry (*Rubus hispidus*) and Wool-Sedge. The soil profile within the wetland was organic (0-25 cm) and was considered a histosol; a restrictive layer (rock) was hit at 25 cm. Hydric soil indicators included Histosol (A1). Observed hydrology indicators included Saturation (A3). WL-3 Coordinates: 435565 m E, 4973754 m N.

WL-4 is classified as a forested / shrub swamp and has an approximate size of 0.15 ha. The dominant species in the tree stratum were Red Spruce (*Picea rubens*) and Black Spruce (*Picea mariana*). Dominant species found within the shrub stratum were Red Maple (*Acer rubrum*), Common Winterberry (*Ilex verticillata*) and Speckled Alder. Dominant species in the herbaceous layer were Tawny Cottongrass (*Eriophorum virginicum*), New York Fern (*Thelypteris noveboracensis*) and Bunchberry (*Cornus canadensis*). The soil profile within the wetland was organic (0-40+ cm) and was considered a histosol. Hydric soil indicators included Histosol (A1). Observed hydrology indicators included Saturation (A3). WL-4 Coordinates: 435575 m E, 4974080 m N.

WL-5 is classified as a Graminoid / shrub swamp and has an approximate size of 0.04 ha. Dominant species within the tree stratum were Red Maple and Black Cherry (*Prunus serotina*). Dominant species found within the shrub stratum were Black Cherry and Red Maple. Dominant species in the herbaceous layer was Canada Mannagrass. Soil profile was 7.5 YR 2/1 (0-30 cm); a restrictive layer (Rock) was hit at 30 cm. Hydric soil indicators included Black Histic (A3). Observed hydrology indicators included Saturation (A3). WL-5 Coordinates: 435587 m E, 4973852 m N.

WL-6 is classified as a Graminoid / shrub swamp and has an approximate size of 0.09 ha. Dominant species within the tree stratum was Red Maple. Dominant species found within the shrub stratum were Gray Birch, and Red Maple. Dominant species in the herbaceous layer were Canada Mannagrass and Wool-Sedge. The soil profile within the wetland was organic (0-15 cm) and was considered a histosol; a restrictive layer (rock) was encountered at 15 cm depth. Hydric soil indicators included Histosol (A1). Observed hydrology indicators included Saturation (A3). WL-6 Coordinates: 435597 m E, 4973908 m N.

WL-7 is classified as a graminoid / shrub swamp with an approximate area of 0.04 ha. No species within the tree stratum. Dominant species in the shrub stratum was Balsam Fir. Dominant species in the herbaceous layer were Bristly Dewberry and Small-Fruited Bulrush (*Scirpus microcarpus*). Soil profile was organic / duff (0-3 cm), 10 YR 2/1 (3-20 cm), and a restrictive layer (Rock) was hit at 20 cm. Hydric soil indicators included Black Histic (A3). Observed hydrology indicators included Saturation (A3). WL-7 Coordinates 436062 m E, 4973783 m N.

WL-8 is classified as a forested / shrub swamp and has an approximate size of 0.15 ha. The dominant species in the tree stratum were Red Maple and Black Spruce. Dominant species found within the shrub stratum were Red Maple and Common Winterberry (*Ilex verticillata*). Dominant species in the herbaceous layer was Northern Beech Fern (*Phegopteris connectilis*). The soil profile within the wetland was organic (0-40+ cm) and was considered a histosol. Hydric soil indicators included Histosol (A1). Observed hydrology indicators included Saturation (A3). WL-8 Coordinates 436005 m E, 4973842 m N.

WL-9 is classified as a forested swamp and has an approximate size of 0.05 ha. The dominant species found within the tree stratum was Red Maple. Dominant species found within the shrub stratum was Balsam Fir. Dominant species in the herbaceous stratum were Three-seeded Sedge (*Carex trisperma*), and Sensitive Fern (*Onoclea sensibilis*). The soil profile within the wetland was organic (0-40+ cm) and was considered a histosol. Hydric soil indicators included Histosol (A1). Observed hydrology indicators included Saturation (A3). WL-9 Coordinates 435789 m E, 4973948 m N.

WL-10 is classified as a shrub swamp and has an approximate size of 0.05 ha. The dominant species found within the tree stratum was White Birch. Dominant species within the shrub stratum were Gray Birch, Speckled Alder, and Black Cherry (*Prunus serotina*). Dominant species found within the herbaceous stratum were Canada Mannagrass, and Bluejoint Reed-grass (*Calamagrostis canadensis*). The soil profile within the wetland was organic (0-40+ cm) and was considered a histosol. Hydric soil indicators included Histosol (A1). Observed hydrology indicators included Saturation (A3). WL-10 Coordinates 435687 m E, 4974099 m N.

5.2.3 FISH AND FISH HABITAT

No naturalized waterbodies or watercourses were noted within the proposed expansion site. The forestry operations carried out previously within the site appear to have altered surface water hydrology, with current conditions consisting of sporadic unconsolidated overland flow without the presence of incised channels.

The nearest natural waterbodies with fish habitat potential include:

- Headwaters of the Sackville River found approximately 0.2 km south of the proposed expansion area.
- Cockscomb Lake found approximately 0.8 km west of the site.
- Lewis and Savage lakes found approximately 2.0 km east of the site.
- Norman Lake found approximately 1.7 km south of the site.
- Hookhorn Lake found approximately 1.4 km north of the site.
- The Meander River is found entering the western end of Cockscomb Lake approximately 4.0 km west of the site.
- Black Brook is found between Cockscomb Lake and Thompson Lake, approximately 3.5 km west of the site.

Several additional unnamed tributaries are found in more distant areas between lakes and ponds in the region. None of these features are anticipated to receive direct or in-direct effects from the proposed quarry expansion Project.

Ongoing surface water monitoring has been completed at the Sackville River headwater areas since 2015, with no indication of siltation or other detrimental conditions observed to date.

5.3 SOCIO-ECONOMIC ENVIRONMENT

The proposed quarry expansion is located in East Hants County Municipality, within the community of Mount Uniacke. Nearby communities include Lakelands to the west, East Uniacke to the east, and Hillsvale to the north. Historically, the Uniacke palatial estate was established in 1815, with Uniacke Township established in 1830, telegraph communications established in 1849, gold mining begin in 1867 and ceased in 1941. Mount Uniacke was incorporated in 1947 and expanded in the 1960s to include Woodville and surrounding areas.

The following subsections describe the local communities, First Nations communities, existing and planned land uses, traditional First Nations land and resource uses, and cultural and archaeological resources.

5.3.1 LOCAL COMMUNITIES

Based on the Socio-Economic Study of East Hants (EH 2018) in 2016, the Uniacke/Rawdon region of East Hants had a population of 4,710, representing 20% of East Hants total population (23,542).

According to Bylaw P-400 (EH 2016), the municipality of East Hants is striving to encourage tourism, commercial development and neighbourhood amenities and connectivity by regulating the form of development in many areas with the aim of achieving:

- a small town community character in urban communities;
- home-based commercial activities that blend well into the rural setting;
- increased neighbourhood, regional, road and active transportation connectivity.

5.3.2 FIRST NATIONS COMMUNITIES

The majority of the First Nations people in Nova Scotia are from the Mi'kmaq nation. According to the 2011 Census, there are 33,845 people of Aboriginal identity in the province, of which 21,895 are First Nations people (PNS 2015).

The East Hants First Nation (Sipekne'katik) is situated west of the Shubenacadie River and Highway 102 and north of Route 14. The east Hants First Nation was established in 1820 with approximately 2588 members living within the community, and approximately 1244 members living outside of the community (SFN 2016). East Hants First Nation also includes the reserve Shubenacadie No.13, located west of Shubenacadie Grand Lake. The east Hants First Nation and has a total area of 1213 ha and is governed by Chief Michael Sack.

5.3.3 EXISTING AND PLANNED USE OF LAND, WATER AND RESOURCES

The existing land use of the Project area includes the existing quarry and forested lands. The Project area is zoned as 'RU – Rural Use' under the East Hants zoning by-law (EH 2016). Other land uses and zoning designations within 5 km include:

- Residential
  - CR – Country Residential
  - R1 – Established Residential Neighbourhood Zone
  - R2 – Two Dwelling Unit Residential
  - LR – Lakeshore Residential
- Community Services
  - IU – Institutional Use
  - OS – Open Space
- Commercial
  - GC – General Commercial
  - HC – Highway Commercial
- Mixed Use
  - VC – Village Core
- Natural Environment
  - WG – Watercourse Greenbelt

An Archaeological Resource Impact Assessment (ARIA) of the Study Area was completed by Davis MacIntyre & Associates Limited (DMAL) in 2021 and includes a background review of traditional land and resource uses by the Mi'kmaq. The Study Area is located within the Mi'kmaw territory, Sipekne'katik, which in Mi'kmaq means "where the wild potatoes grow" (SFN 2016). Three, and potentially four, summer villages were located within Sipekne'katik and located at Truro, Shubenacadie, Tatamagouche and near Halifax. Archaeological evidence supports preoccupation of the Rawdon River, Shubenacadie River, Kinsac River and Shubenacadie Grand Lake and navigable waterways; however, there is a lack of archaeological research within the landscape.

The Shubenacadie River provides access from Cobequid Bay to the interior. Coastal areas would have provided opportunities for the Mi'kmaq to harvest marine birds and other animals, and interior rivers and lakes would have had seasonal migrations of fish and eel, as well as opportunities for hunting larger game animals. The movement between the coast and interior likely followed a seasonal pattern and the use of rivers and long inlets would allow for fluid movement between these areas.

Additional information related to the traditional land and resource uses of the Mount Uniacke area and Sipekne'katik territory is described in the ARIA Report.

5.3.4 CULTURAL AND ARCHAEOLOGICAL RESOURCES

The ARIA, completed by DMAL in 2021 includes a historic background study and reconnaissance to determine the potential for archaeological resources in the impact area and to provide recommendations for further mitigation, if necessary. The assessment was conducted under Heritage Research Permit A2021NS110 (Category C), issued to DMAL by the Department of Communities, Culture and Heritage. The full ARIA report can be found in document references. . The report describes the archaeological methodology, findings and results, and provides recommendations for archaeological resource management.

The ARIA included a historic background study, engagement with the Archaeological Research Division at Kwilmu'kw Maw-klusuaqn Negotiation Offices (KMKNO-ARD), and field reconnaissance, the results of which are summarized below. The background study confirmed that Mi'kmaq have occupied territory in Nova Scotia since time immemorial. The Maritime Archaeological Resource Inventory was accessed on November 5th, 2021. One known archaeological site (BfXc-02) was recorded within 5 km of the Project area. The site represents the historic period as a portion of the Uniacke Estate Museum Park in Mount Uniacke.

Multiple other isolated known precontact sites are recorded within seven kilometres of the Study Area, located along Big Indian Lake. Historic research and mapping indicate that Euro-Canadian occupation of the Study Area and surrounding communities began in the late 18th to early 19th centuries. The establishment of farms, inns and sawmills in the Mt Uniacke area slowly occurred over the mid to late 18th century, along main roads in the area.

A field reconnaissance of the Study Area completed on August 30th, 2021, did not identify any areas of high archaeological potential for encountering Mi'kmaq resources.

6 ENVIRONMENTAL EFFECTS ASSESSMENT

6.1 AIR QUALITY

6.1.1 VEC DESCRIPTION AND BOUNDARIES

Air quality is a valued component in the ecosystem for both flora and fauna. Degraded air quality conditions for extended periods of time have potential to alter the plant community as several species of vascular and non-vascular plants require good to pristine air quality. Air pollution may also deter avian or terrestrial fauna from accessing the area or add health risks to species that choose to continue inhabiting the area. Air quality, including acceptable greenhouse gas (GHG) levels, is also vital for the health and wellbeing of the community residing within, and in close proximity to, the Project area.

The spatial boundaries selected for this VEC comprise those for the proposed expansion area, specifically where blasting, drilling, and processing is expected to occur, and the transportation corridor where vehicles carrying materials may cause increased emissions and dust and debris. The temporal boundaries associated with this VEC include the construction (expansion), operation, and decommissioning phases.

6.1.2 SIGNIFICANCE DEFINITION

A significant adverse effect on air quality is defined as a condition where regulatory objectives are routinely exceeded. Nova Scotia Maximum Permissible Ground Level Concentrations as specified by the *Nova Scotia Air Quality Regulations* under the NS *EA* will apply to total suspended particulates (TSP), NO_2, SO_2 and CO. Canadian Ambient Air Quality Standards (CCME 2012) will apply to fine particulate matter ($PM_{2.5}$).

A positive effect is an effect that measurably reduces the atmospheric contaminant loading as a result of the Project.

6.1.3 ENVIRONMENTAL EFFECTS ANALYSIS

Air quality effects were evaluated based on knowledge of standard construction methods and equipment.

CONSTRUCTION (EXPANSION)

- Emissions of combustion gases and dust from earth-moving activities;
- Dust from land clearing entering the air and depositing on nearby vegetation and waterbodies;
- Increased carbon emissions from heavy machinery in the construction phase;
- Removal of trees and other vegetation may decrease soil stability and increase the potential for particulates to enter the ambient air; and,
- Increased carbon emissions from construction vehicles.

OPERATION

- Emissions of combustion gases and dust from blasting and drilling activities;

- Increased carbon emissions from heavy machinery in the operations stage;
- Increased carbon emissions from machinery;
- Increased dust from processing activities; and,
- Potential for increased carbon emissions and fugitive dust from vehicles idling, operating, and transporting materials.

DECOMMISSIONING

- Emissions of combustion gases and dust from earth-moving activities;
- Increased carbon emissions from heavy machinery in the decommissioning phase; and,
- Increased carbon emissions from construction vehicles.

6.1.4 MITIGATION MEASURES

The following mitigation measures have been prepared to minimize potential adverse effects on air quality during the site construction, operation, and decommissioning phases of the Project:

- Instituting vehicle speed limits and following a non-idling policy;
- Vehicles and equipment should be maintained and inspected as per manufacturer and / or provincial specifications and regulations;
- Where appropriate, trucks carrying loose material should be properly loaded and unloaded and tarped when travelling on and offsite;
- Stabilization of erodible materials, including stockpiles and excavated soils;
- Apply water for dust suppression; and,
- Maintaining a vegetated (preferably treed) buffer between on-site activities to mitigate the effects of emissions on nearby residential areas.

6.1.5 SIGNIFICANCE OF RESIDUAL EFFECTS

With the successful implementation of proposed mitigation during the construction and operation phases, residual effects on air quality and GHG emissions are anticipated to be negligible (Table 14).

Table 14: Summary of the residual effects the Project phases and activities are anticipated to have on air quality

PROJECT VEC INTERACTIONS	MITIGATION AND COMPENSATION MEASURES	NATURE OF EFFECT	SIGNIFICANCE CRITERIA FOR RESIDUAL ENVIRONMENTAL EFFECTS						RESIDUAL EFFECT	SIGNIFICANCE
			MAGNITUDE	GEOGRAPHIC EXTENT	DURATION	FREQUENCY	REVERSIBILITY	ECOLOGICAL AND SOCIAL CONTEXT		
Vegetation clearing, grubbing, and contouring	- Development of ESC plan to stabilize erodible materials - Maintain treed buffer - Maintain vehicles and equipment in working order	A	L	LAA	ST	S	R	MD	Minimal; Decrease of natural habitat, minimal and localized disturbance to air quality	Not Significant
Machinery operation (blasting, drilling, processing)	- Schedule activities when weather conditions are favorable and follow provincial regulations - Inspect and maintain machinery as appropriate	A	L	LAA	LT	S	IR	LD	Minimal; localized disturbance to air quality	Not Significant
Vehicle operation	- Limit vehicle idling - Implement and follow speed limits on and off site - Apply dust suppressants when appropriate - Inspect and maintain vehicles as appropriate	A	L	LAA	LT	R	IR	LD	Minimal; localized disturbance to air quality	Not Significant
Materials storage and movement	- Stabilization of erodible materials - Cover materials with dust screen when transporting on and off site	A	L	LAA	LT	R	R	LD	Minimal; localized disturbance to air quality	Not Significant
Reclamation	- Stabilization of erodible materials - Maintain vehicles and equipment in working order	P	L	LAA	LT	S	IR	MD	Minimal; eventual decrease in emissions and dust generation	Not Significant

LEGEND
Nature of Effect: (A – Adverse) (P – Positive)
Magnitude: (N – Negligible) (L – Low) (M – Medium) (H – High)
Geographic Extent: (PA – Project Area) (LAA – Local Assessment Area)
Duration: (ST – Short-Term) (MT – Medium-Term) (LT – Long Term) (P – Permanent)
Frequency: (O – Once) (S – Sporadic) (R – Regular) (C – Continuous)
Reversibility: (R – Reversible) (IR – Irreversible)
Ecological and Social Context: (LD – Low Disturbance) (MD – Medium Disturbance) (HD – High Disturbance)

6.2 ACOUSTIC ENVIRONMENT

6.2.1 VEC DESCRIPTION AND BOUNDARIES

The acoustic environment was selected as a VEC due to the potential for noise-related impacts from the Project within the Project footprint itself, as well as the surrounding landscape from blasting, drilling, and vehicles travelling on and off site.

The spatial boundaries selected for this VEC include the proposed expansion area and nearby residential areas, specifically where blasting, drilling, and processing is expected to occur and be heard, and the transportation corridor where vehicles carrying materials may cause increased emissions and dust and debris. The temporal boundaries include all phases of the Project.

6.2.2 SIGNIFICANCE DEFINITION

A significant adverse effect on the acoustic environment is defined as a predicted noise level that exceeds the Nova Scotia Guidelines *for Environmental Noise Measurement and Assessment* (NSE 1990). The guideline defines the maximum acceptable noise levels at specific times as follows:

L_{eq} of 65 dBA between 0700 to 1900 hours (daytime);

L_{eq} of 60 dBA between 1900 to 2300 hours (evening time), and

L_{eq} of 55 dBA between 2300 to 0700 hours (nighttime, all day Sunday and statutory holidays).

A positive effect is an effect that measurably reduces the ambient noise as a result of the Project.

6.2.3 ENVIRONMENTAL EFFECTS ANALYSIS

It is anticipated that the sound levels within the Project's proposed expansion area will not significantly increase existing ambient noise levels, as the current sound levels associated with quarrying and processing activities will remain continuous throughout the construction (expansion) and operation phases of the Project. As the Mt. Uniacke Quarry already follows and complies with the provincial quarry and blasting guidelines and regulations, which specify blasting locations, times, weather conditions, and monitoring requirements, it is assumed the sound levels will adhere to the guidelines and not exceed provincial standards and limits. Sound and vibration monitoring will be carried out during blasting periods. Given the distance between the Project and the nearest residences (>1 km), the blasting activities are not anticipated to result in noticeable or measurable vibration levels that could cause property damage or nuisance at nearby residences.

CONSTRUCTION (EXPANSION)

- Increased localized sound levels from construction machinery and vehicles during land clearing and grading;
- Noise disturbance to local wildlife; and,
- Removal of trees around the perimeter of the Project may decrease noise attenuation across the LAA.

OPERATION

- Sporadic increased localized sound levels during drilling and blasting;
- Increased localized sound levels during processing activities;

- Increased sound levels from machinery and vehicles during operation activities; and
- Noise disturbance to local wildlife.

DECOMMISSIONING

- Increased localized sound levels from construction machinery and vehicles during land grading and contouring activities; and,
- Noise disturbance to local wildlife.

6.2.4 MITIGATION MEASURES

The following mitigation measures are recommended to be implemented to minimize the risk of potential noise-related adverse effects on receptors during Project construction (expansion):

- Routine inspection of machinery and construction vehicles to ensure noise levels are acceptable. Any faulty mufflers or other sound dampening equipment should be replaced if necessary;
- Construction and operation should be scheduled during the daytime hours (i.e., 07:00 to 19:00);
- Keep idling of construction equipment to a minimum as necessary and maintain equipment in good working order to reduce noise from construction activities;
- Locate noisy equipment, such as generators, away from noise receptors where possible;
- Enforce vehicle speed limits;
- Plan truck routes such that reversing, and the use of back-up alarms are not required;
- Awareness training for machine and vehicle operators on techniques to reduce noise emissions;
- Where required and practical, the contract documents shall include these recommendations and general best management practice guidelines, as well as identify the receptors in the contract package;
- Noise and vibrations monitoring during blasting activities as per the requirements of the industrial approval conditions;
- Notify public and nearby residents of any planned blasting activities; and,
- Implement a complaints management process. If persistent noise complaints occur, develop specific noise mitigation measures to reduce these impacts.

6.2.5 SIGNIFICANCE OF RESIDUAL EFFECTS

With the successful implementation of the recommended mitigation measures and a noise control plan, residual effects from the construction, operation and decommissioning phases are anticipated to be minor (Table 15). Furthermore, a public notification and complaint management process to address community concerns will assist in managing any unexpected excess noise generation.

Table 15: Summary of the residual effects the Project phases and activities are anticipated to have on the acoustic environment

PROJECT VEC INTERACTIONS	MITIGATION AND COMPENSATION MEASURES	NATURE OF EFFECT	SIGNIFICANCE CRITERIA FOR RESIDUAL ENVIRONMENTAL EFFECTS						RESIDUAL EFFECT	SIGNIFICANCE
			MAGNITUDE	GEOGRAPHIC EXTENT	DURATION	FREQUENCY	REVERSIBILITY	ECOLOGICAL AND SOCIAL CONTEXT		
Vegetation clearing, grubbing, and contouring	- Maintain treed buffer to reduce sound transfer - Implement management and maintenance practices for equipment and vehicle inspections and repair - Schedule activities during daytime hours	A	N	LAA	ST	S	IR	LD	Minimal	Minimal Significance
Machinery operation (blasting, drilling, processing)	- Follow provincial regulations and guidance for blasting and quarrying operations - Schedule activities during daytime and weekday hours - Notify public in advance of blasting operations - Implement management and maintenance practices for equipment and vehicle inspections and repair	A	M	LAA	LT	S	IR	LD	Minimal	Minimal Significance
Vehicle operation	- Implement and follow speed limits on and off site - Schedule activities during daytime hours	A	N	LAA	LT	R	IR	LD	Minimal	Minimal Significance

LEGEND
Nature of Effect: (A – Adverse) (P – Positive)
Magnitude: (N – Negligible) (L – Low) (M – Medium) (H – High)
Geographic Extent: (PA – Project Area) (LAA – Local Assessment Area)
Duration: (ST – Short-Term) (MT – Medium-Term) (LT – Long Term) (P – Permanent)
Frequency: (O – Once) (S – Sporadic) (R – Regular) (C – Continuous)
Reversibility: (R – Reversible) (IR – Irreversible)
Ecological and Social Context: (LD – Low Disturbance) (MD – Medium Disturbance) (HD – High Disturbance)

6.3 GROUNDWATER

6.3.1 VEC DESCRIPTION AND BOUNDARIES

Groundwater resources were identified as a VEC based on potential Project-related effects on water supply, well quantity and quality, and effects that changes to the groundwater regime may have on surface waterbodies, streams and wetlands adjacent to the Project. The spatial boundaries for this VEC includes a l km radius around the proposed expansion area of the Project, and the temporal boundaries include the entire duration of the Project with a specific focus on the operation stage during blasting and drilling activities.

6.3.2 SIGNIFICANCE DEFINITION

A significant adverse effect on groundwater is defined as:

- A change in water well yields that result in a long-term reduction in water supply at a receiver location, or;
- A decrease in groundwater quality resulting in values outside of the Guidelines for Canadian Drinking Water Quality from Health Canada (Health Canada 2022).

A positive effect would be an increase in groundwater quantity or quality within the Project area.

6.3.3 ENVIRONMENTAL EFFECTS ANALYSIS

The desktop review indicated that there are 16 drilled wells located within 1 km of the Project's proposed expansion area; though none are associated with residential properties. Project-environment interactions of concern include:

- Siltation of wells and possible permanent change in water quality or well yield from blasting and vibrations;
- Water level reductions as a result of trenching, drainage, and large cuts or changes in surface topography;
- Contamination of wells from road salting and vegetation management; and
- Contamination of wells from acid rock drainage.

Direct effects on groundwater quality could also result in indirect effects on surface waterbodies such as stream dewatering, which may be caused by deep and/or large-scale site drainage.

6.3.4 MITIGATION MEASURES

NSECC Pit and Quarry Guidelines (NSE 1999) require a hydrological study and approval from the Minister or Administrator prior to any excavation below the water table.

The current Industrial Approval requires an amendment prior to excavation below the water table. Should an amendment be approved, the Proponent may be required to prepare and implement a groundwater monitoring program.

Mitigation of siltation of groundwater includes a pre-blast well survey, avoidance of blasting (when possible) within 500 m of residential wells, and remedial action as necessary to restore damaged wells and/or provide temporary potable water as needed.

Mitigation of water level reductions include monitoring and remedial action, as necessary, to restore damaged wells and/or provide temporary potable water as needed.

6.3.5 SIGNIFICANCE OF RESIDUAL EFFECTS

The residual effects on groundwater quality and quantity within the proposed expansion area caused by the construction (expansion), operation and maintenance are not expected to be significant (Table 16).

Table 16: Summary of the residual effects the Project phases and activities are anticipated to have on groundwater

			SIGNIFICANCE CRITERIA FOR RESIDUAL ENVIRONMENTAL EFFECTS							
PROJECT VEC INTERACTIONS	MITIGATION AND COMPENSATION MEASURES	NATURE OF EFFECT	MAGNITUDE	GEOGRAPHIC EXTENT	DURATION	FREQUENCY	REVERSIBILITY	ECOLOGICAL AND SOCIAL CONTEXT	RESIDUAL EFFECT	SIGNIFICANCE
Machinery operation (blasting, drilling, processing)	- Follow provincial regulations and guidance for blasting and quarrying operations - Nearest known well location is 600 m away from the proposed expansion area - Potential interaction with wetlands.	A	L	LAA	LT	S	IR	LD	Minimal	Minimal Significance

LEGEND
Nature of Effect: (A – Adverse) (P – Positive)
Magnitude: (N – Negligible) (L – Low) (M – Medium) (H – High)
Geographic Extent: (PA – Project Area) (LAA – Local Assessment Area)
Duration: (ST – Short-Term) (MT – Medium-Term) (LT – Long Term) (P – Permanent)
Frequency: (O – Once) (S – Sporadic) (R – Regular) (C – Continuous)
Reversibility: (R – Reversible) (IR – Irreversible)
Ecological and Social Context: (LD – Low Disturbance) (MD – Medium Disturbance) (HD – High Disturbance)

6.4 TERRESTRIAL HABITAT AND VEGETATION

6.4.1 VEC DESCRIPTION AND BOUNDARIES

Priority species of vegetation are valued as an intrinsic component of the natural environment in Nova Scotia. The protection or avoidance of priority or rare vegetation species may result in their surrounding habitats receiving some level of protection as well. This helps to preserve biodiversity in our natural environment. Additionally, the protection of sensitive or critical habitat is likely to benefit key species dependent on those communities or maintain vital ecological functions within the greater landscape.

The spatial and temporal boundaries used for the assessment of effects on flora and habitat include the Project's proposed expansion area throughout the life of the Project. All habitat types on site were investigated with extra emphasis on wetlands that are predicted to impacted via excavation or other disruptive means, and mature forested stands.

Data from the Atlantic Canada Conservation Data Centre (ACCDC) was used to help target habitats of potential SAR or SOCC species within the Project site.

6.4.2 SIGNIFICANCE DEFINITION

A significant adverse effect on terrestrial habitat and vegetation is defined as:

- For species at risk, one that results in contravention of SARA or NS ESA provisions;
- For rare species or species of conservation concern not listed under SARA or NS ESA, a decline in abundance and/or change in distribution beyond which natural recruitment (reproduction and immigration from unaffected areas) would not return the population to its pre-project level within several (three to five) generations.
- For sensitive or critical habitat, a permanent net loss of habitat function.

A positive effect is one that may enhance the quality of habitat, increase species diversity, or increase the area of valued habitat.

6.4.3 ENVIRONMENTAL EFFECTS ANALYSIS

The construction (expansion), operation, and decommissioning of the quarry may impact terrestrial habitat and vegetation in a variety of ways outlined below:

CONSTRUCTION (EXPANSION)

- Direct habitat loss due to partial or complete removal of vegetation or in-filling;
- Stripping of topsoil may alter vegetation communities;
- Loss or reduction of wildlife or vegetation habitat functions;
- Fragmentation of wildlife habitat;
- Alteration of surface hydrology;
- Increased flashiness in any remaining wetlands;
- Increased frequency and/or magnitude of sedimentation or erosion events from earthworks;
- Hazardous or deleterious substance release from equipment and vehicles; and
- Changes to the local surface water and potentially groundwater regime may alter vegetation communities within and adjacent to the project area and in turn alter the potential functions of affected habitats.

OPERATION

- Introduction of invasive or alien species tracked through by vehicles travelling on and off-site; and
- Aggregate crushing may produce significant dust and deposit it within the surrounding environment.

DECOMMISSIONING

- Lack of topsoil available within the quarry areas may reduce the speed of site reclamation and hence;

- Deterioration of environmental protection measures implemented during the Project may lead to potential erosion or siltation events, or release of other deleterious substances in the area; and
- Failure to ensure ground stability upon decommissioning may lead to cascading ecological effects.

6.4.4 MITIGATION MEASURES

Proposed mitigation measures to limit or offset potential adverse effects on terrestrial habitat and vegetation during all phases of the project are outlined below:

- Intact forest stands and wetlands will be avoided wherever possible during detailed Project planning and design in favor of previously disturbed areas (e.g., stands disturbed by timber harvesting, existing roads, or other development);
- Topsoil is to be salvaged and stored for use in site restoration where possible. Upland and wetland soils should be stockpiled separately;
- Where natural, intact habitat cannot be avoided, minimization of total Project footprint will be considered during detailed planning;
- Erosion and sediment control planning will be completed to ensure site runoff is not directed towards unaltered habitat, where possible, to ensure existing drainage patterns are maintained;
- The effect of dust accumulation on adjacent undisturbed vegetation can be mitigated by monitoring dust conditions and when normal precipitation levels are not enough to suppress fugitive dust, water trucks can be used to suppress dust. This reduces potential impact on fauna and improves safety and visibility for other vehicular traffic as well. Oil will not be used as an alternate dust suppressant;
- Winter road maintenance for the quarry site will include conventional snow clearing and deposition of sand for traction control where necessary. Road salt will not be used;
- Trucks will be equipped with spill kits and drivers instructed on their use and spill prevention; appropriate site personnel will be trained in spill isolation, containment, and recovery; and
- Create contingency plan for “sudden unplanned closures” to mitigate potential effects on the surrounding environment in that scenario.

6.4.5 SIGNIFICANCE OF RESIDUAL EFFECTS

The predicted residual environmental effects of the Project on terrestrial habitat and vascular and non-vascular plant species, including SAR and SOCC, are assessed to be adverse, but not significant (Table 17).

Table 17: Summary of the residual effects the Project phases and activities are anticipated to have on the terrestrial habitat and vegetation

PROJECT VEC INTERACTIONS	MITIGATION AND COMPENSATION MEASURES	NATURE OF EFFECT	SIGNIFICANCE CRITERIA FOR RESIDUAL ENVIRONMENTAL EFFECTS						RESIDUAL EFFECT	SIGNIFICANCE
			MAGNITUDE	GEOGRAPHIC EXTENT	DURATION	FREQUENCY	REVERSIBILITY	ECOLOGICAL AND SOCIAL CONTEXT		
Clearing and grubbing	- Ensure rare plant and lichen surveys are completed prior to clearing mature forest - Avoid wetlands and intact mature forest stands where possible, or minimize impact to greatest extent possible - Erosion and sediment control plan to prevent sedimentation and erosion into adjacent habitats - Salvage topsoil for reclamation where possible; hydric and non-hydric soils should be stockpiled separately	A	M	LAA	ST	S	R	LD	Medium	Medium Significance
Heavy machinery operation	- Monitor dust conditions on roads in periods with low rain - Spill kits to be available on-site	A	L	PA	LT	R	R	LD	Minimal	Minimal Significance
Vehicle activity and transportation	- Monitor dust conditions on roads in periods with low rain - Spill kits to be available in site vehicles and available on-site	A	L	PA	LT	R	R	LD	Minimal	Minimal Significance

PROJECT VEC INTERACTIONS	MITIGATION AND COMPENSATION MEASURES	NATURE OF EFFECT	SIGNIFICANCE CRITERIA FOR RESIDUAL ENVIRONMENTAL EFFECTS						RESIDUAL EFFECT	SIGNIFICANCE
			MAGNITUDE	GEOGRAPHIC EXTENT	DURATION	FREQUENCY	REVERSIBILITY	ECOLOGICAL AND SOCIAL CONTEXT		
Decommissioning and reclamation	- Salvage topsoil from site during excavation - Store hydric and non-hydric soils separately - Develop detailed reclamation and revegetation plan to address provincial requirements and targets - Implement erosion and sediment control measures until soils in reclaimed terrestrial areas are stabilized	P	L	LAA	MT	S	R	LD	Medium	Medium Significance

LEGEND
Nature of Effect: (A – Adverse) (P – Positive)
Magnitude: (N – Negligible) (L – Low) (M – Medium) (H – High)
Geographic Extent: (PA – Project Area) (LAA – Local Assessment Area)
Duration: (ST – Short-Term) (MT – Medium-Term) (LT – Long Term) (P – Permanent)
Frequency: (O – Once) (S – Sporadic) (R – Regular) (C – Continuous)
Reversibility: (R – Reversible) (IR – Irreversible)
Ecological and Social Context: (LD – Low Disturbance) (MD – Medium Disturbance) (HD – High Disturbance)

6.5 TERRESTRIAL WILDLIFE

6.5.1 VEC DESCRIPTION AND BOUNDARIES

Terrestrial fauna, and the habitat upon which they rely, may be altered either directly or indirectly affected by proposed Project activities. While this VEC includes understanding the potential effects of the Project on all fauna, the specific survey methods are mainly driven by the need to identify Species at Risk (SAR) and Species of Conservation Concern (SOCC).

The project site boundary constitutes the spatial and temporal boundaries identified for the assessment of effects on terrestrial fauna throughout the life of the Project.

6.5.2 SIGNIFICANCE DEFINITION

A significant adverse effect on terrestrial wildlife is defined as:

- For species at risk, one that results in contravention of SARA or NS ESA provisions, or
- For rare species or species of conservation concern not listed under SARA or NS ESA, one that results in contravention of the Nova Scotia Wildlife Act or a decline in abundance and/or change in distribution beyond which natural recruitment (reproduction and immigration from unaffected areas) would not return the population to its pre-project level within several (three to five) generations.

A positive effect is one that may enhance or increase species abundance and diversity.

6.5.3 ENVIRONMENTAL EFFECTS ANALYSIS

Site construction (expansion), operation, and decommissioning of the Uniacke Quarry may impact terrestrial wildlife in a variety of ways outlined below:

CONSTRUCTION (EXPANSION)

- Clearing and grubbing of forested areas may directly reduce available wildlife habitat;
- Sensory disturbance from increased noise and activity in the area may decrease wildlife utilization;
- Construction lights, if required, may cause sensory disturbance to wildlife in the area;
- Increased vehicular activity may cause direct animal mortality in road crossing situations;
- Opportunistic species such as raccoons, skunks, coyotes, and black bear may be attracted to wastes generated on-site;
- Increased ground vibration during construction activities may cause sensory disruption;
- Potential habitat loss or degradation for aquatic and semi-aquatic fauna if wetlands are altered;
- Dust from construction may reduce quality or quantity of available forage options;
- Increased numbers of workers in the area may result in more frequent animal – human interaction; and
- Blasting new quarry areas may deter wildlife.

OPERATION

- Significant habitat disruption due to quarry operations (machinery);
- Sustained vehicular use in the area may deter wildlife;
- Blasting / other mineral extraction techniques may deter wildlife;
- Aggregate crushing on site may reduce the quality or quantity of available forage options; and
- Increased vibration from material transport and on-site machinery.

DECOMMISSIONING

– Failure to ensure ground stability upon decommissioning may lead to cascading ecological effects.

While the Project has the potential to reduce available terrestrial wildlife habitat and disrupt local wildlife, it is important to note that the existing quarry operations at the project site may already be considered disruptive. Since there is no location within the expansion area found more than 500 m from current quarrying activities or material transport roads, the adverse effects associated with the expansion activities are predicted to be minimal.

Current activities at the Project site which may adversely affect wildlife are displayed below:

– Frequent and ongoing material transport using heavy trucks; and,

– Noise related to current quarry operations: excavators, trucks, pumps, other machinery and implements.

6.5.4 MITIGATION MEASURES

A number of general mitigation measures and planning can help to reduce effects on terrestrial wildlife within the Project area including:

– Minimize Project footprint to limit the removal of wildlife habitat;

– Use an air horn or similar loud noise prior to vegetation clearing to alert wildlife and allow them to safely flee the area;

– Implement speed limits to reduce potential collisions between wildlife and vehicles operating within the quarry;

– Ensure vehicles and equipment are inspected and properly maintained to limit noise and dust generation which may adversely affect wildlife and their habitat; and

– Implement dust control practices during blasting and crushing/processing to limit residual dust from entering adjacent wildlife habitat areas.

6.5.5 SIGNIFICANCE OF RESIDUAL EFFECTS

The residual environmental effects of the Project on terrestrial wildlife, including SAR and SOCC, are assessed to be adverse, but not significant (Table 18).

Table 18: Summary of the residual effects the Project phases and activities are anticipated to have on terrestrial wildlife

PROJECT VEC INTERACTIONS	MITIGATION AND COMPENSATION MEASURES	NATURE OF EFFECT	SIGNIFICANCE CRITERIA FOR RESIDUAL ENVIRONMENTAL EFFECTS						RESIDUAL EFFECT	SIGNIFICANCE
			MAGNITUDE	GEOGRAPHIC EXTENT	DURATION	FREQUENCY	REVERSIBILITY	ECOLOGICAL AND SOCIAL CONTEXT		
Clearing and grubbing	- Minimize Project footprint to limit removal of wildlife habitat - Use air horns or other loud noises prior to clearing to deter wildlife away from work areas and allow them to safely flee into adjacent areas	A	L	PA	ST	S	R	MD	Medium	Medium Significance
Vehicle activity and transportation	Implement speed limits to reduce potential collisions with wildlife	A	N	PA	LT	R	R	LD	Minimal	Minimal Significance
Heavy machinery operation	- Ensure noise muffling equipment is in good working order - Inspect and maintain equipment to limit fugitive dust and emissions	A	L	PA	LT	R	R	LD	Minor	Minor Significance
Blasting and processing	Implement dust control practices to limit fugitive dust into adjacent wildlife habitats	A	L	PA, LAA	LT	S / R	R	LD	Minor	Minor Significance

LEGEND
Nature of Effect: (A – Adverse) (P – Positive)
Magnitude: (N – Negligible) (L – Low) (M – Medium) (H – High)
Geographic Extent: (PA – Project Area) (LAA – Local Assessment Area)
Duration: (ST – Short-Term) (MT – Medium-Term) (LT – Long Term) (P – Permanent)
Frequency: (O – Once) (S – Sporadic) (R – Regular) (C – Continuous)
Reversibility: (R – Reversible) (IR – Irreversible)
Ecological and Social Context: (LD – Low Disturbance) (MD – Medium Disturbance) (HD – High Disturbance)

6.6 AVIFAUNA

6.6.1 VEC DESCRIPTION AND BOUNDARIES

Several avian species found in Nova Scotia are either considered “Species of Conservational Concern” or have been noted to be in decline. Habitat loss and degradation are two main concerns regarding avifauna decline. The spatial and temporal boundaries established for this assessment included the proposed quarry expansion boundary throughout the life of the Project.

6.6.2 SIGNIFICANCE DEFINITION

A significant adverse effect on avifauna (birds) is defined as:

- For migratory birds, one that results in contravention of the Migratory Birds Convention Act (MBCA);
- For species at risk, one that results in contravention of SARA or NS ESA provisions, or
- For rare species or species of conservation concern not listed under SARA or NS ESA, one that results in a decline in abundance and/or change in distribution beyond which natural recruitment (reproduction and immigration from unaffected areas) would not return the population to its pre-project level within several (three to five) generations.

A positive effect is one that may enhance increase species abundance and diversity.

6.6.3 ENVIRONMENTAL EFFECTS ANALYSIS

CONSTRUCTION (EXPANSION)

- Clearing and grubbing of forested areas may directly reduce available avifauna habitat;
- Sensory disturbance from increased noise and activity in the area may decrease avifauna utilization;
- Construction lights, if required, may cause sensory disturbance to avifauna in the area;
- Increased vehicular activity may cause direct avifauna mortality in road crossing situations;
- Increased ground vibration during construction activities may cause sensory disruption;
- Dust from construction may reduce quality or quantity of available forage options;
- Additional land clearing may reduce available habitat within the expansion area;
- Increased workers in the area may result in more frequent avifauna – human interaction; and
- Blasting new quarry areas may deter avifauna.

OPERATION

- Significant habitat disruption due to quarry operations (machinery);
- Sustained vehicular use in the area may deter avifauna;
- Blasting / other mineral extraction techniques may deter avifauna;
- Aggregate crushing on site may reduce the quality or quantity of available forage options;

- Increased vibration from material transport and on-site machinery; and
- Material piles or exposed banks/cliffs greater than 70 degrees may create suitable habitat conditions for Bank Swallow – a SAR bird that can form colonies in sand and gravel pits.

DECOMMISSIONING

- Failure to ensure ground stability upon decommissioning may lead to cascading ecological effects.

6.6.4 MITIGATION MEASURES

Proposed mitigation measures to offset potential adverse effects on avian wildlife during all phases of the Project are outlined below:

- Minimizing the Project footprint to the smallest extent possible to avoid disturbance to suitable avian habitat;
- Clearing and grubbing should only be conducted in the areas necessary to complete the Project;
- Vegetation removal should be completed outside of the breeding bird season (April 1 – August 27) to avoid potential harm to migratory birds or their nests, as outlined in the Migratory Birds Convention Act, 1994. If clearing is required during this time, nest surveys, with approval from NSDNRR and ECCC, can be carried out by a qualified professional prior to clearing;
- If nests are found during a nest survey, an appropriate buffer shall be established, and any clearing or disruptive activities will be avoided until the nest has been confirmed to be inactive by a qualified professional;
- If raptor nests are found within forested areas to be cleared, even outside of the breeding season, a buffer zone must be placed around the nest and clearing can only occur outside of the buffer zone;
- Cover sand or soil stockpiles, or contour them to slopes less than 70 degrees to reduce likelihood of Bank Swallow creating nests;
- Routine environmental monitoring of exposed cliffs during nesting season (mid-April to late-August) to identify if Bank Swallows are actively using the area. The Project EPP should address contingency plans if Bank Swallows are found nesting within the quarry operations area.
- Utilization of trash receptacles and good housekeeping practices to avoid attracting avifauna;
- Ensure vehicles and equipment have sufficient noise muffling equipment in good working order;
- Construction lighting should be restricted to areas where it is necessary and should be directed downwards, if practical, to reduce attraction of nocturnal birds;
- Staff and workers encouraged to refrain from entering the surrounding natural environment during construction and maintenance phases of the work;
- Vegetation clearing along the quarry access road should be avoided during the breeding season; and
- Implementation of EPP, including environmental awareness training.

6.6.5 SIGNIFICANCE OF RESIDUAL EFFECTS

Recommended mitigation measures and anticipated residual environmental effects following the implementation of mitigation measures are summarized in Table 19. With the successful implementation of the recommended mitigation measures, the Project activities associated with the construction, operation and decommissioning phases, are not anticipated to result in significant adverse effects on avifauna, including priority species.

Table 19: Summary of the residual effects the Project phases and activities are anticipated to have on avifauna

PROJECT VEC INTERACTIONS	MITIGATION AND COMPENSATION MEASURES	NATURE OF EFFECT	SIGNIFICANCE CRITERIA FOR RESIDUAL ENVIRONMENTAL EFFECTS						RESIDUAL EFFECT	SIGNIFICANCE
			MAGNITUDE	GEOGRAPHIC EXTENT	DURATION	FREQUENCY	REVERSIBILITY	ECOLOGICAL AND SOCIAL CONTEXT		
Habitat fragmentation or degradation	- Minimize Project footprint	A	L	PA	P	C	IR	LD	Minor	Minor Significance
Construction-related disturbance (noise, dust generation)	- Use existing access routes to the ROW when possible	A	L	PA, LAA	P	C	IR	LD	Minor	Minor Significance
Construction and operations-related disturbance (heavy machinery operation, blasting, truck traffic)	- Minimize Project footprint	A	L	PA, LAA	LT	S	R	MD	Minor	Minor Significance
Disturbance or destruction of migratory bird nests	- Implementation of an EPP	A	L	PA, LAA	ST	S	R	LD	Minor	Minor Significance
Degradation of forage and habitat quality from aggregate crushing	- Implementation of an EPP and dust control measures	A	L	PA	LT	C	R	LD	Minor	Minor Significance
Degradation of roadside habitats from maintenance activities	- Monitor noise levels to ensure work is completed during hours where high levels of ambient noise are permitted	A	L	PA	ST	S	IR	LD	Minor	Minor Significance
Light pollution and disruption	- Environmental awareness training - lighting restrictions and lighting directed downwards, where feasible.	A	N	PA	MT	S	R	LD	Minor	Minor Significance
Avian mortality and traffic collisions	- Implementation of an EPP	A	N	PA	P	S	R	LD	Minor	Not Significant
Composition of avian community	. -Environmental awareness training	A	L	PA	LT	C	R	LD	Minor	Not Significant

PROJECT VEC INTERACTIONS	MITIGATION AND COMPENSATION MEASURES	NATURE OF EFFECT	SIGNIFICANCE CRITERIA FOR RESIDUAL ENVIRONMENTAL EFFECTS						RESIDUAL EFFECT	SIGNIFICANCE
			MAGNITUDE	GEOGRAPHIC EXTENT	DURATION	FREQUENCY	REVERSIBILITY	ECOLOGICAL AND SOCIAL CONTEXT		
Creation of suitable Bank Swallow habitat conditions	- Contour or cover sand or gravel stockpiles - Environmental monitoring during breeding season - Implementation of an EPP	P	L	PA	ST		R	LD	Minor	Not Significant

LEGEND
Nature of Effect: (A – Adverse) (P – Positive)
Magnitude: (N – Negligible) (L – Low) (M – Medium) (H – High)
Geographic Extent: (PA – Project Area) (LAA – Local Assessment Area)
Duration: (ST – Short-Term) (MT – Medium-Term) (LT – Long Term) (P – Permanent)
Frequency: (O – Once) (S – Sporadic) (R – Regular) (C – Continuous)
Reversibility: (R – Reversible) (IR – Irreversible)
Ecological and Social Context: (LD – Low Disturbance) (MD – Medium Disturbance) (HD – High Disturbance)

6.7 WETLANDS

6.7.1 VEC DESCRIPTION AND BOUNDARIES

Wetlands were selected as a valued environmental component (VEC) because they are known to provide important habitat for a variety of species of conservation concern, as well as providing various ecological services to the environment and society. The wetland area within the Uniacke Quarry Expansion site is estimated at approximately 1.04 hectares (ha) and makes up approximately 2.6% of the total expansion area (approximately 40 ha).

The spatial and temporal boundaries used for the assessment of effects on wetlands include the Project site boundary throughout the life of the Project, with emphasis on those wetlands that are within areas where quarry operations are expected to occur.

6.7.2 SIGNIFICANCE DEFINITION

A significant adverse effect on wetlands is defined as an effect that is likely to cause a permanent, uncompensated net loss of wetland habitat and function.

A positive effect is one that may enhance the quality of wetland habitat or function, increase species diversity, or increase the area of valued habitat.

6.7.3 ENVIRONMENTAL EFFECTS ANALYSIS

Construction (expansion), and subsequent ongoing operation and maintenance of the Uniacke Quarry expansion site may impact wetland habitat in a variety of ways outlined below:

- CONSTRUCTION (EXPANSION)
- Direct habitat loss due to partial or complete in-filling (up to 1.00 ha);
- Loss or reduction of wetland functions;
- Alteration of wetland hydrology;
- Fragmentation of wetland habitat;
- Increased potential for events of sedimentation or erosion;
- Increased flashiness of wetland habitat;
- Risk of spills from equipment and vehicles into adjacent wetland habitat;
- Changes to surface water or groundwater regime may potentially add or reduce static water levels within nearby wetland areas; and,
- Introduction of invasive or alien species from vehicles and equipment entering and leaving the area.

OPERATION

- Changes to surface water or groundwater regime may potentially add or reduce static water levels within nearby wetland areas;
- Introduction of invasive or alien species from material transport vehicles and other quarry equipment;
- Nutrient or salt loading;
- Increased flashiness of wetland habitat; and,
- Risk of spills from equipment and vehicles into adjacent wetland habitat.

DECOMMISSIONING

- Deterioration of environmental protection measures implemented during the Project may lead to potential erosion or siltation events, or release of other deleterious substances in the area.

Many of the above effects, such as sedimentation or flashiness, are considered short-term and relate mainly to the construction phase of the Project. Some effects are considered long-term, but low magnitude, particularly those relating to in-filling or the fragmentation of wetland habitat. The loss of wetland area can be compensated through creation of new wetlands, and also the eventual decommissioning of the quarry. Mitigation of long-term hydrological effects are implemented during the design phase of the project via the inclusion of appropriate water control structures.

6.7.4 MITIGATION MEASURES

Proposed mitigation measures to offset potential adverse effects on wetlands during all phases of the Project are outlined below:

- Pre-Project surveys will be completed to identify locations for avoidance or mitigation;
- All necessary permits and approvals will be obtained and on-site;
- Disturbances to wetland and drainage edges will be minimized to the maximum extent possible;
- To the extent practical, construction in wetlands will be scheduled to occur under dry or frozen ground conditions;
- Culverts will be installed, as necessary, to maintain drainage around roads and linear infrastructure;

- Use temporary diversion berms or other methods, as required, to regulate drainage from construction areas;
- Use of sprayers or equivalent dust reduction systems in wetland areas during the construction and operation phases;
- Refueling and staging areas are to be located no less than 60 m from wetlands to reduce accidental spill potential;
- Construction vehicles used for the transfer of materials on or off the site will utilize bed covers to reduce potential sedimentation in transit;
- Wetland monitoring programs within altered wetlands during all phases of construction and 5 years post-construction will aid in identifying current or residual effects, and potential mitigation measures;
- Implementation and adherence of suitable erosion and sedimentation control measures, and regular inspection of the controls;
- Construction monitoring and rain-event inspections;
- Seeding or re-vegetation of wetland areas impacted by construction when possible;
- Inspection of vehicles and equipment for leaks or contaminants with potential for release into the surrounding environment prior to entering the project site;
- Wetland soils will be salvaged and stockpiled separately from upland soils for use during the decommissioning phase; and
- Material piles (if present) should be located away from water features or wetlands and accompanied by appropriate erosion and sedimentation control measures.

6.7.5 SIGNIFICANCE OF RESIDUAL EFFECTS

Recommended mitigation measures and anticipated residual environmental effects following the implementation of mitigation measures are summarized in Table 20. With the successful implementation of the recommended mitigation measures, the Project activities, including the construction and operation phases, are not anticipated to result in significant adverse effects on wetland habitat.

Table 20: Summary of the residual effects the Project phases and activities are anticipated to have on wetlands

PROJECT VEC INTERACTIONS	MITIGATION AND COMPENSATION MEASURES	NATURE OF EFFECT	SIGNIFICANCE CRITERIA FOR RESIDUAL ENVIRONMENTAL EFFECTS						RESIDUAL EFFECT	SIGNIFICANCE
			MAGNITUDE	GEOGRAPHIC EXTENT	DURATION	FREQUENCY	REVERSIBILITY	ECOLOGICAL AND SOCIAL CONTEXT		
Clearing and grubbing	- Attain and comply with all necessary regulatory approvals relating to wetland alteration - Confirm compensation plan for unavoidable wetland alterations - Wetland avoidance during planning phase to minimize project interactions where possible - Erosion and sediment control plan - Development of a work in the dry plan where required - Implement and maintain a 30 m vegetated buffer surrounding wetland habitat where possible - Wetland monitoring at locations impacted directly by project construction	A	M	LAA	ST	S	R	MD	Minor; loss of natural wetland habitat, alteration of drainage patterns	Minor Significant
Heavy machinery operation	- Ensure spill kits and a contaminant spill action plan is in place. - Fuel and other hazardous substances are stored in a secure location no less than 60 m from wetlands.	A	L	PA	LT	R	R	LD	Minimal	Not Significant
Vehicle operation	- Ensure commercial vehicles are equipped with spill	A	L	PA	LT	R	R	LD	Minimal	Not Significant

PROJECT VEC INTERACTIONS	MITIGATION AND COMPENSATION MEASURES	NATURE OF EFFECT	SIGNIFICANCE CRITERIA FOR RESIDUAL ENVIRONMENTAL EFFECTS: MAGNITUDE	GEOGRAPHIC EXTENT	DURATION	FREQUENCY	REVERSIBILITY	ECOLOGICAL AND SOCIAL CONTEXT	RESIDUAL EFFECT	SIGNIFICANCE
	kits, and that a contaminant spill action plan is in place. - Designated fueling location is secured and placed at least 60 m from any wetlands. - Use of sprayers or dust reduction systems on roads adjacent to wetlands - Dust control systems in place for vehicles carrying materials on and off site.									
Processing	- Use of dust reduction systems on processing machinery situated near wetlands	A	L	PA	LT	R	R	LD	Minimal	Not Significant
Decommissioning	- Erosion control measures implemented to prevent sedimentation of any adjacent wetlands	P	L	LAA	LT	S	R	LD	Minimal	Not Significant

LEGEND
Nature of Effect: (A – Adverse) (P – Positive)
Magnitude: (N – Negligible) (L – Low) (M – Medium) (H – High)
Geographic Extent: (PA – Project Area) (LAA – Local Assessment Area)
Duration: (ST – Short-Term) (MT – Medium-Term) (LT – Long Term) (P – Permanent)
Frequency: (O – Once) (S – Sporadic) (R – Regular) (C – Continuous)
Reversibility: (R – Reversible) (IR – Irreversible)
Ecological and Social Context: (LD – Low Disturbance) (MD – Medium Disturbance) (HD – High Disturbance)

6.8 FISH AND FISH HABITAT

6.8.1 VEC DESCRIPTION AND BOUNDARIES

Fish and Fish Habitat have both intrinsic and socio-economic value to the community as healthy fish populations have a positive cascading effect on local biodiversity, including avian and terrestrial fauna, as well as intrinsic and economic value related to sportfishing and tourism opportunities. The spatial and temporal boundaries applied to this VEC is the Project's proposed expansion area throughout the life of the Project, with additional emphasis on downgradient water features.

No natural watercourses or other water features were noted within the proposed quarry expansion area during field investigations; therefore, the focus of this section is on the Project's potential interaction with the headwater of the Sackville River which is located downgradient of the Project's existing settling pond outflow.

6.8.2 SIGNIFICANCE DEFINITION

A significant adverse effect on fish and fish habitat is defined as an effect that results in:

- Harmful alteration, disruption or destruction of fish habitat (as defined under the Fisheries Act) that occurs as a result of Project activities without federal approval, or that cannot be remedied with an appropriate offsetting plan;
- Deposition of a deleterious substance into the aquatic environment, under Section 36(3) of the Fisheries Act; August 2019 Page 111;
- An exceedance of water quality guidelines outlined in the conditions of approval; or
- Death, harm, harassment or capture of a species listed as extirpated, endangered, or threatened under Schedule 1 of SARA.

A positive effect is one that enhances the quality or area of habitat or increases species diversity.

6.8.3 ENVIRONMENTAL EFFECTS ANALYSIS

Construction (expansion) and subsequent ongoing operation and maintenance of the Uniacke Quarry expansion site may impact fish and fish habitat in a variety of ways outlined below:

CONSTRUCTION (EXPANSION)

- Excess dust or silt may deposit in downstream waterbodies during heavy precipitation events;
- Alteration of surface hydrology may increase overland flow;
- Changes to surface water or groundwater regime may potentially add or reduce static water levels in the local area;
- Introduction of invasive or alien species from material transport vehicles and other quarry equipment;
- Nutrient or salt loading;
- Increased flashiness of overland flow; and
- Excess dust or silt may deposit in downstream waterbodies during heavy precipitation events.

OPERATION

- Recurring deleterious substance release from winter maintenance and leaks from commercial vehicles and machinery; and
- Excess dust or silt may deposit in downstream waterbodies during heavy precipitation events.

DECOMISSIONING

- Deterioration of environmental protection measures implemented during the project may lead to potential erosion or siltation events, or release of other deleterious substances in the area.

6.8.4 MITIGATION MEASURES

Several mitigation measures may be implemented at different stages of the Project life. Mitigation measures with potential to be utilized during the life of the Project include:

- Silt fencing and or straw spreading / seeding in areas with potential for erosion or siltation events;
- Pumping of silt-laden water to more distant areas during the site preparation and construction phases;
- Any temporarily stockpiled soil, debris or other excess materials, and any construction-related materials, will be properly contained (e.g., within silt fencing) in areas separated at least 30 m from watercourses and settling ponds;
- Riparian areas (if altered) should be re-vegetated once construction is complete to ensure bank stability.

6.8.5 SIGNIFICANCE OF RESIDUAL EFFECTS

The residual effects on fish and fish habitat, as well as surface water quality and quantity are not anticipated to be significant following the implementation of proposed mitigation measures. Table 21 outlines the potential Project and VEC interactions, corresponding mitigation measures, and the anticipated residual effects and significance.

Table 21: Summary of the residual effects the Project phases and activities are anticipated to have on fish and fish habitat

PROJECT VEC INTERACTIONS	MITIGATION AND COMPENSATION MEASURES	NATURE OF EFFECT	SIGNIFICANCE CRITERIA FOR RESIDUAL ENVIRONMENTAL EFFECTS						RESIDUAL EFFECT	SIGNIFICANCE
			MAGNITUDE	GEOGRAPHIC EXTENT	DURATION	FREQUENCY	REVERSIBILITY	ECOLOGICAL AND SOCIAL CONTEXT		
Heavy Machinery Operation (impacts to water quality from dust, sediments, accidents, and contamination)	- Erosion and sediment control measures, designated refueling site.	A	L	LAA	ST	S	R	LD	Minimal; potential for temporary habitat degradation	Minimal Significance
Construction and removal of material i.e., topsoil grubbing	- Ensure erosion control measures are in place prior to the commencement of work. - Avoid works near watercourses where possible	A	L	LAA	ST	S	R	LD	Minimal; potential for temporary habitat degradation	Minimal Significance

PROJECT VEC INTERACTIONS	MITIGATION AND COMPENSATION MEASURES	NATURE OF EFFECT	SIGNIFICANCE CRITERIA FOR RESIDUAL ENVIRONMENTAL EFFECTS						RESIDUAL EFFECT	SIGNIFICANCE
			MAGNITUDE	GEOGRAPHIC EXTENT	DURATION	FREQUENCY	REVERSIBILITY	ECOLOGICAL AND SOCIAL CONTEXT		
Commercial vehicle traffic (impacts to water quality from dust, sediments, noise pollution accidents and contamination)	- Ensure commercial vehicles are equipped with spill kits, and that a contaminant spill action plan is in place. - Ensure erosion control measures are in place where appropriate prior to commencement of hauling. -Post speed limits and traffic signage at site and ensure these measures are communicated to Project staff.	A	L	LAA	ST	R	R	LD	Minimal; potential for temporary habitat degradation	Minimal Significance
Introduction of invasive species to wetland habitat	- Manage vegetation growth, remove invasives where present	A	L	PA, LAA	MT	S	R	LD	Minor; increased stress on native plant regime	Minor Significance
Impacts from nutrient or contaminant-rich surface water	- Erosion and sedimentation control measures to be placed in newly constructed diches upstream of watercourse confluences - Implement and maintain a 30 m vegetated buffer surrounding watercourse habitat where possible - Rain event monitoring and surface water sampling to ensure implemented measures are effective during site preparation and construction	A	L	LAA	MT	S	R	LD	Minor; habitat alteration and/or degradation	Minor Significance

LEGEND
Nature of Effect: (A – Adverse) (P – Positive)
Magnitude: (N – Negligible) (L – Low) (M – Medium) (H – High)
Geographic Extent: (PA – Project Area) (LAA – Local Assessment Area)
Duration: (ST – Short-Term) (MT – Medium-Term) (LT – Long Term) (P – Permanent)
Frequency: (O – Once) (S – Sporadic) (R – Regular) (C – Continuous)
Reversibility: (R – Reversible) (IR – Irreversible)
Ecological and Social Context: (LD – Low Disturbance) (MD – Medium Disturbance) (HD – High Disturbance)

6.9 ECONOMY AND LAND USE

6.9.1 VEC DESCRIPTION AND BOUNDARIES

The economy and land use VEC is associated with the socio-economic components within the Project area and surrounding landscape and communities. Spatial boundaries for potential VECs in terms of existing and planned land uses are within the Project's proposed expansion area as well as the surrounding landscape, where direct land use impacts may result from the Project. This also includes indirect impacts on adjacent land-uses, such as residential or institutional areas. Economic impacts are typically viewed at a community scale, and for the purposes of this report, have been assessed primarily at the municipal level.

6.9.2 SIGNIFICANCE DEFINITION

A significant adverse effect on the economy and land use is defined as:

- A decrease in the output of the local economy associated with a change in land use;
- A sustained change in existing patterns and land uses (e.g., residential, commercial, industrial, institutional, recreational, etc.) that adversely affects all, or a portion of, a community's use and enjoyment of the lands, or
- The introduction of a new land use that is inconsistent with the Municipal Planning Strategy designations and long-term land use objectives.

A positive effect would be supportive of the Municipal Planning Strategy designations and have a long-term increase in economic activity.

6.9.3 ENVIRONMENTAL EFFECTS ANALYSIS

CONSTRUCTION (EXPANSION)

The construction phase of the Project is not expected to significantly detract from or alter the planned zoning and existing land use within the property and surrounding area. The clearing of vegetation and land will result in a non-limiting decrease of forested habitat within the Project area and surrounding landscape. However, the new land use will be consistent with the existing quarry.

Within the surrounding areas, nearby residential homes and subdivisions may experience temporary disturbance from construction noise, dust, and other emissions. However, impacts to air quality and noise can be mitigated and are addressed in Sections 6.1 and 6.2 respectively.

The construction phase is not anticipated to cause disruption to, or adverse impacts upon, the local economy, as no road closures or traffic-related impacts are expected.

OPERATION

The operation phase of the Project is likely to result in sporadic and temporary noise impacts on nearby residential areas during blasting operations. Mitigation of these impacts has been discussed in Section 6.2 and with such measures implemented stringently, the residual impacts are not expected to be significant.

Increased flows of vehicle traffic from the quarry may increase traffic volume, noise, and vehicle emissions on nearby roads but these impacts are likely to be negligible as the volume and frequency of traffic will not increase significantly and will primarily be routed to Trunk 1, which already experiences heightened traffic volume.

No economic impacts are anticipated from the operation stage of the Project.

DECOMMISSIONING

Decommissioning of the quarry is unlikely to cause adverse impacts to the local economy or surrounding land uses.

6.9.4 MITIGATION MEASURES

Mitigation measures to address temporary adverse impacts to the surrounding area, such as the acoustic environment and air quality, have been addressed in Section 6.1 and Section 6.2.

6.9.5 SIGNIFICANCE OF RESIDUAL EFFECTS

There are no anticipated direct residual effects on existing and planned land uses with the Municipality.

Indirect adverse effects on land uses such as the nearby residential community described are addressed within Section 6.1 (air quality) and Section 6.2 (noise), including mitigation measures and residual effects.

6.10 TRADITIONAL USE OF LAND RESOURCES

6.10.1 VEC DESCRIPTION AND BOUNDARIES

VECs associated with this Project include the traditional use of resources such as those used for hunting, fishing, and harvesting country foods as well as the traditional use of land, which include but are not limited to hunting camps, ceremonies, logging, and agriculture. The identified VECs were chosen based on their cultural and socio-economic significance to the Mi'kmaq-Nova Scotia. Spatial boundaries for the identified VECs include the Project's proposed expansion area as well as the surrounding landscape to account for direct impacts within and immediately surrounding the Project area. The Municipality has also been considered to better account for impacts on the socio-economic and cultural environment. The temporal boundaries of this VEC include all phases of the Project.

6.10.2 SIGNIFICANCE DEFINITION

A significant adverse effect on traditional use of land and resources is defined as one which results in a detrimental long-term change in current use of the land and resources for traditional purposes by the Mi'kmaq of Nova Scotia.

A positive effect is one which results in improved access to land and resources for traditional purposes by the Mi'kmaq of Nova Scotia.

6.10.3 ENVIRONMENTAL EFFECTS ANALYSIS

Direct effects on traditional land and resource use are expected to be negligible within the Project Area. Potential environmental effects during the construction and operation phases are outlined below and may cause temporary disturbance to wildlife. As discussed in the Project ARIA, traditional lands are located outside the boundary of the immediate construction site and are not anticipated to be impacted during construction.

CONSTRUCTION (EXPANSION)

- Reduction or fragmentation of wildlife and/or vegetation habitat function;
- Sedimentation or erosion;
- Release of hazardous or deleterious substance; and
- Noise pollution.

OPERATION

- Release of hazardous or deleterious substance (i.e., oil from vehicles); and
- Noise pollution.

As the Project is not predicted to cause significant impacts on fish, plants, water, or land use, there are no anticipated significant adverse effects on traditional land or resource use.

6.10.4 MITIGATION MEASURES

Mitigation measures for impacts on fish, plants, water, and land use are previously discussed throughout Section 6.

6.10.5 SIGNIFICANCE OF RESIDUAL EFFECTS

There are no anticipated significant residual effects on traditional land or resource use across the proposed expansion area or the surrounding landscape.

6.11 ARCHAEOLOGY AND HERITAGE RESOURCES

6.11.1 VEC DESCRIPTION AND BOUNDARIES

Archaeology and heritage resources include any features and artefacts of scientific, historical and/or cultural/heritage significance. These may include but are not limited to ancient burial grounds and historic settlements.

The spatial boundaries associated with this VEC include the physical footprint of the proposed expansion area, as the proposed work will require ground disturbance. There is potential for the Project to interact with the identified VEC during specific phases of construction such as during site construction and operation (blasting and drilling). As such, the temporal boundary includes all phases of the Project.

6.11.2 SIGNIFICANCE DEFINITION

A significant adverse effect on archaeological and heritage resources is defined as one which results in a permanent disturbance or destruction of an archaeological, cultural or heritage resource considered by provincial heritage regulators or the Mi'kmaq of Nova Scotia to be of major importance where this effect is not mitigated or compensated.

A positive effect is one that results in enhanced understanding of local, regional, or cultural heritage through increased knowledge, or provides physical protection for a site that might otherwise have been destroyed through natural or non-project related anthropogenic events, in the absence of the project.

6.11.3 ENVIRONMENTAL EFFECTS ANALYSIS

The background study, predictive modelling, and field reconnaissance completed in support of the ARIA indicated that there is a low potential for encountering archaeological resources. Therefore, no impacts on archaeological resources are anticipated.

6.11.4 MITIGATION MEASURES

As there is low potential for encountering archaeological resources, no mitigation measures are recommended.

However, if construction and operation activities extend beyond the current proposed boundaries, an archaeological assessment of the new areas must be conducted by a qualified archaeologist.

In the unlikely event that any archaeological resources are encountered during ground disturbance it is required that all activity cease and the Coordinator of Special Places be contacted immediately to determine suitable mitigation measures.

6.11.5 SIGNIFICANCE OF RESIDUAL EFFECTS

No adverse residual effects are anticipated.

6.12 EFFECTS OF THE ENVIRONMENT ON THE UNDERTAKING

6.12.1 SEVERE WEATHER

Severe weather may pose several challenges throughout the Project life, including impacts during construction, operation and decommissioning.

During construction, severe precipitation events can cause significant runoff resulting in nutrient loading and/or increased sedimentation in receiving watercourses. Severe precipitation events may also cause erosion and/or damage to temporary infrastructure such as access roads, thereby delaying construction. Extreme weather such as freezing temperatures, hail, ice, snow, wind, and fog may also delay construction and create visual and/or physical impairment, making it unsafe to operate heavy equipment. Similarly, exposure to extreme cold or heat may invoke health hazards, including but not limited to hyper- / hypothermia.

During construction and operation severe precipitation events can cause erosion, which in extreme circumstances may damage infrastructure (e.g., wash out portions of access roads). Severe precipitation may also increase runoff resulting in nutrient and/or salt loading, or chemical leaching due to operational discharge. Extreme weather may cause unsafe conditions and navigational hazards placing crew and recreational users at risk (e.g., fallen trees, debris, ice). It is essential to conduct proper road and site maintenance and monitor for potential changes that may impact the Project and its users long-term.

MITIGATION MEASURES

- Stabilize erodible material and implement sediment controls;
- Ensure and maintain appropriate drainage, water crossings, and water management infrastructure (remove debris);
- Construct a shoulder or suitable buffer to limit roadside erosion on access roads;

- Provide regular access road maintenance;
- Provide an advisory service for motorists and appropriate signage;
- Reinforce areas that are, or have the potential to be, prone to flash floods and/or freezing;
- Where possible, plan construction during periods where severe cold or precipitation are less likely;
- Monitor the environment and position temporary barriers in advance of impending storms. Stop construction until it is safe to do so if severe weather threatens the planned activities;
- Ensure all personnel on site during construction, operation and decommissioning are wearing the appropriate PPE;
- Lower the site speed limit during severe weather events; and
- Develop a Severe Weather Management Plan for the project site (or update Plan for existing site).

6.12.2 CLIMATE CHANGE

Effects from climate change on the Project are similar to those identified in Section 6.12.1 as climate change is likely to increase the severity and frequency of severe weather events (NSE 2011a). There is an increased risk of flooding in low lying areas and freezing in areas close to rivers and wetlands. Climate change is also predicted to increase the number of freeze-thaw cycles which may deteriorate infrastructure and cause ruts and cracks to form in the pavement (NSE 2011a). It can be expected that climate change will continue exacerbate biophysical impacts on the project. It is also anticipated to increase the frequency and extent of access road maintenance in the future.

As the Project is not expected to be significantly impacted by climate change, an adaptation plan is not required (NSE 2011b). Mitigation measures for severe weather remain applicable (Section 6.12.1).

6.12.3 SIGNIFICANCE OF EFFECTS

Impacts from severe weather and climate change are anticipated to be of low significance to the Project as the Project area is protected from marine influences and is therefore subject to more stable conditions (Section 5.1.5). The proposed quarry expansion will be executed with the above hazards in mind; appropriate mitigation measures are in place to combat infrastructure vulnerability and alleviate potential impacts throughout the duration of the Project lifecycle.

6.13 CUMULATIVE EFFECTS

Cumulative effects are the encompassing changes to the environment that are anticipated as a result from the Project, including future operational use. The cumulative effects are based on the effects and impacts identified in the previous sections. The potential cumulative environmental effects from the proposed Project may result in:

- Reduced groundwater quality and quantity;
- General decrease to air quality from the quarrying activities, including during the construction (expansion) and operation phases;
- Direct loss of flora, and alterations to habitat including landscape fragmentation and spread of invasive species;
- Direct loss of fauna and habitat, and indirect effects resulting from habitat fragmentation, and potential disruption to wildlife corridors;

- Decrease in biodiversity;
- Overall reduction in wetland habitat and indirect impacts on water quality and flood retention; and
- Reduced surface water quality from increase of impervious surfaces collecting stormwater runoff and pollutants.

With the implementation of mitigation and monitoring measures detailed in the previous sections and summarized in Section 7, the residual cumulative effects are expected to be minimal. Additionally, the Project may contribute positively to local communities with the continued aggregate production and stockpiling, to meet the needs of the local aggregate market. The expansion will allow for continued employment at the quarry and in related industries where aggregate materials are used. The Project will also support the municipality of East Hants mandate to encourage commercial development.

7 MONITORING, FOLLOW-UP AND MITIGATION

The mitigation measures and monitoring programs outlined in Section 6 have been recommended to protect against or limit the adverse effects resulting from the Project. The recommended mitigation and monitoring programs will be the responsibility of NCCI and will be implemented via contractual agreements with subcontractors. The mitigation and monitoring plan shall incorporate all EA Condition of Approval mitigation and monitoring requirements.

Table 22: Summary of mitigation and monitoring recommendations

VEC	PROPOSED MITIGATION	PROPOSED MONITORING
Air Quality	Enforcement of speed limits for quarry vehicles throughout life of the Project. Minimize vehicle and machinery idling. Vehicles and equipment should be maintained and inspected as per manufacturer and / or provincial specifications and regulations. Where appropriate, trucks carrying loose material should be properly loaded and unloaded and tarped when travelling on and off-site. Stabilization of erodible materials, including stockpiles and excavated lands. Apply water for dust suppression. Schedule activities when weather conditions are favourable.	Monitoring of quarry equipment to ensure it is properly maintained and in good working order. Dust monitoring according to NSE guidelines may be conducted if complaints are received.
Acoustic Environment	Routine inspection of machinery and construction vehicles to ensure noise levels are acceptable. Any faulty mufflers or other sound dampening equipment should be replaced if necessary. Major construction activities, where possible, should be scheduled during the daytime hours (i.e., 07:00 to 19:00). Minimize vehicle idling and plan truck routes to limit reversing. Enforce vehicle speed limits. Public notification of blasting events. Implement a complaints management process.	Monitoring of quarry equipment to ensure it is properly maintained and in good working order. Noise monitoring at receptor locations if complaints are received.

VEC	PROPOSED MITIGATION	PROPOSED MONITORING
Groundwater	No excavation below the water table without a hydrological study, approval from the Minister or Administrator, and an amendment to the IA. Pre-blast well inventory of water wells within 500 m of the blast site. If possible, avoid blasting within 500 m of residential wells. Use of mechanical vegetation control where possible and limit use of herbicides.	Water well survey of wells within 500 m of blasting area; survey to include analysis for potable water parameters in accordance with NSE sampling guidelines. Implement a monitoring plan to restore damaged wells or provide potable water as needed. Remedial action plan may be required as a component of the monitoring program. Post-construction well water monitoring (if required, pending results of well survey).
Terrestrial Habitat and Vegetation	Minimize Project footprint, leave forested habitats intact, where possible. Implementation of Site-Specific EPP. Salvage and storage of topsoil and hydric soil for use during site remediation. Implementation of erosion and sedimentation control measures. Utilize spraying to mitigate dust. Where appropriate, trucks carrying loose material should be properly loaded and unloaded and tarped when travelling on and off-site. Do no use road salt during winter road maintenance. Trucks and equipment to be equipped with spill kits.	Environmental protection measures should be monitored throughout the life of the Project.
Terrestrial Wildlife	Minimize use of lighting to the greatest extent possible. Set and enforce appropriate speed limits. Minimize Project footprint; leave forested habitats intact where possible. Implementation of Site-Specific EPP, follow proper housekeeping practices to avoid attracting wildlife. Vehicles and equipment should be maintained and inspected as per manufacturer and / or provincial specifications and regulations. Use an air horn or similar loud noise prior to vegetation clearing.	Environmental protection measures should be monitored throughout the life of the Project.

VEC	PROPOSED MITIGATION	PROPOSED MONITORING
Avifauna	Minimize Project footprint. Implementation of Site-Specific EPP, follow proper housekeeping practices to avoid attracting wildlife. Limit excess noise and disruptions to avifauna. Avoid vegetation clearing during breeding bird season. Routine environmental monitoring of exposed cliffs during nesting season (mid-April to late-August). Cover sand and soil stockpiles. Minimize use of lighting to the greatest extent possible. Set and enforce appropriate speed limits. Environmental awareness training.	Environmental protection measures should be monitored throughout the life of the Project.
Wetland	Vehicles and equipment should be maintained and inspected before use near wetlands. Refueling and staging areas are to be located no less than 60 m from wetlands. All necessary permits and approvals will be obtained and on-site. To the extent practical, construction in wetlands will be scheduled to occur under dry or frozen ground conditions. Use of temporary diversion berms or other methods, as required, to regulate drainage from construction areas. Use of sprayers or equivalent dust reduction systems. Implementation and regular inspection of suitable erosion and sedimentation control measures. Wetland soils will be salvaged and stockpiled separately from upland soils for use during the decommissioning phase.	Standard wetland monitoring program including vegetation quadrats and water level monitoring for partial alterations, if applicable.

VEC	PROPOSED MITIGATION	PROPOSED MONITORING
Fish and Fish Habitat	Vehicles and equipment should be maintained and inspected before use near watercourses. Implementation of erosion and sedimentation control measures near watercourses. Position material piles in upland areas away from watercourses. Inspect erosion and sedimentation controls during and following precipitation events totalling over 7 mm per hour.	Environmental protection measures should be monitored throughout the life of the Project.
Economy and Land Use	Adhere to mitigation and monitoring recommendations for VECs. Implement a complaints management process.	No specific monitoring is recommended.
Traditional Use of Land and Resources	Implementation of Site-Specific EPP. See mitigation measures for Air Quality, Noise, natural environment VECs, Land Use, and Archaeology.	See monitoring requirements for Air Quality, Noise, natural environment VECs, Land Use, and Archaeology.
Archaeology	In the unlikely event that any archaeological resources are encountered during ground disturbance it is required that all activity cease and the Coordinator of Special Places be contacted immediately to determine suitable mitigation measures.	No specific monitoring is recommended.

8 SUMMARY OF RESIDUAL EFFECTS AND CONCLUSION

The potential adverse effects, resulting from all activities and phases associated with the development of the Project, were assessed. The assessment included the physical environment (ground water, surface water, air quality, noise, etc.), biological environment (terrestrial habitat and wildlife, wetlands, fish and fish habitat, SAR, etc.), and the socio-economic environment (local communities, First Nations communities, cultural and archaeological resources, etc.), and evaluated the potential interactions between the Project and environment. Mitigation measures and monitoring recommendations have been developed to avoid or limit adverse effects. With the successful implementation of the recommendations, the majority of effects will have either no impact or minimal/minor residual impact, with limited residual impacts of medium significance. No environmental or socio-economic residual impacts of major adverse significance are expected from the construction (expansion), operation and decommissioning of the Project.

The assessment also evaluated the potential effects of severe weather and climate change on the broader environment, as well as the cumulative effects of the Project. Similarly, no significant adverse effects are expected.

A notable positive effect that may occur as a result of the Project is that it supports East Hants' Municipal Planning Strategy to increase economic activity in the long-term.

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