Environmental Assessment Registration Document

Tote Road Quarry Expansion
Head of St. Margarets Bay
Halifax County, Nova Scotia

SCOTIAN MATERIALS LIMITED

February 25, 2022

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Document status

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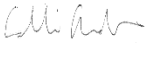
			Name	Signature	Name	Signature	Date
S4		Jessica Romo	Callie Andrews		Callie Andrews		Feb 25, 2022
		Jeff Parks					

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Abbreviations and Common Terms

Acronym	Expanded Use
ACCDC	Atlantic Canada Conservation Data Centre
AMO	Abandoned Mine Opening
ARD	Acid Rock Drainage
BFL	Boreal Felt Lichen
CAAQS	Canadian Ambient Air Quality Standards
CCME	Canadian Council of Ministers of the Environment
CDWQ	Canadian Drinking Water Quality
CEPA	Canadian Environmental Protection Act
CO	Carbon monoxide
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
dB / dBA	Decibel (A-scale)
EA	Environmental Assessment
EARD	Environmental Assessment Registration Document
ECCC	Environment and Climate Change Canada
FEC	Forest Ecosystem Classification
ha	hectare
IA	Industrial Approval
IAA	Impact Assessment Act
IAAC	Impact Assessment Agency Canada
IBA	Important Bird Area
km	Kilometre
km/hr	Kilometre per hour
m	Metres
masl	Metres above sea level
MBBA	Maritime Breeding Bird Atlas
MBCA	Migratory Birds Convention Act
MBS	Migratory Bird Sanctuary
mg/L	Milligrams per litre
MPS	Municipal Planning Strategy
NO	Nitric oxide
NOx	Nitrogen oxides
NO_2	Nitrogen dioxide
NRCan	Natural Resources Canada
NSDNR	Nova Scotia Department of Natural Resources
NSECC	Nova Scotia Environment and Climate Change (formerly NSE or NSEL)
NSEA	Nova Scotia Environment Act

Abbreviations and Common Terms

Acronym	Expanded Use
NSESA	Nova Scotia Endangered Species Act
NSDFA	Nova Scotia Department of Fisheries and Aquaculture
NSDL&F	Nova Scotia Lands and Forestry
NSTDB	Nova Scotia Topographic Database
O_3	Ozone
PID	Property Identification Number
PM_{10}	Particulate matter less than 10 microns
$PM_{2.5}$	Particulate matter less than 2.5 microns
POL	Petroleum, Oil, and Lubricants
SAR	Species at Risk
SARA	Species at Risk Act
SOCI	Species of Conservation Interest
SOx	Sulphur oxides
SO_2	Sulphur dioxide
SPL	Sound pressure levels
t	Tonnes
TDS	Total Dissolved Solids
TSP	Total Suspended Particulates
USEPA	United States Environmental Protection Agency
VC	Valued Component
VOC	Volatile Organic Compound
WC	Watercourse
WESP	Wetland Ecosystem Services Protocol
WL	Wetland
$\mu g/m^3$	Microgram per cubic metre

1. Proponent Information

The Proponent is Scotian Materials Limited (“Scotian”) – a Nova Scotia registered firm. The Nova Scotia Registry of Joint Stocks information for the Proponent is included in Appendix A.

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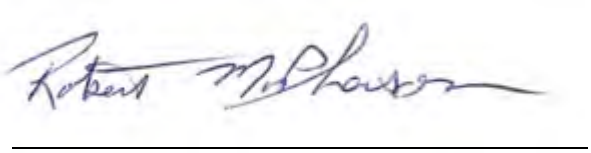


February 25, 2022

Robert MacPherson
Scotian Materials Limited

2. Project Information

2.1 Name

Name of the Undertaking: Tote Road Quarry Expansion Project (Project)

2.2 Location

Location of the Undertaking:

The Project is located on a 32.6 hectare (ha) property on Tote Road, Head of St. Margarets Bay, Halifax County, Nova Scotia (NS) (herein referred to as the Site), approximately 2.3 kilometres (km) west of the community of Westwood Hills, Upper Tantallon, and 2.5 km northwest of the community Head of St. Margarets Bay.

Access to the Project is from Highway 103 Exit 5A at Ingramport, NS via a new property access road to Tote Road or from Highway 3 at Head of St. Margarets Bay Road via Bowater Mersey Road, Hiking Trail Road, and then by an unnamed road to the Site.

Property (Site) – PID 41457821; NTS Map: 11D12; Latitude: 45° 42’ 41.5”, Longitude: 63° 55’ 18.9” or UTM Zone 20 NAD 83 (CSRS): 426976E, 4951327N (Figure 1).

3. Project Scope

3.1 Background

Scotian has operated an existing less than 4 ha quarry at the Site since 2013. An Industrial Approval (IA) (2014-090423-01 - listed as Head of St Margarets Bay Quarry) to construct, operate, and reclaim a quarry less than 4 ha (ha) was granted by the Nova Scotia Environment [NSE) (now the Department of Environment and Climate Change (ECC)] in 2014. Scotian owns the property on which the existing quarry is located. Operations at the existing quarry to date have included grubbing and removal of surficial overburden, blasting, crushing, and stockpiling aggregate. The existing quarry has been developed to the maximum footprint, however there are aggregate reserves remaining within the existing quarry limits. The existing quarry operates based on market demand.

3.2 Description of the Undertaking

Scotian proposes to expand the existing quarry from the approved less than 4 ha to approximately 24 ha in size so that Scotian may continue to extract and supply aggregate to meet local and regional demand. The scope of the proposed Project is similar to other quarries in the region, and encompasses the activities associated with construction, operation, and decommissioning of a quarry, as follows:

- Site preparation (removal and stockpiling of overburden, vegetation)
- On-site processing (blasting, crushing, stockpiling aggregate)
- Transportation/trucking
- Reclamation
- Closure

The Project will adhere to all setbacks and other requirements of the NSECC Pit and Quarry Guidelines (1999) and as prescribed in the existing and future IAs as granted by NSECC.

The Project is located in the Halifax Planning District 1 & 3 (St. Margarets Bay) Plan Area and is zoned MR-2 Mixed Resource 2 (HRM Planning Services, 2019), which allows for the permitted use of extractive facilities. The elevation range of the Site is 120 to 148 metres above sea level (masl). The existing quarry floor has been established at approximately 116 masl and will continue at this elevation in the expansion area, rising towards the north in benches (5 m).

The Project requires blasting to extract rock for processing at the mobile facilities within the Site for crushing and screening to produce aggregate and associated rock products. Within the Project footprint, stockpiles, rock berms, overburden storage, and water management infrastructure will be established with all site run-off directed to a settling pond. The approximate planned development area of the Project, and proposed setbacks, are shown in Figure 2.

The average production rate is estimated to be approximately 200,000 tonnes per year (t/y) depending on market demands with the possibility of increased production depending on contract requirements. The proposed operating schedule for the lifetime of the project is 12 hrs/day, 5 to 6 days/week for up to 35 weeks/year, as required to meet the demand for aggregate and associated rock products in the area. The Project will typically be active during construction season and shut down for the winter. The extractable reserves in the Project footprint are estimated to last at least 30+ years depending on market demand. Production rates, days/times of operation, traffic, blasting frequency etc., will remain consistent with the operations at the existing quarry.

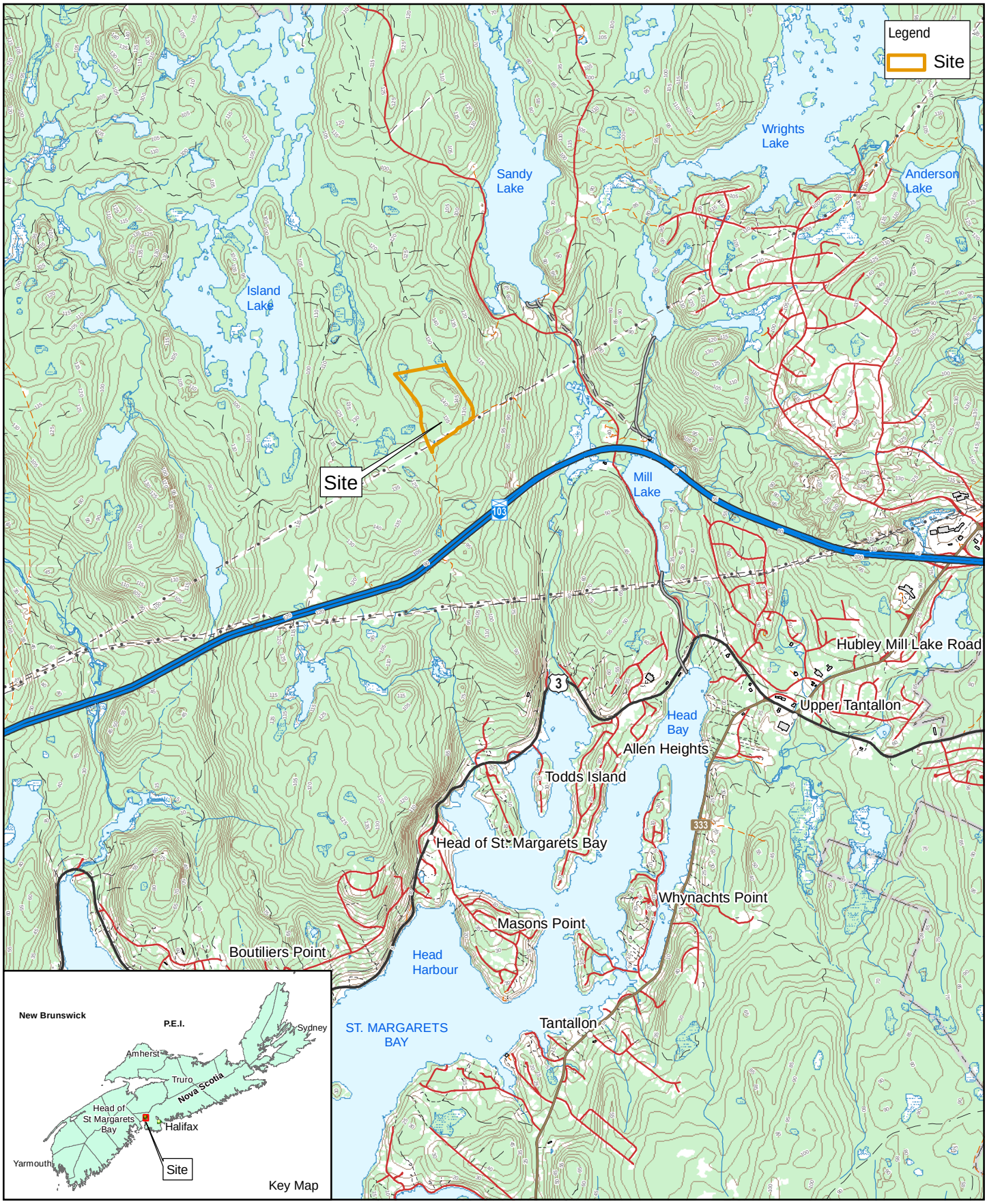
Decommissioning and reclamation concepts are described in Section 3.4.3. Additional details on timelines will be developed as part of the IA Amendment process and conditions of an EA approval, if granted. Reclamation will commence in a progressive manner to minimize the extent of the disturbed footprint and proceed as the quarry face advances.

3.3 Site and Adjacent Land Use

The Site currently consists of an existing 4 ha quarry, laydown/storage areas for other approved land uses such as a permitted mobile asphalt plant and forested lands. The permitted mobile asphalt plant may continue to operate from time to time at the Site under the conditions established in the provincial and municipal approvals. The laydown/storage area is within the Site and will be incorporated into the Project footprint. Figure 2 provides local context of the Project, Project configuration and identifies adjacent land ownership.

The Project footprint is separated from the following number of structures: 800 m – 0; 1.5 km – 10 (industrial/recreational); 2 km – 12; 2.5 km – 44; 3 km – 335 (Figure 3). Structures beyond 2 km are predominantly residences and their outbuildings. The closest permanent residence and seasonal cottage/cabin is approximately 2.4 km from the eastern boundary and 1.1 km from the northwest boundary, respectively.

The proposed Project will adhere to all setbacks and other requirements of the Pit and Quarry Guidelines (NSE 1999) and as prescribed in the existing and future IAs and/or amendments as granted by NSECC. The Project limits were determined by using setbacks, as defined by provincial policy and legislation, for water and wetland features (30 m), road rights-of-way (30 m), property lines (30 m) and existing off-site houses/structures (800 m). The approximate proposed expansion area of the Project, using the prescribed setbacks, are shown in Figure 2.



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Metres

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983 CSRS
Grid: NAD 1983 CSRS UTM Zone 20N

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GHD

SCOTIAN MATERIALS LIMITED
HEAD OF ST. MARGARETS BAY, NOVA SCOTIA
TOTE ROAD QUARRY EXPANSION PROJECT

SITE LOCATION

Project No. 11216599
Revision No. -
Date 26/10/2021

FIGURE 1

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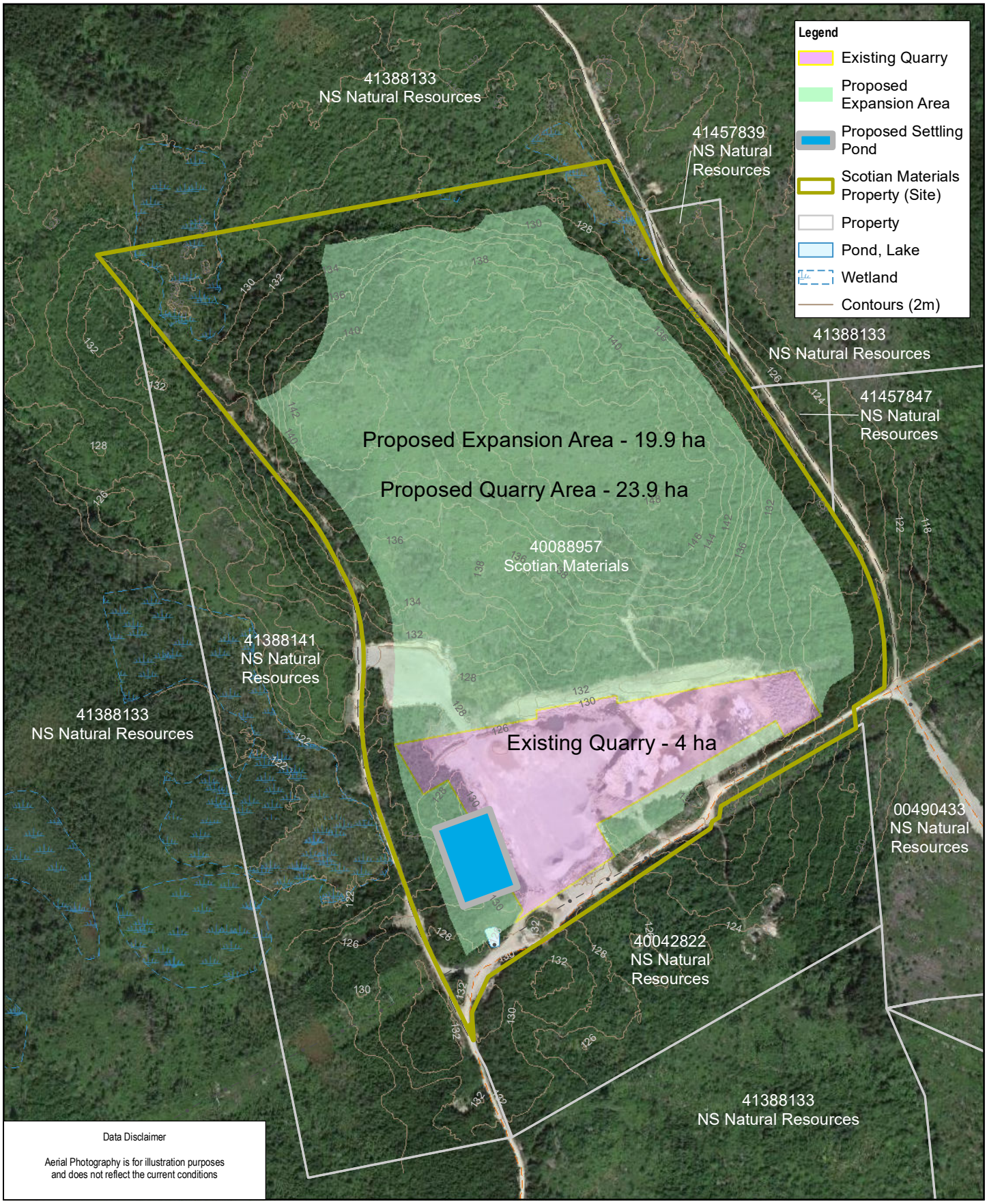

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Map Projection: Transverse Mercator
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Grid: NAD 1983 CSRS UTM Zone 20N

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SCOTIAN MATERIALS LIMITED
TOTE RD, HEAD OF ST MARGARETS BAY, HALIFAX, NS
TOTE ROAD QUARRY EXPANSION PROJECT

QUARRY PLAN

Project No. **11216599**
Revision No. **-**
Date **12/11/2021**

FIGURE 2

N:\CA\Halifax\Projects\661\11216599\GIS\Maps\Deliverables\11216599-RPT-01\11216599-RPT01-GIS-HX002-FIG2_Quarry Plan.mxd
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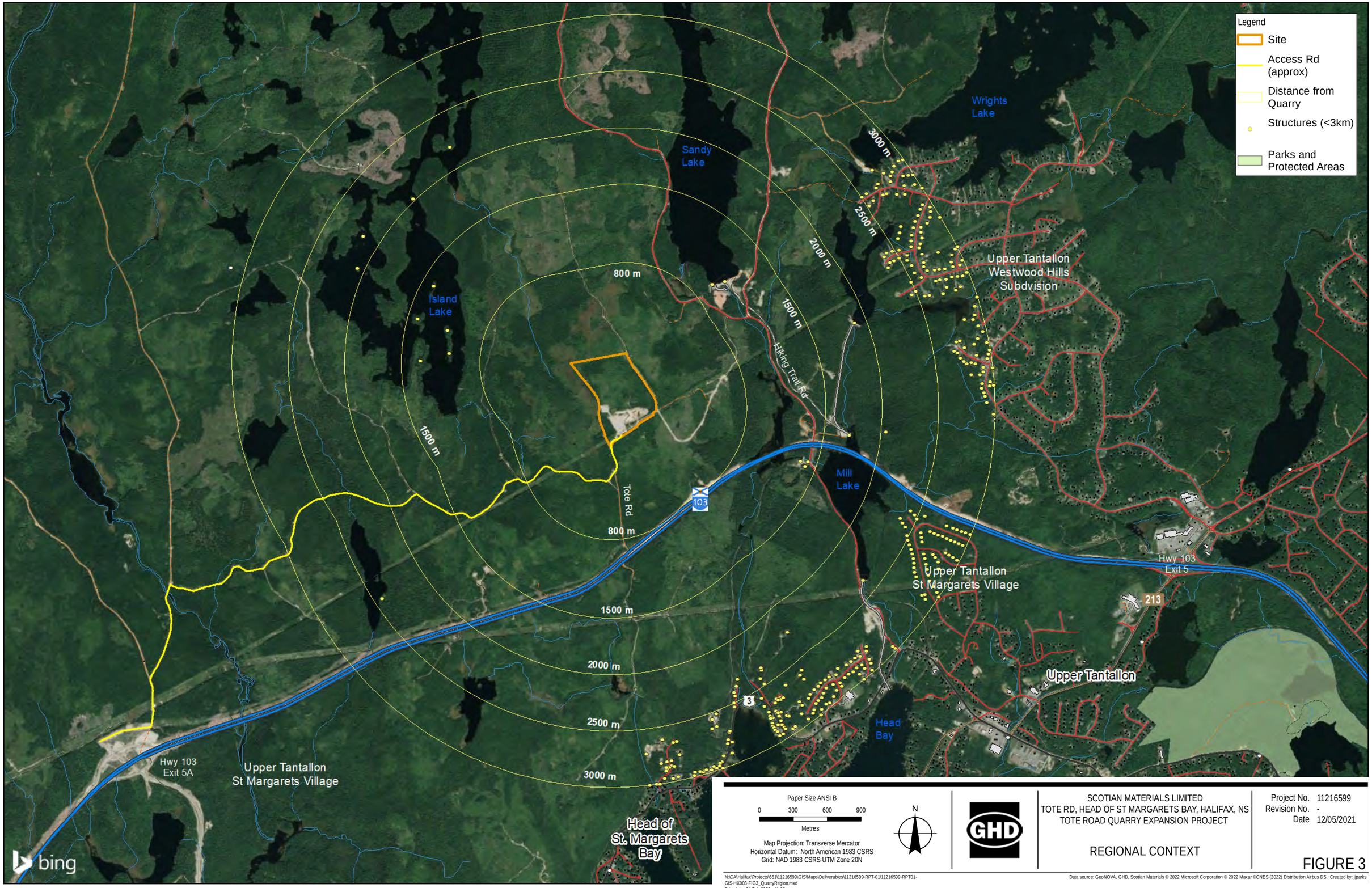

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983 CSRS
Grid: NAD 1983 CSRS UTM Zone 20N

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GHD

SCOTIAN MATERIALS LIMITED
TOTE RD, HEAD OF ST MARGARETS BAY, HALIFAX, NS
TOTE ROAD QUARRY EXPANSION PROJECT

REGIONAL CONTEXT

Project No. 11216599
Revision No. -
Date 12/05/2021

FIGURE 3

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3.4 Project Components

Project activities will include the drilling, blasting, crushing, stockpiling, and transporting of aggregate for sale or for use in projects that are contracted to Scotian. The aggregate will be transported by trucks to markets in the area. The operation will consist of a lay down area for the portable crushing equipment and screens, various aggregate stockpiles, and portable weigh scales, as well as the physical features of the Site such as the quarry floor and active working faces, and a settling pond. Blasting will always be conducted by a fully certified and licensed blaster with expertise in the field and according to the *Blasting Safety Regulations*.

Project components and the estimated durations of project phases are as follows:

- Site Preparation and Construction – 6 months (existing quarry so limited site preparation and construction required).
- Operation and Maintenance – 30+ years depending on market demand.
- Decommissioning and Reclamation – up to 3 years and is dependent on follow-up monitoring duration and the success of reclamation activities.

3.4.1 Site Preparation and Construction

Site access is via a new property access road from Exit 5A at Ingramport, NS to the existing quarry. Equipment used for grubbing will be used throughout the Project life as the quarry develops. Equipment will be brought to the Site as required for development. Mobile equipment including drills, excavators, loaders, crushers, scale and scale house will be moved to other project sites as required during operations, thus the Site will house no “permanent” equipment.

The Project footprint has been harvested for commercial forestry purposes in the past and in general, some degree of historical or current forestry activities have occurred on adjacent lands. Any further requirement to harvest merchantable timber on the Site will be done prior to grubbing in the appropriate seasons. Any remaining vegetation and wood/organic material will be saved and used to the greatest extent possible for reclamation activities on-site.

The removal of topsoil and grubbing will be completed in a progressive nature according to the Project development plan. This will minimize the extent of disturbed area at any one time. This material will be removed by excavators, trucks and dozers and then stockpiled for use during reclamation activities. Run-off from the Site will be directed to a settling pond to be constructed in the southwest corner to allow time for any suspended solids to settle prior to discharge to the surrounding environment.

No hazardous materials will be stored on-site. There are no plans for bulk storage of liquid petroleum products on-site. Fuel will be transferred to equipment by mobile fuelling trucks as required. Should petroleum impacted soil or groundwater be identified, the affected material will be handled, transported and disposed of according to all applicable legislation.

3.4.2 Operation and Maintenance

The Project will be integrated into the existing quarry operations. Operations (crushing, stockpiling, and loading) will occur during daylight hours, however other limited Project activity may occur in predawn or twilight hours. Twenty four hour operation is not envisioned for this Project. Load and haul activities may occur approximately 8 months of the year – and is dependent on winter conditions and spring weight restrictions. Crushing and stockpiling operations will normally be conducted during the construction season (May – October).

Material will be drilled and blasted typically at least once annually; however, additional blasts may be required from time to time to meet market demand. Excavators and front-end loaders will be used to

excavate blasted material from the active working faces and delivered to the on-site portable crushing plant. The various aggregate products will be stockpiled in adjacent areas within the Project footprint. Stockpiles will be constructed to reduce segregation of material and prevent mixing of differing classes. A combination of conveyor belts and front-end loaders will be used to move material from the screens and classifier to the stockpiles. Front end loaders will be used to load stockpiled material onto trucks. Products will be weighed and transported from the Site via highway class trucks. The average daily number of vehicle movements will be variable in keeping with current production volumes and future market demand. Scotian will adhere to any seasonal weight restrictions.

Final design of all aspects of the Project will be in accordance with appropriate legislation and accepted best management practices.

Site Material

Site material will consist mainly of unusable aggregate, grubbings, and organics produced from the development of the Project. This material will be used, as appropriate, berms, ponds and roadways and reclamation. All stockpiled materials will be stabilized as required.

Water Management and Erosion and Sediment Control

Surface water management will be important during site development and operation to address erosion and sediment control. Sediment-laden runoff will be prevented from entering surface waterbodies. Surface water collected at the Site will be directed to a settling pond that will be designed to allow sediment to settle from the water (treated) prior to the water being released to the environment. A settling pond will be constructed in the southwestern portion of the Site. For the purpose of this EARD, it is assumed the pond will be approximately 80 by 56 m in size and 2 m deep [9,000 cubic metres (m^3)]. Detailed design of the settling pond will be included in the Storm Water Management Plan to be developed for the Amended IA application for the proposed Project. Discharge from the settling pond will be directed to the southwestern boundary to maintain the drainage area of the wetlands and watercourse located offsite to the west.

Scotian is familiar with and routinely employs techniques recommended in NSECC's Sediment and Erosion Control Handbook for Construction Sites. This document will be used in the design of all mitigative measures. In addition, industry best practices will be consulted and reviewed in the development of a comprehensive Erosion and Sedimentation Control Plan. Typically, a 100-year return period storm event is used in design; however, this may be dependent on the life of the Project. Design criteria would be reviewed with NSECC during the IA amendment stage of the Project to ensure adequacy.

Temporary erosion and sedimentation control measures will be in place (e.g., rock dams with geotextile, hay mulching, etc.), as needed during the establishment of vegetative cover. Existing and new berms will be used at the Site for drainage control, noise buffering, and visual impact mitigation.

The maximum suspended solids concentration levels will be monitored for compliance.

An NSECC approved Environmental Protection Plan and Spill Contingency Plan is currently in place for the existing quarry. Any requirement to amend these plans will be completed in conjunction with an Amendment to the IA.

Airborne Emissions

Equipment exhaust and dust will represent the majority of air emissions from the Project. Emissions produced will include carbon monoxide, carbon dioxide, oxides of nitrogen, sulphur dioxide, and dust. Emissions from the burning of hydrocarbons will be managed using clean burning, low-sulphur diesel fuel and propane. All equipment will be properly maintained and inspected, and engine idling will be reduced when not in use to further decrease emissions from the site.

Dust will be generated in the quarry through most activities. Scotian will implement operational dust reduction methods (primarily through the application of water) to reduce potential fugitive dust emissions at the Site. Truck covers will be used to reduce the generation of dust during transportation of aggregate.

Noise Emissions

Noise emissions will result from drilling, extraction, processing, and transportation operations. The contributors to noise on-site will be heavy equipment such as crushers, excavators, loaders and trucks.

Scotian will control operations and maintain equipment to ensure that noise levels are kept within recommended limits for quarry operations. Site noise levels may be periodically measured at Site boundaries as directed by NSECC. Certain equipment noises associated with extraction activities may have a specific regulated safety requirement such as back-up beepers. Other methods (e.g., strobes) could be used as warning indicators with the appropriate agency approval. Pre-blast warnings will be audible beyond the Site for short durations within schedule timeframes.

Solid Waste

Waste produced on the site will be removed by Scotian for disposal or picked up by an approved licensed contractor for appropriate reuse or disposal to a provincially approved waste disposal facility.

Liquid Effluents

No on-site sewage treatment system is or will be installed. Portable toilets will be used on the Site as required and will be maintained by Scotian or their subcontractors.

Hazardous Waste

Materials needed for Project operations will be stored in accordance with applicable legislation. Explosives will be used on the Site by Scotian blasting contractors as required. No explosives storage is required on-site.

Petroleum, Oil and Lubricants (POL)

Scotian is familiar with the requirements for petroleum management. The Project will require the use and handling of petroleum products such as fuel oil, gasoline and lubricants on-site. Mobile equipment will be fuelled within the quarry from local fuel supplier's trucks. No liquid petroleum storage will be maintained on-site. Any location where refuelling is taking place will be equipped with a spill kit and the operators will be trained in their use.

The handling of bulk quantities of POL is administered by the following regulations that have been enacted within the *Nova Scotia Environment Act* (NSEA):

- Petroleum Management Regulations
- Emergency Spill Regulations
- Used Oil Regulations

Federal legislation and regulations exist that apply to the storage and handling of POL, however, they generally only apply to federal sites and would not be applicable to the Project. In general, the applicable provincial requirements mirror federal legislation and have been developed in consideration of them.

Scotian is aware of the legislation around POL and will comply with the current and any updated regulations.

3.4.3 Decommissioning and Reclamation

Decommissioning and reclamation, the final phase of the Project, will return the area to a condition that is consistent with the natural surroundings and community use. Two types of reclamation could be completed - progressive (during operations on stable areas that are no longer required for production) and final reclamation (after the cessation of extraction and related activities), for any areas that are not reclaimed progressively.

The objective of reclamation is to produce a landscape that is safe, stable and compatible with the surrounding landscape and final land use. This is generally achieved by grading, contouring, capping with soil, revegetating, and time. Progressive reclamation is understood as an integral part of project planning that keeps potential future land uses in mind. Scotian considers the goal and responsibilities of reclaiming the Project to be a key element and will return the land to a state equal to or better than that existed prior to disturbance within the scope of existing industry practices.

Scotian plans to use their resources for reclamation activities. Dozers and excavators will be used to grade and contour the side slopes of quarry walls to ensure that they are stable and meet the legislated slope requirements. Rock lined ditches and drainage channels will be constructed as necessary to control run-off and prevent erosion of the exposed soils. Steeper rock-face slopes will be blasted as required and graded to 45° (1H:1V). The rest of the Site will consist of gradual slopes; however, slopes may be developed that are typical of the Site prior to disturbance where practicable.

The reclaimed area will typically be seeded with an approved naturalization mix. Grubbing's and stockpiled topsoil/overburden will be used to the extent possible to facilitate natural regrowth of native species.

It is anticipated that the reclamation program (contouring, vegetation, monitoring) will be completed within a one-to-three-year period from the end of the extraction phase being completed. Additional details on timelines will be developed as part of the IA Amendment process and conditions of an EA approval.

The reclamation plan will cover the following details:

- Site contouring and stabilization (for long term erosion control, to mitigate impacts of off-site drainage to adjacent lands / wetlands / or watercourses, and to blend with natural topography)
- Slope specifications which ensure a safe and stable site
- Use of overburden for revegetation purposes
- Use of native vegetation
- Specifications of any ponds, lake, or flood quarry features
- Removal of equipment

The reclamation program will include a management and monitoring plan for water features left on site to address quality and erosion and sediment control. A Reclamation Plan will be completed as part of the requirements for the IA.

3.5 Purpose and Need for the Undertaking

The purpose of the undertaking is to allow Scotian to continue to meet local and regional aggregate demand by expanding the existing quarry footprint and continue operations at the Site. In addition, Scotian has received a directive from NSECC related to the existing quarry boundary limits. Due to blasting, the active quarry face became unstable, and the wall was excavated beyond the approved limits for a small portion of the existing quarry for safety purposes. Scotian is required to complete an EA on this area. Scotian has incorporated this area into the Project.

Through this Project, Scotian will provide continued employment to their employees and indirect employment will continue in related industries. Mining and aggregate extraction are among the highest paying jobs in the natural resource industry, and the industry is among the highest paying average wage of all industries in the province (Mining Association of Nova Scotia, 2021).

This Environmental Assessment Registration Document (EARD) highlights Scotian's commitment to developing an expanded environmentally sustainable quarry in compliance with current applicable legislation and best management practices.

3.6 Consideration of Alternatives

Alternatives to an undertaking are defined as functionally different ways of achieving the same end.

The proposed Project is located at Scotian's existing Tote Road Quarry in Halifax County. This area was initially selected based on the aggregate resources dictated by favourable geologic conditions and considerable efforts (drilling, testing, and planning) by Scotian. Scotian currently owns the land required for the proposed undertaking. Alternative processes are always being considered in terms of their efficiency, cost effectiveness, and environmental mitigation advantages. There are no practical or feasible alternatives to the proposed aggregate extraction method in this particular geology where intermittent drilling and blasting is required.

Few alternatives exist for the methods related to aggregate extraction and crushing. Operations that occurred at the existing quarry include drilling and blasting, crushing/processing on-site, stockpiling into designated areas, and hauling of aggregate. These methods have proven to be effective and will continue to be used at the proposed quarry expansion.

One alternative to the undertaking is a 'do nothing' alternative. This approach results in no increase of aggregate extracted from this area and no benefits to Nova Scotians. The "do-nothing" alternative would have adverse effects on potential revenues not realized, potential employment opportunities and associated skills development, and local business spinoffs that would not occur. This Project would add benefit to the community from a socio-economic standpoint as described herein.

3.6.1 Alternative Site

Alternative sites were not considered for this Project as the Tote Road Quarry already exists on land owned by the proponent, and operates under an existing IA (2014-090423-01), issued by NSECC in 2020, that will remain in effect until March 9, 2025. The existing quarry has been supplying aggregate material for the Highway 103 twinning project from Exit 5 to 5A up to 2020 and is strategically positioned to supply material for the Exit 5A to Exit 6 twinning project that began in 2020. The proposed Project is located in a rural area of NS with the nearest permanent residents over 2 km away to the north and northwest.

The Site was originally chosen because it provided an aggregate product that met the NSTIR specifications for highway projects.

3.6.2 Alternative Methods

The extraction methods, site layout and infrastructure configuration, and processing options at an aggregate quarry have standard practices and few alternatives exist. The planned process is to drill, blast, crush, stockpile, and transport material. Scotian operates other quarries in the province, and has considerable experience with the development, operations and environmental management of aggregate quarries. Although other methods are available such as ripping rock, this is not possible on this Site due to the hardness of the granitic source material. Blasting and a crushing program will be required to process rock. This rock is considered too hard to extract by mechanical means (ripping), thus the need for blasting.

Alternatives to processing aggregate on-site include off-site processing. Off-site processing would involve the transport of material via local roadways to other facilities. This may in effect move the material further away from the intended market thereby raising the cost of the product due to double handling and shipping costs. In addition, transporting material for processing would also increase greenhouse gas (GHG) emissions entering the atmosphere, as well as potentially creating excess dust, noise, or light emissions. In conclusion, the proposed Project location and methods have been identified as the most feasible in terms of their efficiency, cost effectiveness, and environmental mitigation advantages.

4. Scope of the Environmental Assessment

The Nova Scotia *Environment Act* and *Environmental Assessment Regulations* regulate the format of a provincial EA. The proposed Project must be registered for EA as a *Class I* undertaking under Section 9(1) of the Regulations. This document serves to provide information required by NSECC to review the proposed Tote Road Quarry Expansion Project located in the Head of St. Margaret's Bay, NS.

The scope of this document has been determined by Scotian and GHD, based on the Project components, activities, and stakeholder consultations. The *Guide to Preparing an EA Registration Document for Pit and Quarry Developments in Nova Scotia* (NSE, 2009) was also referenced to determine and focus the scope of the assessment. Provincial regulatory officials are aware of the intention to submit the EARD for this undertaking and to satisfy the directive associated the existing quarry. Provincial regulators have assisted in scoping by bringing forth issues of concern and/or uncertainty. No federal environmental triggers have been determined. Other relevant provincial and federal regulations and guidelines include the *Blasting Safety Regulations* made pursuant to the Nova Scotia *Occupational Health and Safety Act* (1996); Nova Scotia Pit and Quarry Guidelines (1999); Canada *Migratory Birds Convention*; *Species-At-Risk;* and *Fisheries Acts* were also reviewed and referenced during the assessment.

The methodologies and approaches used to assess the current (baseline) environmental and socio-economic conditions are contained in this EARD. Baseline data collection, public participation and Mi'kmaq engagement have been incorporated into a program to prepare this EARD. Additional information was found in publicly available documents related to the area and site-specific data was collected on existing environmental conditions. The approach to operations, including environmental management and monitoring, is based on knowledge gathered on similar projects by both Scotian and GHD. The GHD Team have experience in conducting EAs for similar projects. Scotian has experience in the design and construction of quarries and maintains staff with appropriate environmental expertise to effectively manage environmental aspects of this Project.

The Valued Component (VC) analysis is based on the Project scope, the environmental setting, and input from stakeholders involved. The EA evaluates the potential effects of each project phase, (i.e., construction, operation, and decommissioning and reclamation), as well as malfunctions and accidents, with regard to each identified. The VCs identified for this Project are as follows:

- Geology, Soil, and Sediment
- Atmospheric Conditions and Air Quality
- Light
- Noise
- Surface Water Resources
- Fish and Fish Habitat

- Groundwater
- Vegetation and Vascular Plants
- Lichens
- Wildlife
- Priority Species
- Socio-Economic Environment
- Archaeological and Cultural Resources
- Mi'kmaq

Additional information on the methodologies and approaches to the EARD are outlined in Section 6.

4.1.1 Applicable Regulations

The Project, as defined in this EARD, will not trigger a federal impact assessment as outlined in the *Impact Assessment Act* (IAA, 2019) - *Regulations Designating Physical Activities* where the total production capacity of the Project will be less than 3,500,000 tonnes per year. The completion of a EARD may fulfill any federal requirements; however, this will be finalized pending discussions between Impact Assessment Agency of Canada (IAAC) and NSECC.

In addition, the following list provides some pertinent provincial acts, regulations and legislation most applicable for the undertaking (not an exhaustive list):

- *Environment Act* and Regulations
- Nova Scotia Wetland Conservation Policy
- *Special Places Protection Act*
- At-Risk Lichens – Special Management Practices
- Nova Scotia Pit and Quarry Guidelines (1999)
- *Endangered Species Act* and Species-at-Risk List Regulations
- *Wildlife Act* and Regulations
- *Occupational Health and Safety Act* and Regulations

Federal legislation that may also come into play includes (not an exhaustive list):

- *Species at Risk Act*
- *Canadian Environmental Protection Act*
- *Fisheries Act*
- *Migratory Birds Convention Act*

4.1.2 Other Approvals

If the proposed Project receives an EA Approval, it will be issued with Conditions of Release. The Project will also require an amendment to provincial IA. An IA defines specific operational conditions and limitations, including dust, noise, surface water and groundwater discharge criteria and monitoring, and land reclamation. A request for an Amendment to the existing IA, would be submitted by Scotian following receipt of the EA Approval. The IA application is reviewed and approval granted by NSECC.

Scotian is also familiar with the municipal legislation applicable to this Project and will continue to work with the local HRM planning office and staff as required.

5. Regulatory, Public and Mi’kmaq Involvement

Consultation and engagement are key elements in the EA process in that it allows the Proponent to gather feedback from local communities and incorporate this information into the final Project design. Scotian acknowledges the importance and value of effective public and Indigenous engagement and envisions a long and mutually beneficial engagement program for the Project. GHD has worked closely with Scotian in identifying key stakeholders (public and regulators) and rightsholders (Mi’kmaq) and developing an effective consultation and engagement programs. In addition, Scotian will continue to engage with those groups and key regulatory agency contacts and maintain ongoing communication regarding project activities and progress.

5.1 Methods of Involvement

The intent of the consultation and engagement program is to (a) provide information about the intended project; (b) elicit questions, concerns, or suggestions from the local community, other stakeholders and rightsholders; and (c) attempt to address those questions or concerns either through the provision of information or accommodating changes to the Project design.

The following listed activities have been undertaken by the Proponent with respect to consultation and engagement:

- Identification of key stakeholders, and rightsholders
- Discussions with stakeholders (regulators and public), and rightsholders
- Public Information Session
- Communication with the Mi’kmaq

The consultation program included one virtual public session completed in January of 2022 and providing information to the Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO), Native Council of Nova Scotia and to the closest Mi’kmaw communities identified by KMKNO as Acadia First Nation and Sipekne’katik First Nation. Information packages were provided to the Deputy Mayor of District 13 (Hammonds Plains – St. Margarets) and the MLA for the Chester / St. Margarets riding; however, given the proximity of the Site to the other ridings listed above, information packages were distributed to the MLAs for Timberlea / Prospect, and Hammonds Plains / Lucasville ridings.

5.1.1 Rationale for Consultation and Engagement

Scotian proposes to expand the Project footprint of their existing quarry on Tote Road, Head of St. Margaret’s Bay, NS in order to meet local and regional market demand and continue to extract and supply aggregate to local road and construction projects. The existing quarry operated under an IA and some consultation was completed. As market opportunities further evolved, the operational footprint associated with the long-term development plan of the quarry is proposed to increase to approximately 24 ha (maximum), and therefore, consultation was conducted associated with the proposed Project as part of Scotian’s proactive approach and as required through the provincial EA process. Further information on activities and outcomes is outlined below.

5.1.2 Public Information Session

Due to the COVID-19 pandemic, a virtual public information session was held on Thursday, January 27th 2022 (7:00 – 8:30 pm) via Zoom. The session was advertised by flyer-to-the-door delivery of approximately 2700 civic addresses in Tantallon, Boutilier's Point, Ingramport, St. Margarets Village, and Head of St. Margarets Bay. Summary of information presented during the virtual public information session is provided in Table 1 below. Prior to the information session, the notice, trifold and presentation slides were posted on the Scotian website: https://www.scotianmaterials.ca/. The notice of virtual public information session, informative trifold and presentation is included in Appendix B.

Table 1 Public Information Session Presentation

Presentation Slide	Description
The Proponent	Overview of Scotian Materials Limited.
The Project	Overview of the Project being proposed and key components, including production rates, project timelines, operations, and size of proposed Project footprint.
Processing	Description and details of site activities associated with construction, operation, and decommissioning and reclamation of the Project as well as details on processing aggregate at the Site.
Reclamation Concept	Overview of types of reclamation and preliminary reclamation plans for the Site.
Environmental Assessment Process	Overview of the EA process and the importance of consultation and how it is incorporated into the final Project design.
The Environment	Overview of baseline studies completed and key preliminary results.

A total of 53 participants registered, and 35 attended the virtual session. Attendees viewed the prepared presentation and were given the opportunity to ask question to Scotian or GHD representatives. Question and comments from the attendees were discussed and recorded by GHD. A summary of the comments is provided in Table 2 below.

During the session, multiple attendees requested access to the presentation. A link was provided to Scotian's website and demonstration was shown to clarify how to access the presentation which was posted on the Scotian website prior to the session. The last slide of the presentation encouraged the public to submit any question they may have, engage through the This trifold encouraged the public to engage through the public review period, a process that will be on-line only during the pandemic.

5.1.3 Indigenous Groups and Communities

Correspondence was sent via email to KMKNO, the Native Council of Nova Scotia, Acadia First Nation and Sipekne'katik First Nation on December 1, 2021 with information on the Project (Appendix B) and encouraged representatives to respond if they had any further questions, comments or concerns. The same organizations were emailed on January 19, 2022 with notification of the public information session and again welcoming any feedback on the proposed Project. No responses were received from any Indigenous groups or communities in relation to the Project. Indigenous consultation is still ongoing.

5.1.4 Regulatory Consultation

The NSECC EA Branch was consulted throughout the completion of the EARD. Further, the biophysical assessment methods were shared with the Department of Lands and Forestry (NSDL&F) for review and comment. In addition, a representative from the Office of L'nu Affairs was also informed regarding the Mi'kmaq engagement activities.

5.2 Comments and Steps taken to Address Issues and Concerns

A key element of consultation and engagement is to identify and address concerns that may arise and to incorporate that information into the final design of the Project, where possible. Scotian has recorded all comments made at the public information session and incorporated this feedback in the overall final design of the Project, as noted in the table and throughout this document.

Table 2 Summary of Comments and Concerns Raised by Stakeholders

Comments / Question	Response
There is some concern around mainland moose in the area and the potential threat the Project will have on their presence and recovery.	No signs of mainland moose were identified during field surveys completed on the Site and surrounding areas in 2021. Additional consultation with the Moose Recovery Team will be completed.
Questions were raised regarding access to the Site and maintaining public safety while transporting heavy equipment.	The Site is accessed via a deeded access road (Tote Road). As Scotian will be using this roadway, they are obligated to make sure it is maintained in a safe manner. Transporting heavy equipment (i.e., crusher) is infrequent and would not occur on a regular basis. More common equipment use would include tandem and two steered dump trucks. Scotian recognizes the need for proper adherence to speed limits and safe driving standards and directs all staff and contractors to do so.
There is some concern around blasting and potential impact on residential homes and potable wells.	The provincial guidance states that blasting must occur more than 800 m from structures. The nearest seasonal structure is approximately 1 km away and the closest residential receptor is approximately 2.3 km away from the Site. The proposed Project footprint meets the guidance of an 800 m setback from any structure. Blasting monitoring will occur to make sure that the prescribed ground vibrations and air percussion limits are achieved. Scotian welcomes the public to contact them directly to address additional concerns related to blasting during quarry operations. Scotian is willing to conduct additional monitoring to alleviate concerns. If residents do not believe their concerns are adequately addressed, they can also contact NSECC directly.
Concerns expressed over noise levels during blasts and operational activities.	The proposed Property will operate in the same manner as it has historically. There will be no new sources of noise associated with the Project. Noise levels are expected to be consistent with the existing quarry operations. Baseline noise monitoring was completed to provide a baseline in which future noise levels can be compared to. Noise monitoring will be conducted in accordance the IA requirements and as required by NSECC. Scotian welcomes the public to contact them directly if they have any additional concerns related to noise levels during the Project operations.

Comments / Question	Response
Concern expressed over the change in recreational use of the Site and surrounding areas	The Project will operate in the same manner as it has historically. The proposed operating schedule for the lifetime of the project is 12 hrs/day, 5 to 6 days/week for up to 35 weeks/year and will operate in response to market demand. The Site is located on private property and access to the Site is restricted. Scotian will evaluate sending out a blast notification to alert of upcoming blasting to alleviate concerns of the public and recreational users. Impacts to recreational users as a result of the expanded Project footprint is expected to be minimal.
There is some concern around the protection of watercourses and wetlands. Residents expressed concern over perceived impacts that could result from discharge of silt and fine-grained material getting into groundwater and nearby watercourses from blasting.	Final Project design will take into account benching to help reduce impacts on wetlands. A settling pond will be used to aid in allowing fine grained material and silt to settle prior to discharge to the receiving environment. Further, water monitoring will be conducted according to the IA and the NS Pit and Quarry Guidelines.

6. Valued Components and Effects Management

The following section identifies baseline conditions of the environment and designates VCs based on those aspects of the environment valued by all stakeholders and that may interact with or be influenced by the Project.

Methodology

Surveys aimed at determining the current environmental baseline conditions of the Site and surrounding area have been ongoing since 2020 by several consultants and subcontractors. The surveys consisted of: geology, surface and groundwater resources, wetlands and watercourses, flora, fauna, habitat, priority species, air quality, noise, and archaeological and cultural resources. GHD conducted surveys associated with geology, groundwater resources, air and noise. Ecological surveys were undertaken by McCallum Environmental Ltd. (MEL). A desktop assessment and field reconnaissance of potential archaeological and heritage resources was completed by Cultural Resource Management (CRM) Group Ltd., and Mi'kmaq Ecological Knowledge Study (MEKS) was conducted by Membertou Geomatics Solutions.

Additional information in support of the field studies was gathered through a review of publicly available documents, including maps and other grey literature (i.e., government websites). From these studies, and in consultation with the Proponent and regulators, appropriate mitigation measures were determined, as required to minimize potential environmental effects from the proposed Project.

Project Boundaries

For the purposes of this EA, the Site is located on a 32.6 ha privately-owned property that includes the existing quarry and footprint of the proposed quarry expansion. The Site is surrounded by NS Crown-owned land. The assessment of the surrounding environment and potential impacts of the Project includes the surface environment, air shed, noise shed, watershed, downstream receiving waterbodies, groundwater and communities within measurable zones of influence around the Site as outlined in subsequent sections of this report. This delineation has been determined in relation to the Project footprint,

as directed by prescribed setbacks, and the immediate area surrounding it, within which the VCs are likely to interact with, or be influenced by the Project. The Site is presented in Figures 2 and 3.

With respect to defining temporal boundaries, estimated phase durations, potentially expanding in 2022 pending regulatory approvals, are as follows: Site Preparation and Construction – 6 months; Operation and Maintenance - 30+ years depending on market demand; Decommissioning and Reclamation - up to 3 years and is dependent on follow-up monitoring and the success of reclamation activities.

6.1 Geology, Soil, and Sediment Quality

Geology, soil and sediment quality are selected as a VC due to the potential for erosion causing sediment from operations and stockpiles to be transported to nearby watercourses. Secondary concerns are for potential acid generating rock to occur.

6.1.1 Existing Environment

Landscape

The Project is located in a rural area of Halifax County, NS, classified as NS Western ecoregion – St. Margarets Bay ecodistrict – Spruce Hemlock Pine Hummocks and Hills Ecoelement. A patch of Spruce Pine Hummocks Ecoelement is mapped in the south-western portion of the Site in an area already disturbed by the existing quarry.

The St. Margaret's Bay ecodistrict is mainly underlain by the south-eastern most portion of the South Mountain Batholith—a massive granitoid formation (Neily et al., 2017). The Spruce Hemlock Pine Hummocks and Hills represent about two-thirds of the Ecodistrict occurring primarily on hills and hummocky (knobs and knolls) terrain where coarse-textured soils, derived from granite till, are well to rapidly drained (NSDNR, 2015).

Site topography ranges from 148 masl in the central portion of the Site to the low point of 120 masl at the south-eastern property boundary. The floor of the exiting quarry is at 116 masl. Surface drainage occurs radially off the central high to streams wetlands located off- site. There are no on-site watercourses and general drainage is south/southeast to St. Margarets Bay. Lakes of various sizes occur to the northwest and northeast of the Site. The Site Ecosection is described as WCKK – W: well drained, C: coarse texture soil, KK: knoll and knob terrain (NSDNR, 2015).

Soils

Soil over the region is mapped as the Gibraltar Series which occupies about 20-prercent of Halifax County. The parent material has a sandy loam texture derived from granite. These soils are shallow, extremely stony, porous, and well to excessively drained (low moisture holding capacity). The soil is a good support of forest vegetation consisting mainly of spruce, fir, maple, and birch. Soil depths are seldom greater than 50 cm. (MacDougall et al., 1963)

The Gibraltar Series is classed as forest soil types ST2, the most common upland forest soil type in NS. ST2 is mainly associated with fresh, coarse-loamy soils, dominated by sandy loam texture. These soils are usually well drained but can be rapid or moderately well drained depending on slope position, slope percent, soil depth and subsoil permeability" (Keys et al., 2011).

Surficial Geology

The surficial unit over the region is Stony Till Plain (Ground Moraine). Stea et al. (1992) describes the surficial geology at the Site as part of the Wisconsinan aged hummocky ground moraine unit consisting of stony till (mixture of gravel, sand and mud of glacial origin). The material has a poor buffering capacity for

acid rain. The topography is flat to rolling, with many surface boulders, in this class. Thickness of overburden may range from 2 to 20 m. Surficial geology is shown on Figure 4.

Bedrock Geology

The Site is underlain by mid to late Devonian aged biotite monzogranite (Figure 5) of the South Mountain Batholith. The batholith, which extends from Yarmouth County to Halifax and forms the south side of the Annapolis Valley, is the largest granitoid body in the Appalachian range (MacDonald, 2001). The bedrock at the Site is described as the Sandy Lake biotite monzogranite, a light to medium grey, medium to coarse grained granitoid (quartz, alkali feldspar, and plagioclase). These rocks can also have a fine-grained texture or have megacrysts. Metasedimentary xenoliths (from Goldenville and/or Halifax Groups) are common to abundant (White et al., 2014).

Paleontology

Fossils or features of paleontological significance are not known to occur in areas underlain by granitoids. There is low possibility of finding such features on the project site.

Acid Rock Drainage

Acid rock drainage (ARD) refers to the outflow of acidic water from (usually abandoned) metal mines or coal mines or disturbance from construction (highways, housing, commercial developments) in some environments where mainly iron sulphides may be exposed in the strata. When these environments are disturbed and come into contact with water, oxygen, and iron reducing bacteria, the sulphide minerals, become oxidized and acid is generated in the process. The presence of iron reducing bacteria serves as a catalyst that accelerates acid production and the potential for generation of ARD.

Total Sulphur (S) and acid producing potential analysis was not completed for rock at the Site because the granitic rock is not considered to be acid producing. Tests conducted on other areas of the South Mountain Batholith with similar lithologies have shown that 95% of the granitoid samples are non-acid producing and had low average total sulphur content of 0.02 wt. % (White and Goodwin, 2011), well below the regulatory threshold of 0.4 wt. % (12.51 kg H_2S0_4/tonne) which is considered hazardous ARD material as defined by the NS *Environment Act – Sulphide Bearing Material Disposal Regulations.*

6.1.2 Potential Effects, Proposed Mitigation, Monitoring and Follow-Up

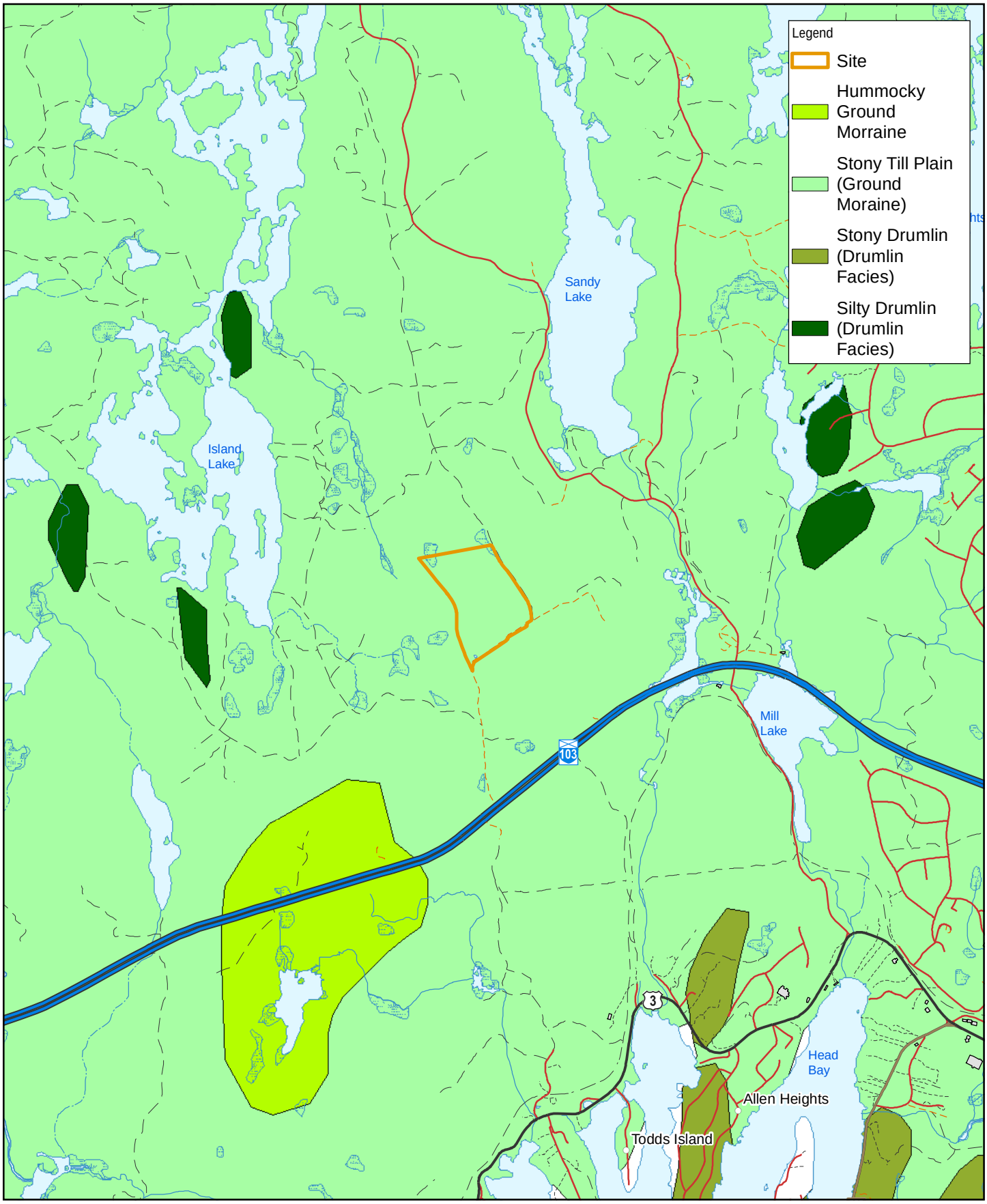
Potential Effects

Due to the thin soils/overburden, low to moderate slopes, and well drained soils/tills drainage, the erosion potential would be considered low, and any effects would be directed to and managed by erosion and sediment controls and the settling pond located in the southwestern portion of the Site.

Acid rock drainage (ARD) is not expected to be an issue at this quarry based on bedrock geology at the Site.

No paleontological specimens or pre-historic remains have been reported on or near the Site and none are expected to be found. As such, potential impacts are expected to be negligible with the appropriate mitigation applied.

With appropriate mitigation measures implemented, Project related impacts related to geology, soil and sediment quality are anticipated to be negligible.



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Metres

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983 CSRS
Grid: NAD 1983 CSRS UTM Zone 20N

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GHD

SCOTIAN MATERIALS LIMITED
HEAD OF ST. MARGARETS BAY, NOVA SCOTIA
TOTE ROAD QUARRY EXPANSION PROJECT

SURFICIAL GEOLOGY

Project No. 11216599
Revision No. -
Date 02/02/2022

FIGURE 4

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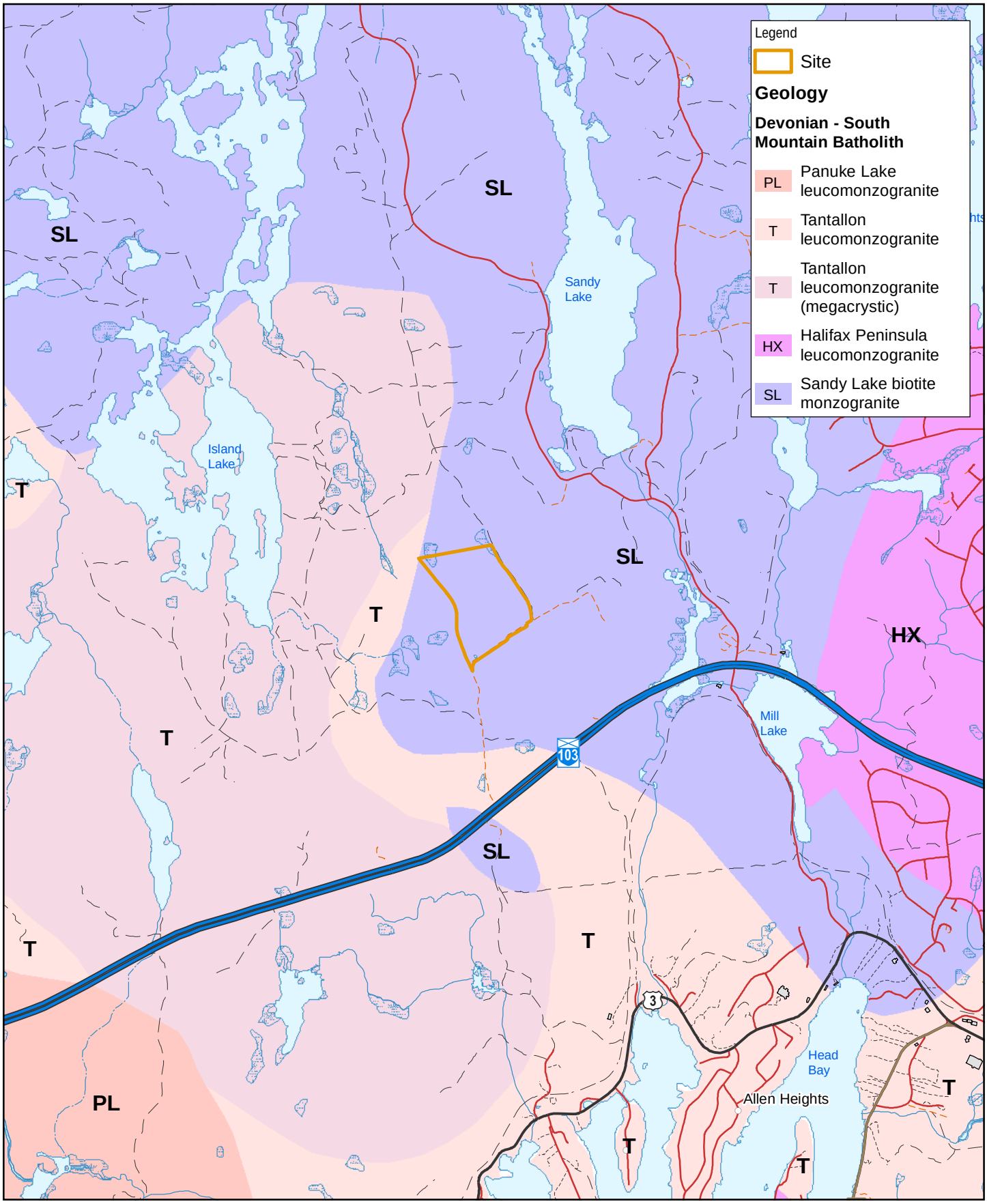
Data source: GEONOVA, GHD, NS Natural Resources. Created by: jjparks



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Map Projection: Transverse Mercator
Horizontal Datum: North American 1983 CSRS
Grid: NAD 1983 CSRS UTM Zone 20N

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GHD

SCOTIAN MATERIALS LIMITED
HEAD OF ST. MARGARETS BAY, NOVA SCOTIA
TOTE ROAD QUARRY EXPANSION PROJECT

BEDROCK GEOLOGY

Project No. 11216599
Revision No. -
Date 02/02/2022

FIGURE 5

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Print date: 04 Feb 2022 - 11:26

Data source: GEONOVA, GHD, NS Natural Resources. Created by: jjparks

Proposed Mitigation

Progressive reclamation will return the land to a use approved by the Proponent, regulators and the community. Stockpiles of soil/till will be allowed to revegetate to minimize dust and erosion potential. Overburden will be stored using appropriate angles of repose for the material. Although acid generating bedrock is not anticipated on the site, storage of potentially acid generating bedrock, if encountered, will be conducted in compliance with the *Sulphide Bearing Material Disposal Regulations*. Sedimentation and erosion control measures will be used to prevent erodible soils and materials from entering surface water bodies. The Project design includes setbacks and vegetated buffers from watercourses that will be maintained through the operation of the facility.

Monitoring and Follow-up

Organic and overburden material stockpiles will be progressively reclaimed to reduce erosion potential. Unused or completed portions of the quarry will also be progressively reclaimed and vegetated. Surface run off aggregate stockpiles will be directed to Site settling ponds prior to being released to the environment.

Surface water monitoring for pH will detect changes in local surface water chemistry that maybe associated with acid rock drainage.

Scotian will report to, and work with, the Nova Scotia Museum and other interested parties if paleontological resources should be found on the Project Site.

Visual monitoring of erosion and sedimentation control measures will be required to measure the effectiveness of mitigation activities.

6.2 Atmospheric Conditions and Air Quality

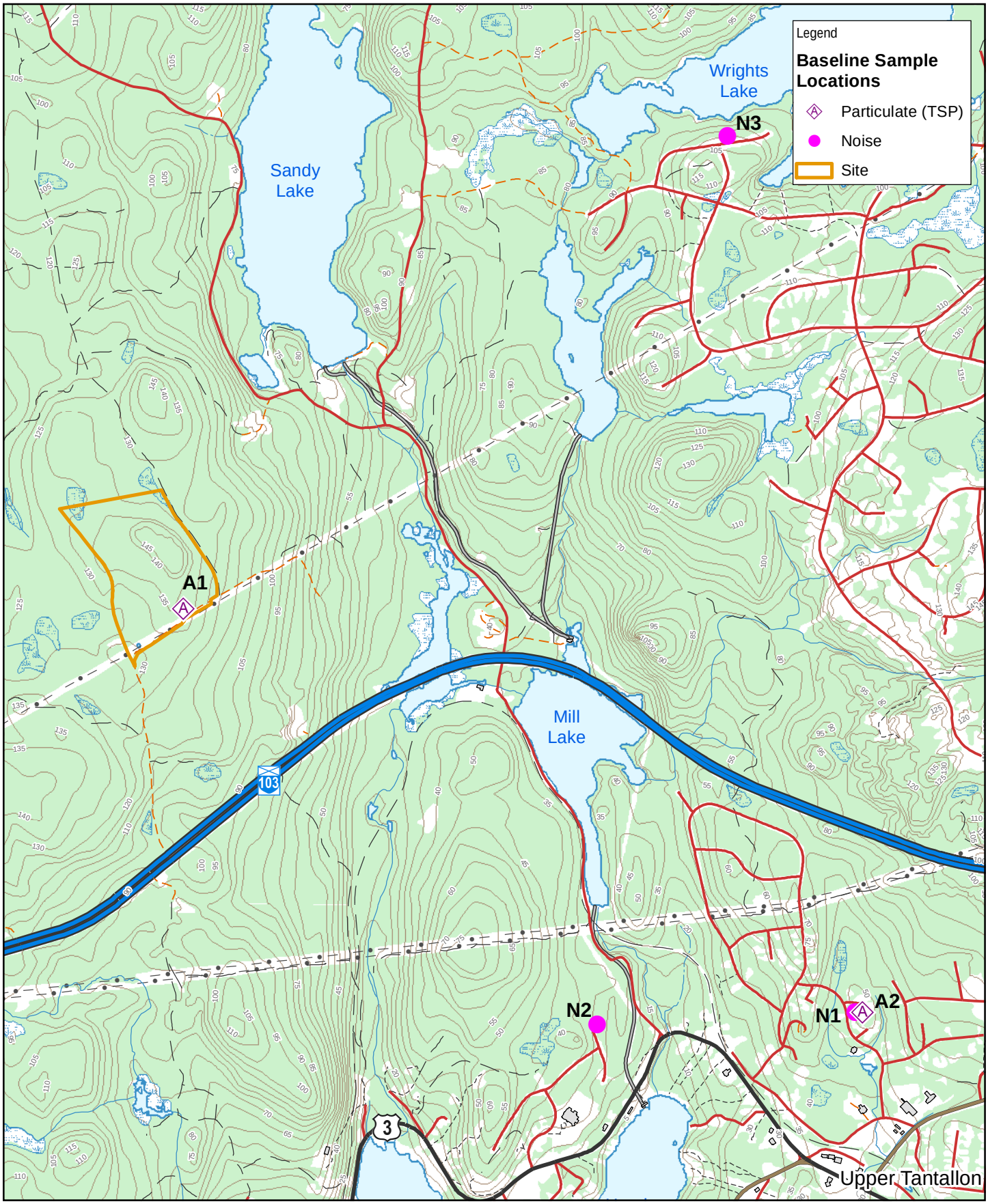
Total suspended particulates (TSP) include dust, dirt, soot, smoke, and liquid droplets directly emitted into the air by sources such as factories, power plants, cars, construction activity, fires and natural windblown dust. Particles formed in the atmosphere by condensation or the transformation of emitted gases such as SO_2 and Volatile Organic Compounds (VOCs) are also considered particulate matter. Atmospheric conditions and air quality was selected as VC as the proposed Project and continued quarry operations has the potential to result in changes to air quality through dust and particulates, and GHG emissions.

Baseline particulate monitoring was conducted at two locations from August 16 through August 19, 2021. The monitoring locations were selected based on accessibility, wind direction, and the proximity to Site boundaries for the purpose of capturing baseline particulate concentrations in the vicinity of the Site. Table 3 provides a description of the air monitoring locations. Monitoring locations are depicted on Figure 6.

Table 3 Particulate Monitoring Locations

Sample Location ID	Description
A1	Tote Road, Head of St. Margaret's Bay – Quarry. Monitoring conducted in southeast corner of existing quarry, near existing settling pond.
A2	15 Hollyberry Lane, St. Margaret's Village – private residence located approximately 3.7 km southeast of quarry. Monitoring conducted in back yard.

The monitoring program for TSP was carried out in accordance with United States Environmental Protection Agency (USEPA) CFR 40 Part 50 - Regulations for Ambient Particulate Sampling. Sampling equipment utilized by GHD consisted of three high volume (Hi-Vol) air samplers equipped with 8-inch x 10 inch glass fibre filters for sample collection. Sampling methodologies are further described in Appendix C.



Paper Size ANSI A

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983 CSRS
Grid: NAD 1983 CSRS UTM Zone 20N

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GHD

SCOTIAN MATERIALS LIMITED
HEAD OF ST. MARGARETS BAY, NOVA SCOTIA
TOTE ROAD QUARRY EXPANSION PROJECT

BASELINE AIR & NOISE MONITORING SAMPLING PLAN

Project No. 11216599
Revision No. -
Date 02/02/2022

FIGURE 6

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Print date: 04 Feb 2022 - 11:24

Data source: GEONOVA, GHD, Scotian Materials . Created by: jjparks

Collected samples were submitted to an accredited laboratory, AGAT Laboratories in Dartmouth, NS, for analysis in accordance with the EPA Method 5 as per the analytical report method. The laboratory results and certificate of analysis are provided in Appendix C.

6.2.1 Existing Environment

Climate

The Nova Scotia Western Ecoregion - the St. Margaret's Bay Ecodistrict (780), tends to experience a milder and moister climate due to the influence of its proximity to cooler coastal waters, which increases local rain and fog. In general, NS Western Ecoregion has early springs, warm summers, and milder winter (Neily et al., 2017).

Weather conditions in NS are monitored using a network of 47 weather stations, owned and operated by Environment and Climate Change Canada (ECCC). Weather stations started collecting data in 1981 and consist of precipitation, relative humidity, temperature, wind direction, and wind speed. The St. Margaret's Bay Weather Station (ID 8204800; Coordinates: 44.7 N, 63.9 W, Elevation: 17.4 m) is located approximately 2 km from the Tote Road Quarry. Climate normals from 1981 to 2010 for the St. Margaret's Bay Weather Station are presented in Table 4 (Government of Canada, 2021). The climate normals calculated for St. Margaret's Bay station indicate that the average temperature ranges from -5.7°C to 18.0°C. Historical records show that August, on average, is the hottest month and January is the coldest.

Table 4 Summarized Climate Data for St. Margaret's Bay, NS (1981-2010)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Year
Temperature °C													
Daily Average	-5.7	-5.1	-1.2	4.3	9.4	14.3	17.8	18.0	14.2	8.5	3.8	-1.8	6.4
Standard Deviation	2.3	2.3	1.8	1.0	1.3	1.2	1.1	1.2	1.6	1.4	1.0	2.4	1.8
Daily Maximum	-0.2	0.8	4.0	9.3	15.0	20.1	23.4	23.6	20.2	14.1	8.4	3.0	11.8
Daily Minimum	-11.3	-11.0	-6.3	-0.7	3.9	8.4	12.1	12.3	8.2	3.0	-0.9	-6.7	0.9
Record High	15.0	17.0	22.8	27.2	32.0	36.0	34.0	34.4	34.0	30.6	23.9	16.7	N/A
Record Low	-32.8	-31.7	-27.8	-22.2	-7.2	-1.7	-0.6	0.0	-3.9	-10.0	-16.1	-28.0	N/A
Average Precipitation (mm) / Snow (cm) / Rainfall (mm)													
Precipitation	130.1	106.5	134.4	111.7	119.1	96.5	95.7	83.9	101.8	122.1	147.3	132.6	1381.6
Snowfall	43.6	29.9	25.2	5.7	0.3	0.0	0.0	0.0	0.0	0.0	7.8	23.8	136.3
Rainfall	86.5	76.6	109.3	106.0	118.8	96.5	95.7	83.9	101.8	122.1	139.5	108.8	1245.3
Precipitation days (>0.2 mm)	10.9	8.7	10.8	11.8	13.2	11.8	10.1	9.2	9.9	11.3	12.3	10.7	130.7
Snowy days (>0.2 cm)	5.8	4.2	3.1	1.1	0.08	0.0	0.0	0.0	0.0	0.0	1.2	3.6	19.1

Source: Government of Canada (2021a)

Total Suspended Particulate (TSP) Monitoring

Project activities such as blasting, on-site vehicle operations, crushing, processing, and wind erosion on open ground and stockpiles can contribute to increased particulate levels. Based on *Nova Scotia Air Quality Regulations*; a significant adverse environmental effect with respect to TSP is one that would reduce air quality, such that the level of TSP matter exceeds 120 µg/m^3 over a 24-hour averaging period or 70 µg/m^3 over an annual averaging period. The total suspended particulate measurements made at two monitoring locations over a three-day period ranged from 7.0 µg/m^3 to 20.2 µg/m^3. Recorded values are below the maximum permissible ground level concentration as noted above.

Total suspended particulate measurements compared to applicable criteria are presented in Appendix C.

Greenhouse Gases (GHG)

The Site is located in NS Central Air Zone. For this Project, on-site trucking, mobile equipment, and utility vehicles have the potential for producing emissions of air contaminates including sulphur dioxide (SO_2), nitrogen oxide (NO), carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter, ground level ozone (O_3) and other volatile organic components (VOCs). These contaminants are currently regulated under *Nova Scotia Air Quality Regulations* (N.S. Reg 187/2010) and with guidance through the Canadian Ambient Air Quality Standards (CAAQS). With respect to local conditions, the key air quality parameter of concern would be particulates (i.e., dust).

The closest applicable Ambient Air Quality Station to Tote Road is located in Halifax, NS. Monthly average and minimum and maximum average monthly values for the 14-year period December 2006 to December 2019 are shown in Table 5.

Table 5 Summarized Air Quality Data for Halifax

	PM2.5 (µg/m^3)	SO_2 (ppb)	NO_X (ppb)	NO (ppb)	NO_2 (ppb)	O_3 (ppb)
Minimum	0	0	0	0	0	0
Maximum	145.5	173.6	258.8	268	320	78
Average	5.6	2.1	10.6	10.7	20.9	21.2

While Halifax may provide a geographic/topographic setting that is similar to Tote Road, the data presented is likely influenced by the downtown urban location (Halifax station located in the Johnston Building, 1672 Granville St., NS) (i.e., increased traffic, construction projects, etc.), and therefore air quality is likely better in the Tote Road area.

6.2.2 Potential Effects, Proposed Mitigation, Monitoring and Follow-Up

Potential Effects

Quarry activities are not expected to change from the scope of operations at the existing quarry. Site preparation and operations associated with the proposed Project have the potential to result in changes in air quality (i.e., dust and particulates); and in GHG emissions with potential climate effects.

Dust and exhaust type emissions will be produced from equipment and machinery used for site preparation, operation, and reclamation. Mitigative measures, could include wet suppression of unpaved surfaces and roads, to help reduce dust impacts from these activities. Regular machinery maintenance, the use of low sulphur fuel, the overall distance of reclaimed areas from sensitive receptors and the natural

buffers of the reclamation areas will help reduce emissions and dust impacts associated with the equipment utilized in the reclamation process.

Assuming appropriate mitigation to minimize dust generation and transport, minor effects on air quality are anticipated during development, operation, and active reclamation phases. Since no change in production is anticipated, it is predicted that there will be no net change in GHGs produced from Project. Technology improvements over time may provide for lower emissions. Based on the mitigation measures, Project related impacts related to atmospheric conditions and air quality are anticipated to be minor.

Proposed Mitigation

The following mitigative measures will be utilized to reduce Project emissions:

- During periods of heavy activity and/or dry or windy periods, water spray will be used to reduce dust.
- Consideration shall be given to the strategic placement of overburden and aggregate stockpiles to act as wind barriers to crushing activities.
- Appropriate truck loading and hauling procedures shall be followed to reduce the generation of dust during trucking activities.
- When not in use, machinery and light vehicles shall not be left idle so as to reduce emissions.
- All vehicles and machinery shall be maintained in proper working order to reduce emissions.

Monitoring and Follow-up

Scotian is aware of the legislation related to airborne particulate emissions and will comply with reporting requirements, as applicable. Monitoring of particulate emissions will be conducted in accordance with the IA, and as required by NSECC in accordance with the NS Pit and Quarry Guidelines and Nova Scotia Air Quality Regulations.

6.3 Light

Light level limits are not directly regulated through the provincial regime. Changes (i.e., increases or changes to occurrence / timing) to ambient light levels have the potential to adversely affect fauna and birds, as well as increase level of light pollution experienced by the general public or specific populations.

Canada Occupational Health and Safety Regulations (SOR/86-304) direct the minimum illumination levels required at various workplace locations. To the extent that migrating birds may be affected by the Project, the *Migratory Birds Convention Act 1994*, and the *Species at Risk Act* could apply.

The adverse effects of light trespass on human receptors are due both to an increase in general illuminance that may cause annoyance and may disrupt sleeping patterns, and from the direct view of the light source that can cause glare issues. The adverse effects of light trespass from exterior lighting are influenced by a number of factors:

- Light trespass is more likely to be perceived as obtrusive if the lighting installation is located above the observer. Lighting installations are usually directed towards the ground and an observer could have a direct view of the luminaire.
- The surrounding topography and site infrastructure, including distance, hills, trees, and buildings generally have a positive effect by shielding the observer from the light source.
- Pre-existing lighting in the area. Light from a particular light source is seen as less obtrusive if it is located in, or perceived in, an area where the lighting levels are already high, e.g., along roads near built up areas.
- The zoning of the area. A residential area is seen as more sensitive compared to commercial areas where high lighting levels are seen as more acceptable.

- Time of use. Light will be seen as being more obtrusive during night time. This is generally considered to be between 11:00 pm and 6:00 am.

6.3.1 Existing Environment

The Site is located in a remote, rural and mostly forested location. Ambient night-time light conditions would be minimal and typical of a relatively undeveloped rural area. The largest artificial light sources in the vicinity of the Site are from the nearest residences, approximately 2.3 km to the west, 2.5 km to the southeast, and 2.4 km to the southwest, and lighting from the scale house, mobile equipment / vehicle headlights, and the crusher, if present, during operations.

The Project will continue to operate intermittently in response to market demand. The Project will operate during daylight hours, to prevent night-time disturbance, with the potential for other site activity to occur in predawn or twilight hours, if necessary. Twenty-four-hour operation is not envisioned for the Project.

Light monitoring was not completed during the baseline study program, as ambient night time light conditions would be minimal and typical of a relatively undeveloped rural area and are not anticipated to cause any effects on the nearest residences, located at a minimum 2.3 km away from the Site. Furthermore, there will be no new sources of light or changes to light intensity associated with the expansion as the operation will proceed as it has historically.

6.3.2 Potential Effects, Proposed Mitigation, Monitoring and Follow Up

Potential Effects

Light is a sensory disturbance that can impact fauna by potentially causing disturbance or displacement of species, disorientation and / or by impacting foraging, reproduction, and communication through behaviour changes (Longcore and Rich, 2004; Da Silva et al., 2015). Further, behaviour changes can also disrupt habitat connectivity (Bliss-Ketchum et al., 2016). For species which may be attracted to light, lights may increase potential for direct mortality of these species or may increase habitat suitability by supplementing their source of prey. Some opportunistic wild species may be attracted to the site as a result of increased access and available food sources (natural prey or anthropogenic food sources), potentially increasing interactions between site personnel and wildlife.

A significant impact is defined as direct light trespass that according to the affected resident; regularly interferes with the use and enjoyment of nearby residential properties on a permanent basis and/or evidence of unacceptable levels of bird mortality associated with Project lighting.

Ambient night-time light conditions in the vicinity of the Project are expected to be minimal and typical of a relatively undeveloped rural area. Light impacts on-site result from temporary lighting systems (including portable lights) installed during active construction and operation, mobile equipment, and vehicle headlights moving around the Site as well as entering and exiting the Site. There is currently no permanent lighting on-site, and there will be no new sources of light or changes in light intensity associated with the expansion as the operation will proceed as it has historically. There are no new or additional effects from light anticipated.

Given the distance from residential properties, rural setting of the site, the topography / vegetative cover, and intermittency of operational activities in response to market demands, the light impacts on residences are expected to be negligible with the appropriate mitigation applied.

Proposed Mitigation

Appropriate mitigation measures will be taken when required. The key mitigation measures applied to the assessment of light are:

- Use of lights will be limited to the amount necessary to ensure safe operation.
- Lights on-site infrastructure will be installed downward facing, to reduce attraction to birds.
- Wherever possible, motion-sensing lights will be installed to ensure lights are not turned on when they are not necessary.
- Lighting, when required, should be shielded to shine down and only to where it is needed without compromising the safety of the employees.
- Lighting not in use will be turned off.
- Efficient sources of light, such as LED, will be utilized wherever practicable, to reduce overall magnitude of light.
- Based on the mitigation measures, Project related impacts related to light are not anticipated to be significant.

Monitoring and Follow Up

Scotian will maintain a clear line of communication through their Project Manager during continued operations, and any complaints related to light trespass will be recorded and evaluated in accordance with NSECC specific requirements.

6.4 Noise

Noise is defined as any unwanted sound which may be hazardous to health, interfere with speech and verbal communications or is otherwise disturbing, irritating or annoying. Noise is measured as sound pressure levels (SPL) in decibels (dB). This scale is “A" weighted to approximate the way the human ear hears. Noise measurements are therefore represented as dBA units. In general, an increase in noise levels from 1 to 3 dBA will not be noticeable, 3 to 5 dBA will be noticeable by most people, 5 to 7 dBA will be easily heard and an increase of 7 to 10 dBA will be considered by most to be twice as loud (USEPA, 1974). Because the decibel scale is logarithmic, doubling of the number of noise sources will increase noise levels by 3 dBA. A tenfold increase in the number of noise sources will add 10 dBA to the noise level. Noise was selected as a VC as the proposed Project will act as a periodic source of noise in the area.

Table 6 lists some common noises and typical sound levels (dBA). Extremely low levels of sound are in the 20 to 35 dBA range. A quiet location such as library or inactive residential area will register a sound level of approximately 35 dBA. Sounds causing immediate and noticeable disturbance start at 70 to 80 dBA. A tractor-trailer passing at a distance of 10 to 15 m will create 80 dBA, similar to that of shouting at a distance of one metre.

Table 6 Common Noise Levels

Noise Level (dBA)	Typical Noise Levels
140	Threshold of pain on the human ear
130	Jet Aircraft (65 m)
120	Thunder
110	Gas mower (1 m), nightclub music

Noise Level (dBA)	Typical Noise Levels
100	Loud Street Noise
90	Noisy factory
80	Tractor -trailer travelling 70 km/hr (15 m), cocktail party
70	Car travelling 70 km/hr (15 m), toilet flushing
60	Conversation
50	Private office
40	Light rain
30	Countryside at night, whisper
20	Recording studio
10	Rustle of leaves
0	Threshold of hearing

Quarry operations and use of heavy equipment can contribute to increased noise levels at the Site and the surrounding area. Table 7 provides typical noise ranges at 15 m from heavy construction equipment as may be found on the Site. Noise levels for stationary construction equipment will decrease by approximately 6 dBA at a doubling of the distance from the source. For context, the nearest residential receptor is located approximately 2.3 km from the proposed Project (at minimum), a distance of over 2 km (2000 m) from the typical noise level range as defined in the table below.

Table 7 Typical Noise Levels (Heavy Equipment)

Type of Equipment	Noise Level Range (dBA)					
	15 m from Source	30 m from Source	60 m from Source	960 m from Source	1920 m (1.92 km) from Source	3840 m (3.84 km) from Source
Front Loaders	75-94	69-88	63-82	39-58	33-52	27-46
Backhoes	74-92	68-86	62-80	38-56	32-50	26-44
Trucks	85-95	79-89	73-83	49-59	43-53	37-47
Excavator	85-95	79-89	73-83	49-59	43-53	37-47
	Reference: Construction Noise Impact Assessment, U.S. NRC, 2012; Construction Noise Handbook, US Dept. of Transportation - Federal Highway Administration, 2006					

6.4.1 Existing Environment

To further understand the baseline noise levels in the area, baseline noise monitoring was conducted at three locations, in proximity to the air sampling locations, between August 16 and 19, 2021. Table 8 provides a description of the noise monitoring locations. Monitoring locations are depicted on Figure 6.

Table 8 Noise Monitoring Locations

Sample Location ID	Description
N1	15 Holly Berry Lane, St. Margaret's Village – private residence located approximately 3.7 km southeast of quarry. Monitoring conducted in back yard.
N2	Vacant lot adjacent to 95 Chera Drive, Head of St. Margaret's Bay – private vacant lot northwest of adjacent residence (95 Chera Drive, same property owners) lot located approximately 2.8 km southeast of quarry. Monitoring conducted in grassed area of vacant lot.
N3	152 Falcourt Run, Upper Tantallon – private residence located approximately 3.2 km northeast of the quarry. Monitoring conducted in front yard.

Sound level measurements were collected using a Larson Davis sound level meter, equipped with data-logging capabilities. The device was calibrated at 94 decibels (dBA) before and after each measurement period using a Larson Davis Calibrator.

The noise meter was programmed to record continuous 1-minute sound level measurements taken with the detector in slow response using the A-weighting (dBA scale) and reported as average equivalent continuous level (Leq) dBA readings at each of the three monitoring locations. The sound level meters were equipped with an outdoor casing and foam covering to protect the microphone from adverse weather conditions and reduce sound disturbances caused by physical contact and wind disturbances. Sampling methodologies are further described in Appendix C.

Project operations such as blasting, on-site vehicle operations, and rock crushing can contribute to increased noise levels. As specified in the Noise Measurement and Assessment Guidelines (Nova Scotia Environment Pit and Quarry Guidelines, May 4, 1999, Revised August 20, 2003).

Average sound level values ranged from 31.10 dBa to 50.63 dBa at all locations. Average sound level values for each time interval were reported below the maximum permissible sound levels of the Noise Measurement and Assessment Guidelines. The lowest sound levels were reported northeast of the Project, at location N3 (152 Falcourt Run). The highest noise levels recorded during daytime (07:00 – 19:00), evening (19:00 – 23:00) and overnight hours (23:00 – 07:00) hours were measured at location N1 (15 Hollyberry Lane). During the monitoring event, construction on nearby properties were taking place in close proximity to N1 monitoring location which may have contributed to noise levels recorded.

A complete summary of the results and the sound level measurements compared to applicable criteria are presented in Appendix C.

6.4.2 Potential Effects, Proposed Mitigation, Monitoring, and Follow-Up

Potential Effects

Project activities have the potential to generate noise through on-site blasting, heavy equipment and truck traffic. The operational phase of the Project is expected to be 30+ years. Noise impacts will result from heavy equipment and vehicle operations, and will occur during site preparation, continued operations and reclamation. A significant adverse effect related to noise occurs when a Project increases background noise levels in a residential area about the NSECC guidelines or by more than 10 dBA. An adverse effect that does not meet these criteria would be considered as negligible.

Given the setting of the Project, SPL on Site and in the surrounding area are expected to be typical of levels in a rural resource development area. The Project is not expected to change from how it proceeded historically, therefore there will be no new sources of quarry related noise associated.

Given the distance to the nearest residential receptor (approximately 2.3 km from the Site), background noise and the noise caused by heavy equipment and continued quarry operations will be negligible with the appropriate mitigation applied and is unlikely to impact the normal day to day life of residential properties. Recreational users may experience periodic elevated noise levels as a result of Project depending on distance from the Site. Any Project related noise will be consistent with the existing operations where there will be no changes to traffic, blasting, operations etc.

Based on the mitigation measures, Project related impacts related to noise are anticipated to be minor.

Proposed Mitigation

Appropriate mitigation measures will be taken when required to ensure noise limits are met. The nearest residential receptor is approximately 2.3 km from the Site (at minimum).

A technical blast design will be prepared by a qualified person who ensures that the prescribed ground vibration and air concussion limits are achieved.

The key mitigation measures applied to the assessment of noise are:

- Blasting and crushing will occur as market demand requires.
- Applicable guidelines and regulations will be followed as established by NSECC approvals to operate.
- Regular maintenance of vehicles and equipment.
- Barrier berms will be established to minimize noise propagation where appropriate.

The level of noise will vary according to the type of activity. Noise from the blasting and equipment is a primary source of noise. Scotian will continue to control operations and equipment to ensure noise levels are kept within regulated limits and applicable guidelines as determined by NSECC. The following are typical limits at any compliance monitoring stations at the Site boundaries or at any other station identified by NSECC.

- Day: 7 am to 7 pm – 65 dBA
- Evening: 7 pm to 11 pm - 60 dBA
- Night: 11 pm to 7 am - 55 dBA: maximum (instantaneous) levels

Monitoring and Follow-up

All blasts will be monitored for concussion and ground vibrations Blast Notifications will be distributed informing public and community members of upcoming blasts.

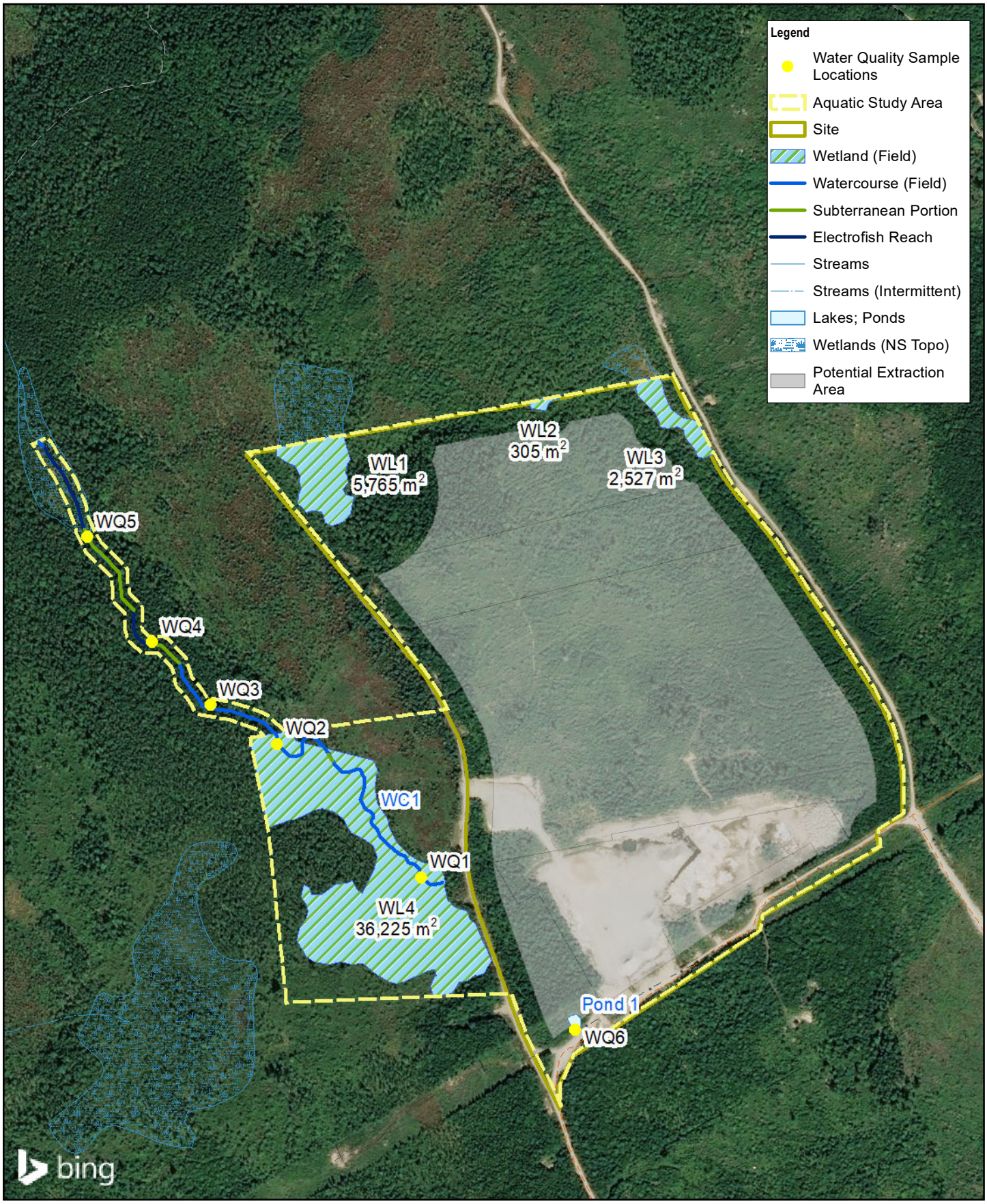
Scotian will maintain a clear line of communication through their Project Manager for noise complaints to be recorded and evaluated in accordance with legislation and NSECC specific requirements. Noise monitoring will be conducted in accordance with the IA and as required by NSECC.

6.5 Surface Water Resources

Surface water resources, including wetlands, were selected as VCs because of the potential for Project activities to interact with the freshwater environment. Wetlands can have many functions, known as wetland functional attributes, which play important roles in natural ecosystems. Wetlands can minimize erosion, control flooding, and reduce contaminant loads. Wetlands may also be closely linked to local hydrogeology in that they may play a role in groundwater recharge and discharge areas. They also perform various important biological functions, such as providing habitat for wetland species, as well as for upland

species that require wetland habitat over their development. Humans also used wetlands for various recreational activities such as bird watching, hunting, and harvesting of wild plants. In Nova Scotia, wetlands are protected under the Provincial *Environment Act* and an approval is required for their alteration.

For this VC, additional areas beyond the Site were evaluated – referred to as the Aquatic Study Area. The Aquatic Study Area includes the Site, defined by the boundaries of the 32.6 ha property (PID 41457821) owned by Scotian, as well as an additional 7.8 ha to the west, located on crown land (PIDs 41388141 and 41388133). The Aquatic Study Area is shown in Figure 7.



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Metres

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983 CSRS
Grid: NAD 1983 CSRS UTM Zone 20N

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GHD

SCOTIAN MATERIALS LIMITED
HEAD OF ST MARGARETS BAY, NOVA SCOTIA
TOTE ROAD QUARRY EXPANSION PROJECT

AQUATIC RESOURCES

Project No. **11216599**
Revision No. **-**
Date **21/10/2021**

FIGURE 7

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Print date: 07 Feb 2022 - 17:27

A desktop review was completed to identify and assess surface water resources within and surrounding the Site. Topography, satellite imagery and mapped systems were through the Nova Scotia Topographic Database (NSTDB) Nova Scotia Wetlands Inventory Database and Nova Scotia Wet Areas Mapping (WAM) were reviewed to gather information on mapped watercourses and waterbodies, provincial flow accumulation data, and depth to water table mapping to identify potential surface water features within or in proximity to the Site.

Watercourse delineation and characterization were completed throughout the Aquatic Study Area in conjunction with wetland delineation and evaluation on April 9 and July 5, 2021, by MEL. Methodologies employed for wetland delineation and functional analysis, and watercourse locations and identification are detailed in Appendix D [Section 2.6 (Wetlands), Section 2.7 (Surface Water) and Section 2.8 (Fish and Fish Habitat)].

GHD completed a water balance to predict effects on surrounding surface waterbodies caused by the proposed Project. A preliminary water balance assessment was developed to assess the potential environmental impacts of the proposed Project at the end-of-quarry (EOQ) and reclamation conditions. The assessment was developed to determine the monthly changes to flow composition during an average year for the baseline, EOQ, and reclamation scenarios. The methodology used for the water balance calculations are detailed in Appendix E.

6.5.1 Existing Environment

Regional Context

Nova Scotia contains an abundance of surface water features in all areas of the province. High annual rainfall, moderate to low evapotranspiration rates, thin soils with near surface bedrock and a short summer season combine to make a large volume of water available for surface water resources. The past effects of glaciation have resulted in a multitude of wetlands and small lakes as well as a dense network of small streams. The province contains 46 primary watersheds whose networks of streams and 6,670 lakes together cover about 215,000 ha, or about 4% of the province.

The Site is located within two unnamed tertiary watersheds, 1EH-3-P and 1EH-3-Q, both of which are contained within the Indian River Secondary Watershed (1EH-3). The Indian River Secondary Watershed drains south to Indian River and empties into Head Harbour (Atlantic Ocean) and is located within the East/Indian River Primary Watershed (1EH).

Local Context

Field surveys across the Aquatic Study Area identified one watercourse (WC1) and one waterbody (Pond1). The watercourse drains south to north into Island Lake and is a first order stream sourced from a headwater wetland (WL4). The waterbody (Pond1) is an anthropogenically developed pond sourced from roadside ditching and has no outlet or connectivity to fisheries resource.

Drainage from the existing quarry infrastructure is captured within a settling pond located east of the quarry floor. Surface drainage occurs radially off the central high on the Site to low areas and wetlands around the Site. There are no on-site streams and regional drainage is south/southeast to St. Margarets Bay.

The NSECC Wetlands Inventory Database identified three mapped wetlands within the Aquatic Study Area. Field studies across the Aquatic Study Area identified four wetlands (Figure 7). One of the four wetlands (WL1) was identified as a wetland of special significance, due to the presence of blue felt lichen (*Pectenia plumbea*; SARA & COSEWIC Special Concern; NSESA Vulnerable; ACCDC S3). Blue felt lichen was observed outside of the Site, in the northern extent of the wetland. None of the wetlands identified during field surveys were located within the Project footprint. Of the identified wetlands, three exist as isolated features while one exists as a headwater wetland. None of the wetlands identified during field

surveys were located within the Project footprint. An overview of the wetland characteristics is provided in Table 9 below.

Table 9 Wetland Characteristics

Wetland Number	Wetland Type	Wetland Size (ha)[1]	Water Flow Path	Landscape Position	Landform	Hydric Soil Indicator	Hydrological Conditions	Dominant Vegetation
WL1	Softwood Treed Swamp	0.58	Isolated	Terrene	Basin	Histosol	Highwater table, saturation, stunted or stressed plants	**Herbs:** Kalmia angustifolia, Osmundastrum cinnamomeum, Rhododendron groenlandicum, Vaccinium myrtilloides, Vaccinium oxycoccos **Shrubs:** Picea mariana **Trees:** Picea mariana, Acer rubrum
WL2	Mixedwood Treed Swamp	0.03	Isolated	Terrene	Basin	Histosol	Saturation, stunted or stressed plants, geomorphic position	**Herbs**: R*hododendron groenlandicum, Kalmia angustifolia, Osmundastrum cinnamomeum, Cornus canadensis, Carex trisperma* **Shrubs**: *Acer rubrum, Viburnum nudum* **Trees**: *Acer rubrum, Picea mariana*
WL3	Fen	0.25	Isolated	Terrene	Flat	Histosol	High water table, saturation, stunted or stressed plants, geomorphic position, micro topographical relief	**Herbs**: *Carex trisperma, Kalmia angustifolia, Osmundastrum cinnamomeum, Drosera rotundifolia, Eriophorum vaginatum* **Shrubs**: *Picea mariana, Acer rubrum* **Trees**: *Acer rubrum, Abies balsamea*
WL4	Mixedwood Treed Swamp	3.6	Outflow via WC	Headwater Terrene	Basin	Histosol	Surface water (2 cm, 5% of wetland), high water table, saturation, stunted or stressed plants, geomorphic position, micro topographical relief	**Herbs**: *Carex trisperma, Osmundastrum cinnamomeum, Rhododendron groenlandicum* **Shrubs**: *Picea mariana* **Trees**: *Picea mariana, Abies balsamea, Acer rubrum*

[1] All field delineated wetlands extend beyond the Site or Aquatic Study Area boundaries

The Wetland Ecosystem Services Protocol (WESP) – AC functional evaluation technique calculates the overall scores for seven wetland functional groups including a functional and benefit rating for five of the groups (Hydrologic, Water Purification, Aquatic Support, Aquatic Habitat, and Terrestrial Habitat) and the benefit rating for the Wetland Condition and Wetland Risk functional groups.

Of the four wetlands evaluated, the average accumulated functional score per wetland was 2 (moderate). Based on the same analysis, the average accumulated benefit score per wetland was 2 (moderate). WESP-AC guidance states that the most valuable wetlands are those that possess both higher functions and benefits. Benefits relate to the perceived worth of the wetland function to societal needs (Adamus et al., 2016). Three wetlands scored higher for function and benefit: WL1 and WL2 for Water Storage and Delay, and WL4 for Songbird, Raptor and Mammal Habitat.

Wetland condition refers to the integrity or health of a wetland defined by its vegetative composition and richness of native species. All wetlands scored either Moderate (WL1, WL2, and WL4) or Higher (WL3) for wetland condition indicating that these wetlands currently support relatively healthy vegetative communities. High scoring wetlands may have more microhabitats and species diversity, while low scoring wetlands may be more susceptible to changes in their surroundings.

Wetland Risk takes sensitivity and stressors into account by averaging the two. Stress relates to the degree to which the wetland is or has recently been altered by humans in a way that degrades its exposure to multiple stressors. All wetlands analyzed had moderate-higher risk scores for Wetland Risk benefit, due to their small size, lack of outlets (WL1, WL2, and WL3), stressors (WL3), and proximity to clearings and forestry roads. Small wetlands run the risk of drying up especially when they are not adjacent to a pond, stream, or other waterbody. Proximity to roads, even if they are unpaved, may introduce invasive species and/or human activities that may alter their functions.

In general, wetlands within the Aquatic Study Area have similar functions and benefits to each other and in comparison to other wetlands across the NS landscape; they are not unique in their functional roles as analyzed by WESP. While higher benefit and function scores were calculated for various wetlands, no wetlands scored higher in all function groups. Three of the wetlands scored higher in both function and benefit for one group score: WL1 and WL2 in hydrologic group, and WL4 in terrestrial habitat group. WL1 and WL2 are hydrologically isolated and have deep peat soils with high ability to store water. WL4 scored higher for terrestrial habitat group, likely due to the amount of downed wood present, wide range of woody heights and form diversity and diversity of shrub species. This results in a range of habitat types present in the wetland. Variable scores across the Aquatic Study Area for the majority of wetlands indicates that on average, these wetlands are very similar to those outside of the Aquatic Study Area.

The Wetland Conservation Policy was developed by NSECC and provides a framework for the conservation of wetlands and the identification of wetlands of special significance. According to the Wetland Conservation Policy, one of the wetlands identified on Site (WL1) is considered a wetland of special significance because it supports a significant species, blue felt lichen (Pectenia plumbea; SARA & COSEWIC Special Concern; NSESA Vulnerable; ACCDC S3). Blue felt lichen was observed outside of the Site, in the northern extent of the wetland. A 100 m setback was put in place for the protection of the significant species identified, as further discussed in Section 6.9.

Water Balance

Three site conditions were analyzed; existing (baseline) conditions; EOQ conditions; and reclamation conditions. EOQ conditions consider the quarry at full development of 24 ha and are expected to occur at approximately 30 years. Runoff in EOQ conditions will be discharged in the southwest portion of the Site. Reclamation conditions are representative of the Site upon removal of all equipment and after re-contouring and revegetation. As such these represent “worst case” as some degree of progressive reclamation will happen as site development occurs. Refer to Appendix E for detailed methodology related to the water balance.

Contributing drainage areas were delineated for watercourse WC1, wetlands WL1 through WL4, Island Lake, and Little Indian Lake. Drainage areas for WC1, WL1 – WL4, and Island Lake are all sub watersheds within the Little Indian Lake watershed. The Little Indian Lake watershed experiences no net loss in area due to the Project. The contributing drainage areas were delineated using PCSWMM software and the 1 m digital elevation model (DEM) and were verified by manual methods within a GIS environment. Watershed delineations were completed for the three life-cycle phases of the proposed Project: baseline watershed delineations, EOQ and reclamation watersheds. It should be noted the drainage from EOQ conditions to reclamation conditions is expected to remain constant. As such watershed areas from EOQ conditions to reclamation conditions do not change. During EOQ and reclamation conditions, water which falls on the quarry will be discharged to the drainage areas supplying WC1, WL4, and Island Lake. Watershed areas under each site condition assessed are presented in Table 10, below.

Table 10 Water Balance – Existing, EOQ and Reclamation Drainage Areas

Watershed	Existing Area (ha)	EOQ Area (ha)	Reclamation Area (ha)
WC1	77.81	86.5	86.50
WL1	6.41	5.66	5.66
WL2	1.99	0.39	0.39
WL3	6.00	3.09	3.09
WL4	41.11	50.57	50.57
Island Lake	1045.25	1052.04	1052.04

Surface Water Quality

Baseline field water quality measurements were recorded in-situ during the surface water sampling program on September 2, 2021. Water quality parameters were compared against the Canadian Council of Ministers of the Environment (CCME) water quality guidelines for the Protection of Freshwater Aquatic Life (FWAL).

Water temperature, dissolved oxygen concentration, pH, conductivity and total dissolved solids (TDS) were measured in WC1 and fell within a tolerable range acceptable for aquatic life, with the exception of dissolved oxygen which fell below the recommended concentration for aquatic life. The dissolved oxygen levels recorded in September 2021 were low in WC1, ranging from 0.7 – 6.8 mg/L (average of 3.3 mg/L). The average of the recorded dissolved oxygen levels is below the CCME guideline for the Protection of Aquatic Life for both early and other life stages of both cold-water and warm-water biota. The CCME guidelines for the Protection of Aquatic Life establish a minimum recommended concentration of DO of 9.5 mg/L for early life stages of cold-water biota and 6.5 mg/L for other life stages. For warm-water biota, the CCME guidelines recommend 6.0 mg/L for early life stages, and 5.5 mg/L for all other life stages. Low levels of dissolved oxygen recorded in WC1 are likely attributed to minimal instream vegetation, low flow conditions, and lengthy subterranean sections.

6.5.2 Potential Effects, Proposed Mitigation, Monitoring and Follow-Up

Potential Effects

The Project limits were determined by using setbacks, as defined by provincial policy and legislation, for water and wetland features (30 m to 100 m). Following these setback distances, the proposed expansion area will be located a minimum of 30 m from wetlands WL2, WL3, and WL4, and a minimum of 100 m from wetland WL1. No wetlands were identified to provide fish habitat within the Site. WL4 is the only wetland

identified to contain a throughflow surface water feature (WC1); however, WC1 is entrenched within the wetland, and as such, any potential fish habitat is confined to the channel of the watercourse.

Based on the water balance conducted, there may be an indirect effect on wetlands as a result of the Project. Under EOQ and reclamation conditions, the catchments supplying WL2 and WL3 experience decreases in runoff of 75.75% and 38.15%, respectively. These changes are considered significant in terms of possible impacts to the function of WL2 and WL3.

Under EOQ conditions, runoff decreases 1.80% and 11.70% in the WC1 and WL1 watersheds, respectively, and increases 9.30% in the WL4 watershed. Under reclamation conditions, runoff in the WC1 and WL4 watersheds increases 7.91% and 16.94%, respectively, and decreases 6.43% in the WL1 watershed. These changes are not significant in terms of possible impacts to the function of WC1, WL1, and WL4.

Wetland alteration requires an NSECC Permit through the regional office. A Wetland Alteration Permit application for WL2 and WL3 will be submitted to NSECC, and approval granted prior to commencement of any wetland alteration to support Project. The approval will not be required until the Project encroaches on the catchments for WL2 and WL3. Compensation to offset lost wetland habitat will be provided as part of the Permit process

No potable surface water supplies were identified in relation to the Aquatic Study Area. Low potential for fish habitat was identified within the vicinity of the Site. Suspended sediment and silt in site runoff is the main concern that could potentially cause adverse effects to the receiving environment. All run-off from the Site will be directed to the settling pond prior to discharge into the receiving environment.

Based on the mitigations measures including wetland compensation for WL2 and WL3, Project related impacts on surface water resources are expected to be minor.

Proposed Mitigation

Potential adverse impacts will be mitigated or avoided through adherence to best practices, adhering to IA requirements, and applicable regulations and guidelines. Scotian will use their experience with existing quarry operations to manage surface water runoff at the Site, including:

- The amount of exposed soil shall be kept to a minimum.
- Working areas are stabilized / gravelled.
- Surface overflow which does not infiltrate the quarry floor shall be directed to the settling pond.
- Off-site surface water flows shall be directed around the site to minimize the amount of runoff passing over the site.
- The Project was developed in consideration of the wetlands to the north. The elevation of the quarry floor will be benched to reduce potential surface water/groundwater interactions.

Drainage ditches and swales will be utilized to the greatest extent practicable to divert surface water, originating up-gradient of the Site, around the quarry perimeter, thereby minimizing contact of water with the quarry floor and working faces. A settling pond will capture surface flow and allow for suspended sediment to settle out of the water column. An outflow is constructed in the settling pond to allow treated water to return to the surrounding environment. Reclamation will proceed incrementally as operations continue. The reclamation phase will include a management plan for water features left on-site to address quality and erosion and sediment control. Additional details on timelines and a formal reclamation plan will be developed as part of the IA process as guided by conditions of an EA approval.

For wetlands that will be disturbed in the expansion of the quarry, a Wetland Compensation Plan will be developed as required. Compensation plans will be filed with NSECC as part of the IA process if the EA approval is granted.

During operations, when areas that are currently vegetated are disturbed, it will be particularly important to follow the NSECC Erosion and Sedimentation Control Handbook (1998) techniques for ensuring there is no potential for impact to surface water quality. If a malfunction of erosion and sediment control measures is observed, then available on-site materials will be used to remedy the issue.

Monitoring and Follow-up

Additional wetland surveying, monitoring, or follow-up will be developed in accordance with all approvals issued in consultation with NSECC.

Significant changes to surface water quality are not anticipated based on the location of the identified watercourse and anthropogenically formed waterbody in relation to the Project footprint. Surface water monitoring will be conducted according to the Site IA and the NS Pit and Quarry Guidelines.

Visual monitoring will be conducted through all phases of the Project on erosion and sedimentation control measures to identify any potential pathways to surface water bodies and wetlands. If pathways are identified, water samples will be collected and analyzed for Total Suspended Sediment (TSS) to ensure there are no impacts to the surface water quality and that no additional mitigative measures are needed.

6.6 Fish and Fish Habitat

Fish and fish habitat were selected as a VC because of the potential for quarry operations to interact with fish bearing systems or alter fish habitat.

Fish habitat characterizations and fish assessments were completed for all delineated watercourses in the Aquatic Study Area by MEL on August 27, 2021. Watercourse characterizations included a visual assessment of substrate, cover, riparian habitat, and physical channel measurements (depth, wetted, and bankfull widths). Electrofishing was conducted within on survey location (WC1; two reaches) to determine fish species present within the Aquatic Study Area and within features that intercept surface water from the Project.

6.6.1 Existing Environment

A desktop review was completed to identify and assess surface water resources within and surrounding the Site. The NS Freshwater Fish Species Distribution Records were reviewed, no records were found for waterbodies surrounding the Aquatic Study Area (NSDFA, 2019). NS Departure of Fisheries and Aquaculture (NSDFA) were consulted and confirmed there were no records of fish data on water features (Island Lake or surrounding area) in proximity to the Aquatic Study Area. The following fish species were identified within the secondary watershed records in Five Mile Lake and Uniacke Lake (recorded between 1986 – 2004); American eel (*Anguilla rostrata*), brook trout (*Salvelinus fontinalis*), yellow perch (*Perca flavescens*), white sucker (*Catostomus commersonii*), golden shiner (*Notemigonus crysoleucas*), banded killifish (*Fundulus diaphanous*), smallmouth bass (*Micropterus dolomieu*) and, nine spine stickleback (*Pungitius pungitius*).

The ACCDC report identified brook trout and alewife (*Alosa pseudoharengus*) within 5 km of the Site as well as American eel and Atlantic Salmon [Inner Bay of Fundy (IBoF) population] within 10 km. The Aquatic Study Area is outside of the range of the IBoF population of Atlantic Salmon (Fisheries and Oceans Canada, 2019a). The Department of Fisheries and Ocean (DFO) aquatic SAR map does not identify any aquatic SAR within Indian Brook or Island Lake (DFO, 2019b).

The potential for wetland and watercourses to support fish and fish habitat were evaluated during field identification / evaluation. Fish habitat surveys were completed in WC1 which included electrofishing (two reaches). No fish were captured or observed. Fish may access the upper reaches of this watercourse, though only during periods of high flow or after heavy rain events. Fish habitat within WC1 is limited by dry

conditions, subterranean sections, and dechannelized surface flow through wetland habitat. As a first order stream, WC1 does not provide passage to any upgradient aquatic features. Based on these characteristics, this watercourse may provide suitable habitat for juvenile American eel in the form of fine substrates and moderate cover as they have the ability to travel terrestrially over wet substrates and as such, may be able to circumvent the subterranean reaches. WC1 provides poor quality habitat for other fish species including salmonids, suckers and minnows due to the inconsistent flow, poor water quality, and subterranean sections acting as impediments to fish passage throughout watercourse. Outside of the watercourse but within WL1, fish habitat is also limited.

Field surveys across the Site also identified one waterbody (Pond1). Pond1 is located within the linear corridor in the southern extent of the Aquatic Study Area. Pond1 is approximately 135 m^2 and receives water from a hung culvert that is fed from a quarry road ditch line. It is an anthropogenically developed pond sourced from roadside ditching and has no outlet or connectivity to fisheries resources.

Further details on the identification and characterization of fish species and fish habitat is provided in Appendix D (Section 3.3.3).

6.6.2 Potential Effects, Proposed Mitigation, and Monitoring and Follow Up

Potential Effects

WL1 is the only wetland identified to contain a throughflow surface water feature (WC1); however, WC1 is entrenched within the wetland, and as such, any potential fish habitat is confined to the channel of the watercourse. Low potential for fish habitat was identified within the Aquatic Study Area (WC1) therefore, the potential adverse effects to fish and fish habitat as a result of continued quarry operations is considered negligible. Based on the water balance detailed in Section 6.5, a decrease in runoff during operations of 1.80% is estimated with an increase in run-off of 7.91% during reclamation. This change is not considered significant.

Proposed Mitigation

Suspended sediment and silt in site runoff is the main concern that could potentially cause adverse effects to the receiving environment. Potential adverse impacts to surface water resources and the receiving environment will be mitigated or avoided through adhering to IA requirements, and applicable regulations and guidelines, as further described in Section 6.5 above.

Monitoring and Follow Up

During operations, erosion and sedimentation control measures will be followed to ensure there is no potential for impact to surface water quality, and therefore no potential for impact to fish and fish habitat. Any further requirement to monitor for potential fish and fish habitat will be conducted according to the Site IA and applicable regulations.

6.7 Groundwater Resources

Groundwater is an integral part of the hydrologic cycle that originates from surface water (rain, snow) infiltration that fills voids (pores, cracks and joints) in the substrate (till and bedrock). The water table, the upper portion of the saturated zone, intersects the surface at streams, springs, and lakes. Given the distance to the nearest residents, this VC was chosen because of its relationship with the surface water conditions.

6.7.1 Existing Environment

Hydrogeology

The local hydrogeological regime can be characterized as two separate systems with the degree of interaction between the two systems highly dependent on the topography and local geology. In the surficial materials, groundwater movement is between the individual soil grains and moves under gradients controlled by topography. In the deeper bedrock aquifers, groundwater flow is dependent upon the degree to which fractures and voids within the strata are connected and the hydraulic head differences between these openings. In some areas, the bedrock groundwater system will receive direct recharge from the surface system as water migrates downward.

Hydrogeologic characterization of NS Groundwater Regions (Kennedy, 2009) gives indication of the bedrock groundwater regions of NS and the chemistry of wells throughout the province. The Project is located within two unnamed tertiary watersheds, 1EH-3-P and 1EH-3-Q, both of which are contained within the Indian River Secondary Watershed (1EH-3). The Indian River Secondary Watershed drains south to Indian River and empties into Head Harbour (Atlantic Ocean) and is located within the East/Indian River Primary Watershed (1EH). Groundwater discharges south to the Atlantic Ocean at St. Margaret's Bay.

Well Water

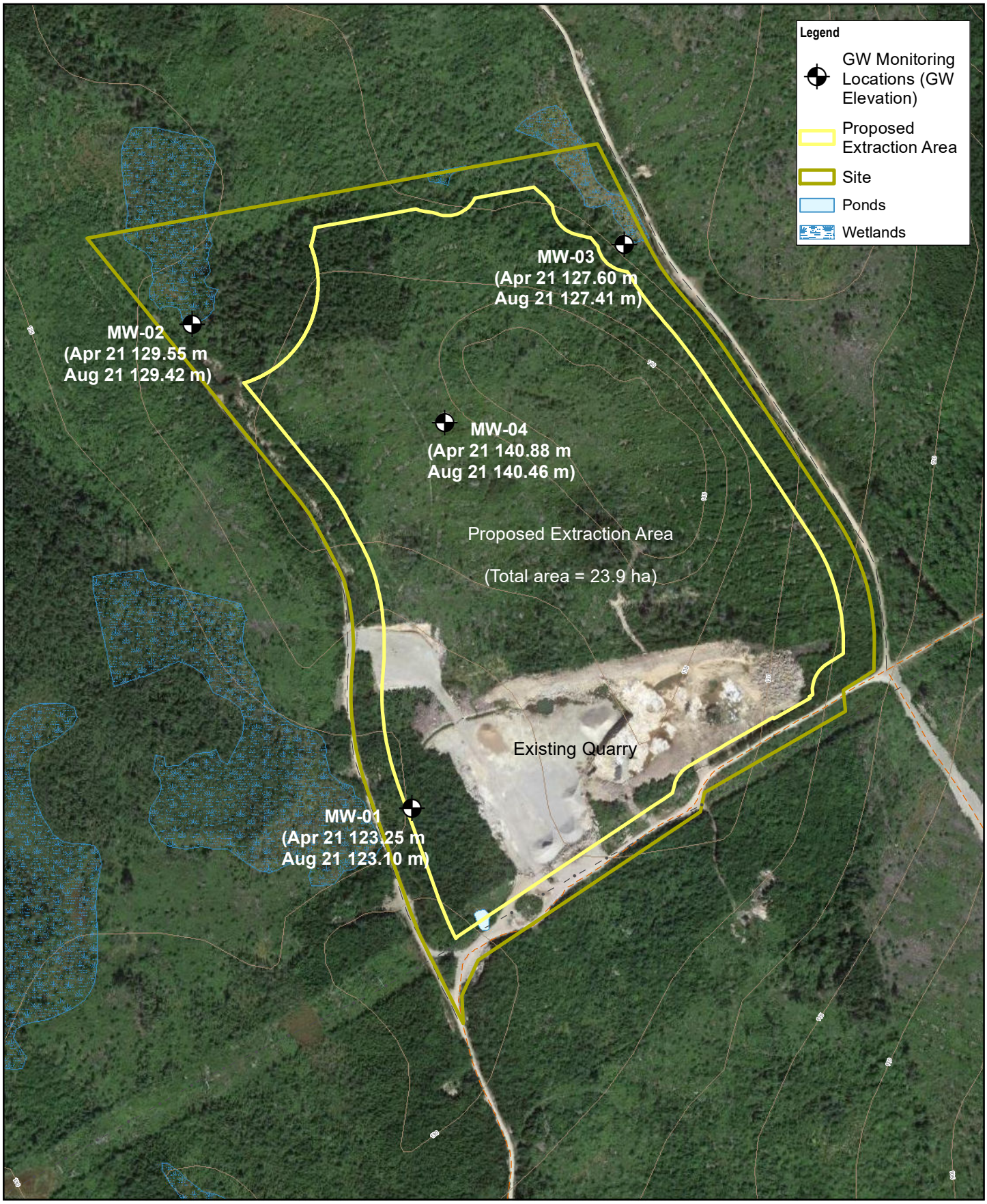
There are no known wells located within 2.3 km of the Project. The Project is located approximately 2.3 km west of the community of Westwood Hills, Upper Tantallon and 2.4 km northwest of the community Head of St. Margarets Bay. The residential areas in the vicinity of the Project are not serviced by a municipal system, therefore it is presumed that a drilled or dug wells exist at the property. Given the age of the subdivision in Westwood Hills, and neighbouring communities, it is expected that most residential wells are drilled. It is possible for some older homes in the vicinity of the Site to have dug wells; however, they would be located at minimum 2.3 km away, and are not expected to be affected by Project activities. The closest known seasonal cottages are located approximately 1.0 km northwest of the Site on Island Lake, this is not a permanent residence and therefore a well is not likely. It is presumed that the occupants utilize surface water sourced from Island Lake. The Site is more than 1 km beyond the assessment area for seawater intrusion vulnerability (Kennedy, 2012). Given the distance from the coast, the geology of the aquifer (granitic), and the quarry floor elevation of more than 116 masl it is unlikely that quarry operations will cause saltwater intrusion into wells near the coast.

The "Arsenic in Well Water Risk Map" (Interprovincial Arsenic Working Group, 2005) indicates that all of NS is likely or very likely to have a risk of arsenic in groundwater wells, and the Tote Road (Head of St. Margarets Bay / Upper Tantallon) area is indicated as high risk of arsenic in well water (drilled wells) (Kennedy and Drage, 2017).

Baseline Program Methodology

GHD was retained by Scotian to complete a hydrogeologic investigation at the Site, including the installation of four monitoring wells and baseline groundwater monitoring.

Logan Drilling and Geotechnical (Logan) advanced four boreholes completed as monitoring wells (MW-01, MW-02, MW-03, and MW-04) (Figure 8) using a CME-75 track mounted drill rig between April 6 and 8, 2021 under the full-time supervision of GHD staff. Boreholes were advanced to depths ranging from 6.55 (MW-03) to 9.75 (MW-01) mbgs. The monitoring wells were sampled after fully developing and purging the wells to obtain a representative groundwater sample. On April 8, 2021, the depth to groundwater ranged from 129.55 to 123.25 metres above sea level (masl). During a subsequent groundwater monitoring event on August 17, 2021, the depth to groundwater ranged from 129.42 to 123.10 masl. Bedrock groundwater flow direction on Site is in a radial pattern from the topographic high near MW-04 to the Site boundary and adjacent wetlands.



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Map Projection: Transverse Mercator
Horizontal Datum: North American 1983 CSRS
Grid: NAD 1983 CSRS UTM Zone 20N

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GHD

SCOTIAN MATERIALS LIMITED
HEAD OF ST MARGARETS BAY, NOVA SCOTIA
TOTE ROAD QUARRY EXPANSION PROJECT

GROUNDWATER MONITORING WELL LOCATIONS

Project No. **11216599**
Revision No. **-**
Date **04/02/2022**

FIGURE 8

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Groundwater samples were submitted for standard water and dissolved metals analysis in April and August 2021. A total of five groundwater samples, including one field duplicate sample (MWDUP collected at MW-03) were submitted to AGAT Laboratories in Dartmouth, NS for analysis.

The groundwater analytical results were compared to Health Canada Guidelines for Canadian Drinking Water Quality Guidelines (CDWQG) [Maximum Allowable Concentration (MAC) and Aesthetic Objective (AO)], CCME guidelines for the protection of FWAL, and NSECC Pathway Specific Standards (PSS) for groundwater; groundwater discharge to surface water (0-10 m from a freshwater body). Groundwater exceedances of applicable guidelines are found in Table 11 (Standard water analysis) and Table 12 (Dissolved Metals) below.

Table 11 Groundwater Exceedances – Standard Water Analysis

Monitoring Well ID	Date	Canadian Drinking Water Quality Guidelines; MAC	Canadian Drinking Water Quality Guidelines; AO	CCME for the protection of Freshwater Aquatic Life	NSE PSS for GW; GW Discharge to SW (0-10 m from a freshwater body)
MW-01	8-Apr-21	--	pH, Turbidity	pH	--
	18-Aug-21	--	pH, Turbidity	pH	--
MW-02	8-Apr-21	--	pH, Turbidity	pH	--
	18-Aug-21	--	pH, Turbidity	pH	--
MWDUP (Field Dup of MW-02)		--	pH, Turbidity	pH	--
MW-03	8-Apr-21	--	pH, Turbidity	pH	--
MWDUP (Field Dup of MW-03)		--	pH, Turbidity	pH	--
MW-03	18-Aug-21	--	pH, Turbidity	pH	--
MW-04	8-Apr-21	--	pH, Turbidity	Fluoride, Ammonia	--
	18-Aug-21	--	pH, Turbidity	pH	--

Note:
-- denotes no exceedance

Table 12 Groundwater Exceedances – Dissolved Metals

Monitoring Well ID	Date	Canadian Drinking Water Quality Guidelines; MAC	Canadian Drinking Water Quality Guidelines; AO	CCME for the protection of Freshwater Aquatic Life	NSE PSS for GW; GW Discharge to SW (0-10 m from a freshwater body)
MW-01	8-Apr-21	Manganese	Iron, Manganese	Aluminium Cadmium Copper Iron Manganese Zinc	Aluminium Cadmium Chromium Copper Iron Zinc
	18-Aug-21	Manganese	Iron, Manganese	Aluminium Cadmium Iron Manganese Zinc	Aluminium Cadmium Chromium Iron Zinc
MW-02	8-Apr-21	--	Manganese	Aluminium Cadmium Copper Zinc	Aluminium Cadmium Copper Zinc
	18-Aug-21	--	Aluminium	Aluminium Cadmium Copper	Aluminium Cadmium Copper
MWDUP (Field Dup of MW-02)		--	Aluminium	Aluminium Cadmium Copper	Aluminium Cadmium Copper
MW-03	8-Apr-21	Lead, Manganese	Manganese	Aluminium Copper Lead Manganese	Aluminium Cadmium Copper Lead
MWDUP (Field Dup of MW-03)		Manganese	Manganese	Aluminium Copper Manganese	Aluminium Cadmium Copper
MW-03	18-Aug-21	Manganese	Manganese	Aluminium	Aluminium Cadmium
MW-04	8-Apr-21	Manganese	Manganese	Aluminium Cadmium Copper Manganese Zinc	Aluminium Cadmium Copper Zinc
	18-Aug-21	Manganese	Manganese	Aluminium Cadmium Copper Manganese Zinc	Aluminium Cadmium Copper Manganese Zinc
Note: -- denotes no exceedance					

The NS Department of Natural Resources has published a series of groundwater chemistry maps for selected naturally occurring parameters including aluminum, iron, and manganese (Kennedy and Finlayson-Bourque, 2011; Kennedy, 2019, 2021). Cadmium and zinc occur naturally in groundwater because they are mineral constituents, and they were detected in baseline groundwater samples that were collected prior to any existing quarry related activities in the immediate vicinity of the newly installed

monitoring wells. Therefore, aluminum, cadmium, iron, lead, manganese, and zinc are all naturally occurring in groundwater.

Detailed methodologies and further details on the monitoring well installation and groundwater monitoring program can be found in Appendix F.

6.7.2 Potential Effects, Proposed Mitigation, Monitoring and Follow-Up

Potential Effects

Potential impacts to water wells are generally a function of the Project development plan, distance from the Project, location of a well with respect to groundwater flow directions, and individual well construction details (dug vs. drilled). Potential impacts from an extraction operation may include water quality deterioration of down-gradient wells from surface runoff and/or accidental releases of deleterious substances, such as petroleum, oil or lubricants (POL) within quarry area.

As a result of the distance between the Project and the nearest residential structure, and the vertical separation between the Project and private wells, presumed to be drilled into bedrock, and the typically low hydraulic conductivity of the bedrock there is limited potential for the Project to impact private wells in neighbouring communities.

No interactions are anticipated with surface water resources from the Project. The proposed quarry floor will be maintained at a minimum 1.0 m above the groundwater table. The elevation of the quarry floor will be benched in the northern portion of the Site to reduce potential groundwater/surface water interactions. The distances from the bench to the wetlands increases from 30 to 125 m.

Based on the mitigation measures, Project related impacts on groundwater are expected negligible.

Proposed Mitigation

Any surface water resulting from precipitation or snowmelt events will be controlled by means of quarry floor grading, berms, and ditching and will contribute to groundwater recharge at this elevation.

The Project was developed in consideration of the wetlands to the north. The elevation of the quarry floor will be benched to reduce potential surface water/groundwater interactions.

Effects to the groundwater quality as a result of site preparation, operation and reclamation of the expanded quarry will be limited in extent. The key sensitive receptor is the closest residential well located approximately 2.3 km from the planned maximum extent of the expanded Quarry boundary, as such no impacts to groundwater are anticipated. Any release of POL will be dealt with effectively and immediately removing the impacted sediments and disposing of in an approved manner and in accordance with provincial legislation.

Proper fuelling procedures shall be followed, and fuelling shall occur in designated areas, away from potential water receptors. Spill kits shall be maintained on-site while the Site is operational in the event of an accidental spill or release.

Monitoring and Follow-up

Water quantity impacts are not predicted for domestic wells. Scotian will maintain a clear line of communication through their Project Manager for any complaints related to domestic wells, to be recorded and evaluated in accordance with legislation and applicable NSECC specific requirements. If required, a groundwater monitoring program will be further defined in accordance EA approval, the IA and as required by NSECC.

6.8 Vegetation and Vascular Plants

The presence of rare flora may be indicative of rare habitats which may support unusual assemblages of plants and animals. The presence of rare vegetative species has the potential to impact Project design on Site layout, based on this vegetation and vascular plans were selected as a VC.

A desktop review was conducted using a suite of available GIS datasets and the provincial landscape viewer, including Provincial Forestry GIS database, Wetland Inventory, Ecological Land Classification, and NS Old Forestry Policy Polygons (NSDNR, 2015; 2016). A desktop review of known vascular plant observations and potential habitat for rare plants within the Site was conducted. The desktop study included a review of the ACCDC database results, a review of mapped wetland habitat, a review of the vegetation communities and classification, and a review of the Priority Species List.

Vegetation community surveys were completed in April 2021 by MEL. The surveys followed meandering transects at the Site, and habitat types were surveyed whenever noticeable habitat changes occurred. The objective of the vegetation community survey was to document the key forested and non-forested vegetative plant communities and to identify areas with a higher potential for rare plants or lichens. Vascular plant surveys were completed early (June 15, 2021) and late (September 12, 2020) in the growing season (June 1 to September 30) to capture plant species with different flowering periods. GIS databases include the ACCDC report, ACPF (Atlantic Coastal Plain Flora) Buffers (NSDNR, 2019), the ecological land classifications of NS (Neily et al., 2017) were reviewed. Meandering transects were completed on foot, and all major habitat types were assessed to create a species list of vascular species and community assemblages observed on Site.

Classification of forested and non-forested community types were completed by merging several existing classification systems: NS Department of Natural Resources (NSDNR) Forest Ecosystem Classification (FEC) (Neily et al., 2010); Maine Natural Areas Program - Natural Communities and Ecosystems (NCE) (Government of Maine, 2013); and Classification of Heathlands and Related Plant Communities on Barrens Ecosystems in Nova Scotia - DRAFT (Porter et al., 2020). Both wetland and upland vegetation communities were assessed, acknowledging that additional wetland information will be recorded during detailed wetland evaluations. The data collected in the field was processed to approximate boundaries of the vegetation types at the Site. This was aided by the use of aerial imagery.

Detailed methodologies, descriptions of the vegetation, vascular plants, and community types are provided in Appendix D (Section 2.1, 2.2, 3.2.1 and 3.2.2).

6.8.1 Existing Environment

The Site is located within the St. Margarets Bay (780) ecodistrict within the Western Ecoregion (700) (Webb and Marshall, 1999). The soils within the ecodistrict are typically shallow, stony, well-drained sandy loams, and the landscape is dotted with large granite boulders. Small streams, rivers, bogs, swamps, and several large lakes are located within the ecodistrict. The predominant vegetation includes red spruce forests on the slopes of hills, hemlock near watercourses, white pine in areas with drier soils and black spruce in areas with poorly drained soils (Neily et al., 2017; NSDL&F, 2019).

The Site is primarily comprised of regenerative softwood stands, wetlands, and disturbed areas. Disturbed portions of the Site include approved land uses such as cleared pad used for temporary mobile asphalt plant operations and stockpiling of aggregates, the existing quarry footprint, gravel roads, and historic timber harvesting. Historic timber harvesting has occurred in the central portion of the Site. The entire treed extent of the Site is dominated by softwood communities, the majority of which are regenerating stands of balsam fir associated with historic timber harvesting. No Old Forest polygons (NSDNR, 2006) are present within the Site. Within the Site, two upland vegetation types and two wetland vegetation types were present. The upland vegetation types belong to the Spruce Hemlock Forest Group (SH) and the wetland

vegetation types belong to the Wet Coniferous Forest Group (WC) and the 'cut-over' group. The cut-over vegetative group was identified in WL3. This group is characterized by historic clearing activities (~20 years ago). None of the vegetation types observed are unique or uncommon in Nova Scotia. The vegetation communities identified within the Site do not have an elevated potential for priority species.

The disturbed habitats (e.g., approved industrial land uses, existing quarry footprint, gravel roads, and historic timber harvesting) consisted primarily of regenerative softwood communities indicative of a low pH and nutrient poor regime, and herbaceous pioneer species, with the majority of the exotic species being confined to the edges of the gravel roads running along the eastern and western property boundary. Many of the wetlands at the Site were disturbed and regenerative and did not provide habitat for many of the vascular plant rarities found in NS.

A total of 101 vascular plant species were observed within the Site, one of which is classified as SOCI (Figure 8): the Nova Scotia agalinis (Agalinis neoscotica; ACCDC S3S4) (Figure 9). Nova Scotia agalinis was observed within the Site, outside of the proposed Project footprint. No priority vascular plant species were observed within the Project footprint. Within the Site, 6% of the observed vascular plant species (n=6) comprised of exotics, 94% (n=95) were native and of the native species less than 2.1% (n=2) belonged to the ACPF Group.

6.8.2 Potential Effects, Proposed Mitigation, Monitoring and Follow-Up

Potential Effects

Project related effects on vegetation are limited due to the disturbed nature of the Site, resulting from previously approved land uses, existing quarry operations, and historical forestry activities. Any disturbance related to the Project, such as increased land clearing, is deemed minor in considering that by means of progressive reclamation, a specific group of individuals within a localized area will be affected for less than one decade when factoring in intermittent restoration methods involving revegetation with endemic species.

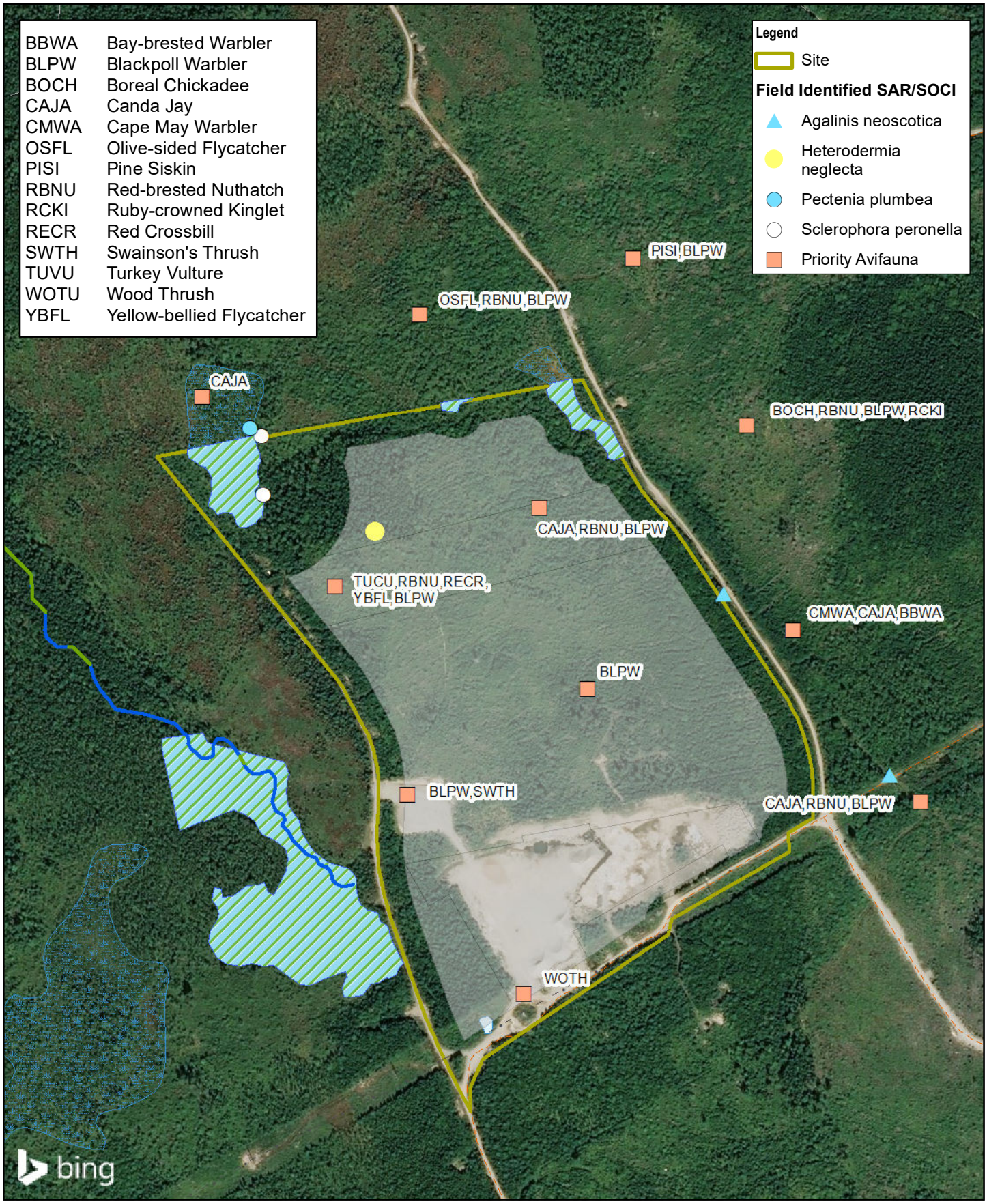
The Project footprint proposed for impact is not unique within the landscape, and no unique habitat required to support species life cycle were identified during the ecological baseline studies completed by MEL. Therefore, the proposed Project is expected to impact localized habitat, and negligible impacts to the regional context are expected.

Proposed Mitigation

Site reclamation will return the Site to a condition that is consistent with the natural surroundings. Progressive reclamation activities will occur during operations on stable areas that are no longer required for aggregate production and final reclamation will occur after extraction has been completed and operational activities related to aggregates reserves have been exhausted. The goal of reclamation is to produce a landscape that is safe, stable and compatible with the surrounding landscape and final land use. This is generally achieved by grading, contouring, capping with soil, revegetating, and time. A mix of native species of plants is recommended for revegetation efforts during the Site reclamation process. Scotian will stockpile available grubbings for use in final cover to create a diverse landscape in line with that represented locally. Progressive reclamation is understood as an integral part of project planning. A final reclamation plan will be developed in line with the NS Pit and Quarry Guidelines and will be in accordance with the IA and permits granted by NSECC.

Monitoring and Follow-up

The final phase of the Project will be to return the area to a condition that is consistent with the natural surroundings and reasonably restored to pre-existing conditions, thus restoring vegetation and habitat. The reclamation plan, including any additional vegetation and/or habitat surveying, monitoring, or follow-up, will be developed in accordance with the NS Pit and Quarry Guidelines, the IA process, and with any NSECC granted approvals.



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SCOTIAN MATERIALS LIMITED
HEAD OF ST MARGARETS BAY, NOVA SCOTIA
TOTE ROAD QUARRY EXPANSION PROJECT

PRIORITY SPECIES

Project No. **11216599**
Revision No. **-**
Date **21/10/2021**

FIGURE 9

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6.9 Lichens

Lichens were selected as a VC as they are one of the most sensitive components of an ecosystem and can serve a role in monitoring environmental stability and uncovering environmental effects and air quality issues as a result of continued Project activities. Changes to air quality through dust and particulates generation and have the potential to interact with lichen species on Site or in the surrounding area.

A detailed desktop review of known lichen observations and potential habitat for rare lichens at the Site was conducted prior to the completion of field surveys. The desktop review process involved a review of the following four components: a review of the ACCDC database results; the NSDNR predictive habitat mapping for boreal felt lichen (BFL) (*Erioderma pedicellatum*); the Mersey Tobeatic Research Institute (MTRI) vole ears (*Erioderma mollissimum*) and the priority species list.

All suitable lichen habitats on Site were surveyed on September 12, 2020 by MEL. Meandering transects were completed on foot and targeted mature trees appropriate for hosting lichen SAR and Species of Conservation Interest (SOCI). Trees that are appropriate for hosting priority lichen species were visually inspected by focused on tree trunks, branches, and twigs.

Detailed methodologies and descriptions of lichen species identified are provided in in Appendix D (Section 2.3 and 3.2.3).

6.9.1 Existing Environment

The ACCDC report identified two priority lichen species within 5 km of the Site: blue felt lichen (SARA & COSEWIC Special Concern; NSESA Vulnerable; ACCDC S3); and grizzled rocktripe lichen (*Umbilicaria v*ellea; ACCDC S1). No predicted BFL polygons are present, however, one predicted polygon is present 200 m west of the Site. According to the MTRI databases, no extant BFL populations and vole ears lichens are within 19 km and 23 km of the Site, respectively.

A total of 22 lichen species were observed at the Site during field surveys, with two identified as priority species; frosted glass whiskers (*Sclerophora peronella*; Atlantic population; SARA & COSEWIC Special Concern; ACCDC S1?); and fringe lichen (*Heterodermia neglecta* (Figure 9); ACCDC S3S4). Frosted glass whiskers were identified in two locations; both of which are east of WL1 (i.e., in upland habitat) and north of the proposed Project.

Additional information regarding the lichen Priority Species is provided in Section 6.12.

6.9.2 Potential Effects, Proposed Mitigation, Monitoring and Follow-Up

Potential Effects

At Risk Lichen Special Management Practices (SMP) provides an outline of mitigation measures to reduce impacts to maintain health of at-risk lichens on Crown Lands (NSDNR, 2018). Both the blue felt lichen and the frosted glass whiskers are listed in the SMP as requiring a 100 m buffer. Although the Site is not considered Crown Land, Scotia is committed to maintaining this 100 m buffer to be protective of these lichens. The Project footprint was developed to maintain this buffer.

Localized impacts to one priority lichen species; the fringe lichen (ACCDC S3S4) located within the Project footprint will occur due to land clearing and excavation. Effects are considered minor with the appropriate mitigation applied as a small, specific group of individuals within an ecosystem would be affected.

Proposed Mitigation

Where disturbance of lichens is not avoidable with respect to extraction areas, consultation with NS NSDL&F and NSECC will take place regarding potential mitigation options such as transplantation.

The mitigation measures chosen for lichen species identified on Site will be consistent with the best available information included in any recovery strategy, action plan, or management plan, and will take into consideration the terms and conditions of the SARA regarding protection of individuals, residence, and critical habitat of all identified Priority Species.

The SMP requires a 100 m buffer from rare and sensitive lichens, including blue felt lichen on crown land. The SMP was considered in the development of setbacks from identified blue felt lichen and the frosted glass whiskers. A 100 m setback from all operations has been put in place for the protection of the blue felt lichen identified outside of the Site, in the northern extent of WL1, and frosted glass whiskers, identified in two locations; both of which are east of WL1 (i.e., in upland habitat) and north of the proposed Project.

Monitoring and Follow-up

The final reclamation phase of the Project will return the Site to a condition that is consistent with the natural surroundings and reasonably restored to pre-existing conditions, thus restoring vegetation and its habitat. The reclamation plan will include any additional lichen surveys, monitoring, or follow-up required, developed in consultation with and approved by NSDL&F and NSECC.

6.10 Wildlife

Wildlife including mammals, herpetofauna, and other priority species are considered a VC due to their role in biodiversity and ecological integrity. Many faunal species are protected under the *Nova Scotia Wildlife Act* (1989). In NS, a species is considered rare when it is listed as rare or sensitive to anthropogenic disturbance by the province (NSDNR General Status Ranks of Wild Species or the NSESA), or listed nationally by Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or *Species at Risk Act* (SARA). The details of the wildlife assessments completed as part of this EARD, including methodologies, are provided in Appendix D (Section 2.0 and Section 3.0).

The GIS forestry database was used to determine the forest cover types within and surrounding the Site. The significant habitat database was reviewed to determine presence of SAR and SOCI wildlife. In addition, the mainland moose (*Alces alces americana*) concentration area GIS layer and the NSDL&F mainland moose shelter patches were used to determine if mainland moose use habitat within or surrounding the Site and the wood turtle (*Glyptemys insculpta*) Special Management Practices (SMP) spatial file provided by NSDL&F was reviewed as was the ACCDC report with its accompanying GIS files. These databases were reviewed to determine what wildlife or habitat is potentially on Site and to support wildlife survey design.

A desktop review for known bat hibernaculum on Site and in the surrounding area was completed. Government records of abandoned mine openings (AMOs) were reviewed, as AMOs that are uncapped and unflooded may provide bat hibernacula.

Incidental observations and dedicated surveys (i.e., mainland moose surveys) of terrestrial fauna were documented during biophysical field surveys in 2020 and 2021 by MEL. All observations were identified and recorded to compile an overall species list.

6.10.1 Existing Environment

Habitat on Site was found to contain a mosaic of disturbed and intact forest. Disturbances were largely related to human activity, including approved land uses such as cleared pad used for temporary mobile

asphalt plant operations, the existing quarry footprint, gravel roads, and historic forestry activities. The Site primarily consists of regenerative softwood stands, wetlands, and disturbed areas. Habitat is suitable for those wild species that thrive in fragmented, diverse landscapes, such as white-tailed deer (*Odocoileus virginianus*), coyote (*canis latrans*), and snowshoe hare (*lepus americanus*). This fragmented diverse landscape provides edge habitat for foraging and patches of full canopy coverage for refuge and cover through all seasons. Wildlife habitat observed was neither unique nor rare in the local or regional landscape context.

There are no documented NSDL&F significant habitats on Site. The Site is within a mainland moose concentration area and mapped core habitat. The ACCDC report states that mainland moose have been observed 20.1 km from the Site, and no priority mammal species were listed within 5 km of the Site. The ACCDC report also states that there are no observations of Blanding's turtle (*Emydoidea blandingii*), wood turtle, snapping turtle (*Chelydra serpentina*), or eastern painted turtle (*Chrysemys picta picta*) within 5 km of the Site.

The ACCDC report states that there are known bat hibernaculum present, while NSDL&F confirmed that no hibernaculum is located within 5 km of the Site. The NSDNR records were reviewed and indicated that there are no AMOs located on the Site, the closest is located 4.8 km southeast, therefore there is no potential for bats to be using uncapped and unflooded AMOs as hibernacula. No bats or potential hibernacula were identified during field surveys.

Winter and pellet group inventory (PGI) surveys (Figure 10) found signs (scat, tracks, etc.) of seven mammals; eastern coyote (*Canis latrans*), snowshoe hare (*Lepus americanus*), white-tailed deer (*Odocoileus virginianus*), American red squirrel (*Tamiasciursus hudsonicus*), white-footed deermouse (*Peromyscus leucopus*), North American porcupine (*Erethizon dorsatum*), and bobcat (*Lynx rufus*). No sign of mainland moose (Figure 10) was observed during field surveys.

It is expected other species such as northern raccoon (*Procyon lotor*), American mink (*Neovison vison),* striped skunk (*Mephitis mephitis),* American black bear (*Ursus americanus*), red fox (*Vulpes vulpes),* short-tailed easel (*Mustela* erminea), and Eastern chipmunk (*Tamias* striatus) may inhabit the Site, at least periodically, however, they were not observed during the field surveys completed by MEL in 2021.

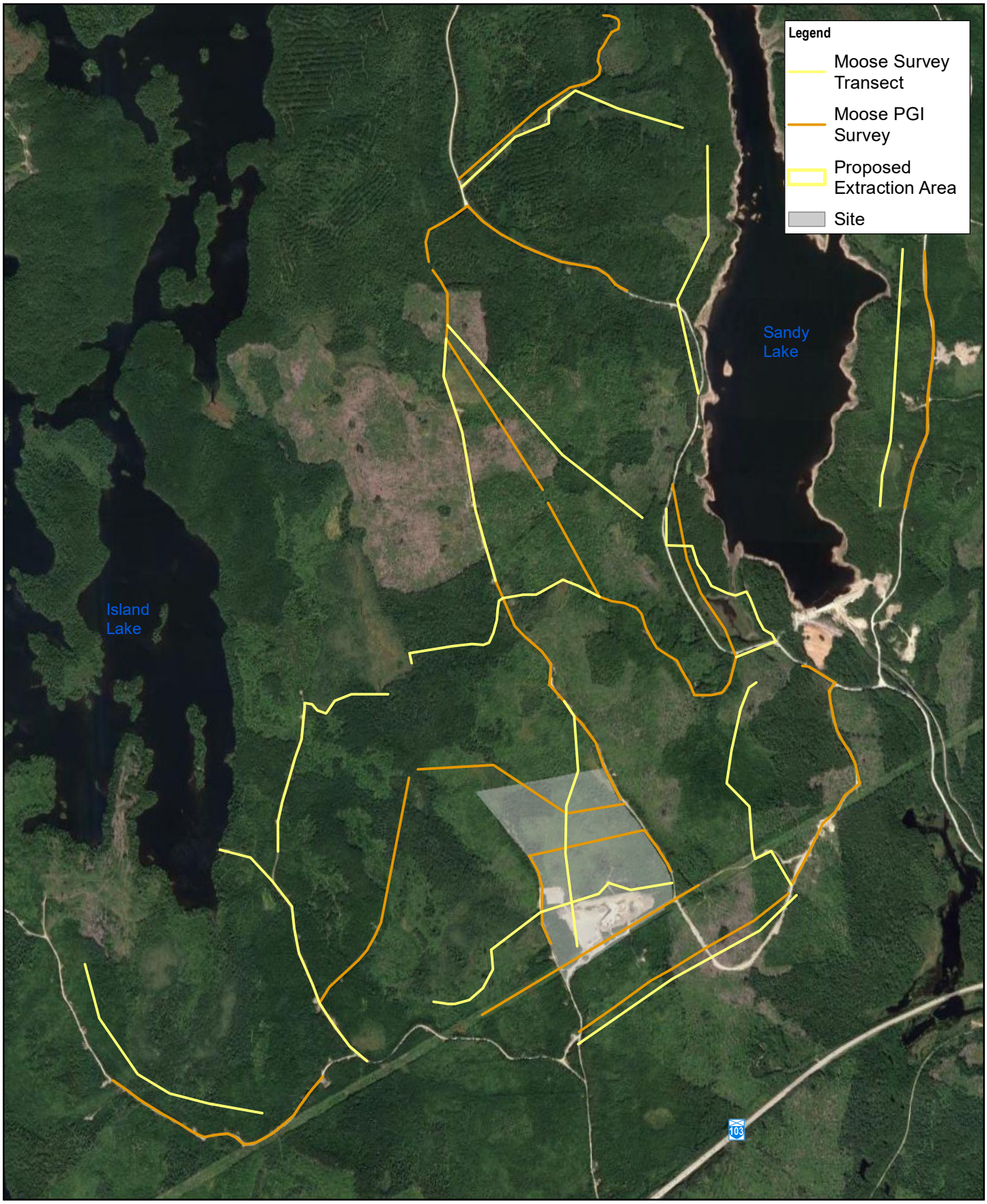
Spring peepers (*Pseudacris crucifer*; ACCDC: S5) were incidentally heard calling outside of the Site during nocturnal owl surveys and one green frog *(Lithobates clamitans*; ACCDC S5) was identified in the mapped waterbody in the Site. No priority herpetofauna species were observed during field surveys.

6.10.2 Potential Effects, Proposed Mitigation, Monitoring and Follow-Up

Potential Effects

Project-related effects on fauna and habitat are limited due to the disturbed nature of the Site, resulting from previously approved industrial land uses, existing quarry operations, and historical forestry activities. Loss of habitat will occur in the extraction area but will have minimal impact due to the availability of similar replacement habitat in the surrounding area.

Habitat and wildlife species observed within and adjacent to the Site are consistent with conditions present in the adjacent regional landscape. Vehicle and heavy equipment traffic during operations may result in collisions with terrestrial wildlife. Traffic associated with the proposed Project will be consistent with the existing operations. If collisions occur, they are presumed to be infrequent and would not have a significant impact on terrestrial wildlife populations.



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Map Projection: Transverse Mercator
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Grid: NAD 1983 CSRS UTM Zone 20N

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SCOTIAN MATERIALS LIMITED
HEAD OF ST MARGARETS BAY, NOVA SCOTIA
TOTE ROAD QUARRY EXPANSION PROJECT

WILDLIFE
MOOSE STUDIES

Project No. **11216599**
Revision No. **-**
Date **04/02/2022**

FIGURE 10

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Data source: GeoNova, Scotian Materials, GHD . Created by: jjparks

The Site is not unique within the landscape, and therefore no unique habitats required to support species life cycle were identified during the baseline studies. As such, the proposed Project is anticipated to impact localized habitat at a minor level with the appropriate mitigation applied, and negligible impacts may potentially occur in the regional context.

Proposed Mitigation

Proposed mitigation measures for all project phases include:

- Minimize the Project footprint to the absolute necessary delineation.
- Clearing of vegetation and overburden will be restricted to areas absolutely necessary to carry out the Project.
- Implement erosion and sediment control measures, and dust prevention / abatement measures.
- Good housekeeping practices (no food waste or garbage left exposed to attract animals).
- When not in use, machinery and light vehicles shall not be left idle so as to reduce emissions and noise.
- Lighting, when required, should be shielded to shine down and only to where it is needed without compromising the safety of employees.
- Standard mitigation measures for noise (including blasting).
- Reclamation of disturbed areas through progressive reclamation.

Monitoring and Follow-up

Regular Site monitoring will be required to ensure nothing is left to attract terrestrial fauna. The final reclamation phase of the Project will return the area to a condition that is consistent with the natural surroundings and reasonably restored to pre-existing conditions, thus restoring habitat temporarily disturbed by the Project. The reclamation plan will include any additional wildlife surveying, monitoring, or follow-up, as required.

6.11 Birds

In NS, legislation protecting birds includes the *Migratory Birds Convention Act* (MBCA) and the *Nova Scotia Wildlife Act*. The MBCA protects migratory birds and their nests. Most bird species present in NS are listed under the MBCA; however, it does not include avian predators such as raptors and introduced species such as European starlings (*Sturnus vulgaris*). The *Nova Scotia Wildlife Act* specifically protects raptors including eagles, ospreys, falcons, hawks, and owls.

A review of the Canada Important Bird Areas (IBA) database, ACCDC, Maritime Breeding Bird Atlas (MBBA) Square (20MQ25), and Canada Wildlife Service Migratory Bird Sanctuary (MBS) was reviewed to support bird survey design and methodology. ACCDC further categorizes bird species using breeding bird status qualifiers that determine whether a species is a Priority Species, based on the time of year in which the species was observed.

Baseline point count surveys (Figure 11) for birds took place within and surrounding the Site in a variety of habitats including closed canopy forests, mature hardwoods, wetlands and open areas. The following field surveys were completed by MEL:

- Spring migration (May 1, 14 and 26, 2021)
- Breeding bird (June 14 and 24, 2021)
- Fall migration (September 12, 27, and October 12, 2020)
- Common nighthawk (June 24 and July 7, 2021)

- Nocturnal owl (April 15, 28, and May 4, 2021)
- Winter birds (January 27 and February 12, 2021)

Appendix D (Section 2.5 and Section 3.2) provides details on the bird survey methodologies, location summaries, and species lists.

6.11.1 Existing Environment

There are no IBA within 5 km of the Site. The nearest IBA is the Grassy Island Complex (NS026) approximately 10.1 km south of the Site (Bird Studies Canada, 2012).

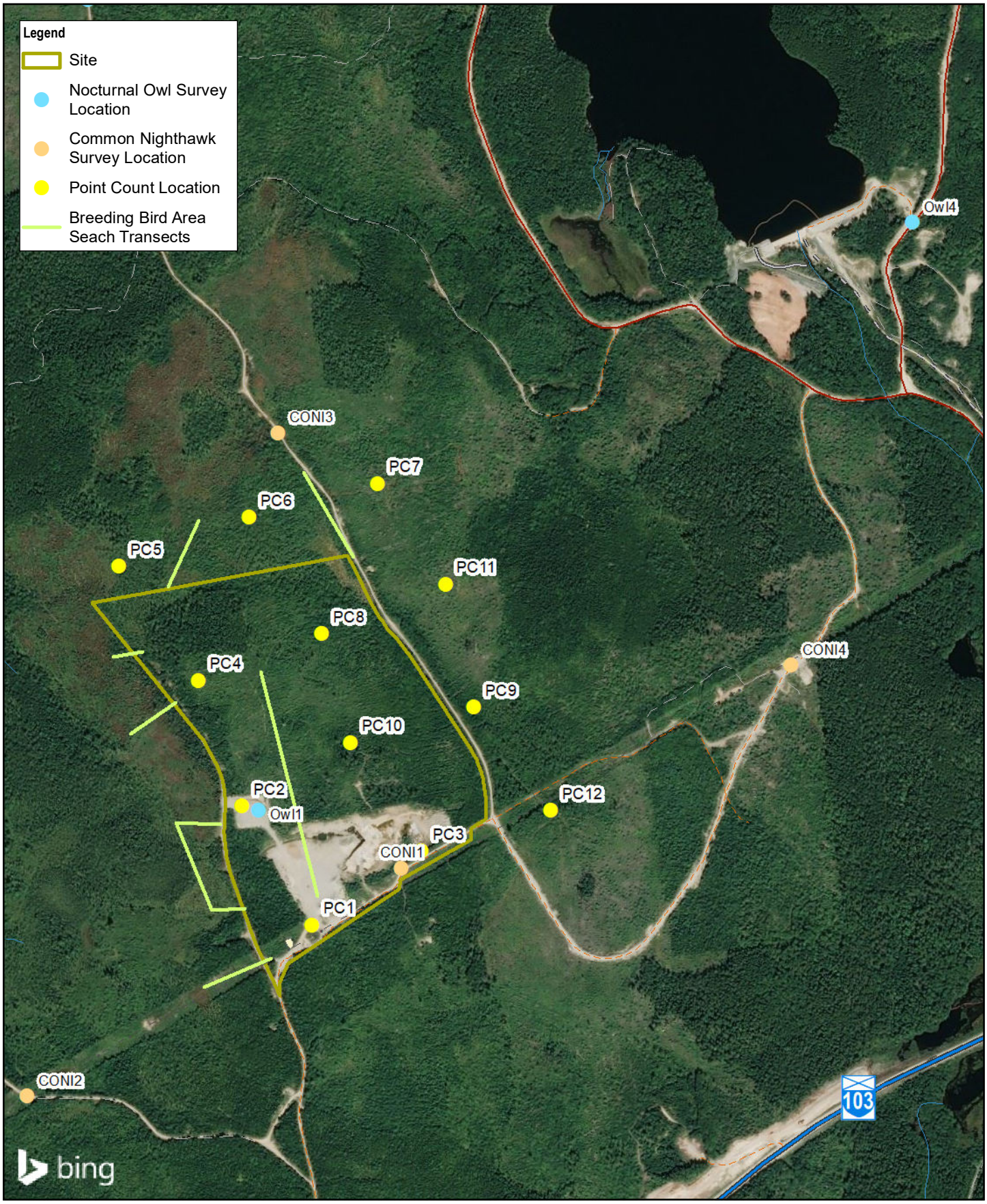
The Grassy Island Complex IBA includes three islands, Grassy Island (33 km from the Site) and Westhaver Island (43 km from the Site) in Mahone bay and Wedge Island (10 km from the Site), on the east side of St. Margarets Bay (IBA Canada, n.d.). All three islands are <10 ha in size and Wedge Island is the only one that is treed. The habitats provided within the Grassy Island Complex IBA are not consistent with habitat present within the Site.

The closest Canada Wildlife Service MBS is the Kentville MBS, located approximately 60 km northwest of the Site, which contains habitat consisting of flood plains and marshes. The habitats provided within this MBS are not consistent with habitat present within the Site.

The avian field surveys resulted in the observation of 1,041 individuals, representing 62 species. An additional 54 individuals representing 21 species were identified during winter surveys. A total of 14 priority species (Figure 9) were observed during avian field surveys. Priority avian species identified are as follows:

- Bay-breasted warbler (*Dendroica castanea*)
- Blackpoll warbler (*Setophaga striata*)
- Boreal chickadee (*Poecile hudsonica*)
- Cape May warbler (*Setophaga tigrina*)
- Canada Jay (*Perisoreus canadensis*)
- Olive-sided flycatcher (*Contopus cooperi*)
- Pine siskin (*Spinus pinus*)
- Red-breasted nuthatch (*Sitta canadensis*)
- Red crossbill (*Loxia curvirostra*)
- Ruby-crowned kinglet (*Regulus calendula*)
- Swainson’s thrush (*Catharus ustulatus*)
- Turkey vulture (*Cathartes aura*)
- Wood thrush (*Hylocichla mustelina*)
- Yellow-bellied flycatcher (*Empidonax flaviventris*)

There are no significant water bodies within the Site that would attract large flocks of migrating birds, with the nearest waterbodies Little Indian Lake and Island Lake approximately 1.0 km southeast and northeast of the Site, respectively. The Project footprint is also not located along a ridge, valley, or coastline, and therefore not a significant migratory bird pathway.



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Map Projection: Transverse Mercator
Horizontal Datum: North American 1983 CSRS
Grid: NAD 1983 CSRS UTM Zone 20N

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SCOTIAN MATERIALS LIMITED
HEAD OF ST MARGARETS BAY, NOVA SCOTIA
TOTE ROAD QUARRY EXPANSION PROJECT

AVIAN SURVEY LOCATIONS

Project No. **11216599**
Revision No. **-**
Date **04/02/2022**

FIGURE 11

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All avian species identified during field surveys are native species to NS and were observed within common habitat associated with the Site and surrounding area. With the exception of the common grackle (*Quiscalus quiscula*) flocks observed, there was no obvious concentrations of one particular bird group and no identifiable migratory pathway. Habitat fragmentation currently on the landscape may have decreased habitat quality for avian species that rely on interior forest conditions. Further, the habitats within the Site were not found to significantly concentrate foraging activities.

6.11.2 Potential Effects, Proposed Mitigation, Monitoring and Follow-Up

Potential Effects

Potential effects to birds include direct habitat loss or nest disturbance through clearance and maintenance as well as indirect disturbance to their habitat such as noise, changes to the local environment or habitat fragmentation. The attraction of ground nesting birds may occur through unsuitable waste management and unattended or unvegetated stockpiles of material left during the breeding season.

Most bird species construct nests in trees and shrubs, but several species nest at ground level (e.g., common nighthawk). Some bird species may nest on cliffs or in stockpiles of overburden material in the banks of quarries. Some migratory birds (including certain waterfowl species) may nest in settling ponds if they are large enough and remain undisturbed for a period of time.

Given the mobile nature of the avifauna, and the non-unique nature of the landscape proposed for impact, it is believed that any displaced SAR or SOCI species will be able to utilize equivalent habitat if displacement occurs. Negligible effects on birds from Project activities are anticipated with standard mitigation applied.

Mitigation

Measures that will be utilized to mitigate potential impacts to birds include:

- Clearing activities will occur outside of the nesting season (April 1 to August 15) or as determined by regulators.
- If clearing is required during the nesting time frame, NSECC will be consulted for appropriate protocol, which likely would involve pre-construction nest surveys and the requirement to leave barriers around nests, if identified.
- Stockpiles will be examined during the nesting season to ensure that ground-nesting birds are not present, and disturbance avoided until after the nesting season.
- No one shall disturb, move or destroy migratory bird nests. If a nest or young birds are encountered, work shall cease in the immediate area of the nest and NSDL&F contacted.

Monitoring and Follow-up

If priority birds are located within the Project footprint and would potentially be impacted during the site preparation, operation, or reclamation phases of the Project, a management plan will be created in discussion with NSDL&F and if necessary, such species would be avoided.

6.12 Priority Species

Priority species were assessed as a VC through the EARD process as they require additional consideration from a conservation and management perspective. The protection of identified priority species have the potential to influence Project layout and operational activities. The list of priority species

was developed by first identifying broad geographic general habitat areas, and then identifying specific habitat requirements for each species and isolating those found at the Site.

A desktop priority species list was created in accordance with the *Guide to Addressing Wildlife Species and Habitat in an EA Registration Document* (NSE, 2009) to inform biophysical field programs by identifying species that have the potential to be present at the Site. The desktop priority list was based on general species habitat requirements and the broad geographic area in which individual species are known to occur.

Databases provided by MTRI were assessed to identify the potential for priority lichen species including vole ears and BFL. The provincial records of AMOs were also reviewed as AMOs that are uncapped and unflooded may provide bat hibernacula. Further, the NSDL&F significant species and habitats database was reviewed.

A priority species list outlining those SAR with the highest potential of occurring at the Site over all seasons, based on habitat and geographic preference, and presence of preferred habitat on the property, was compiled. Observational databases including the MBBA, and the ACCDC report were used as supplementary resources throughout the compilation of the list. Based on the priority species list, targeted priority species surveys, including mainland moose winter tracking and pellet group inventory, were completed by MEL on January 27 and May 11, 2021. Further, incidental priority species were also noted during all field surveys.

Appendix D (Section 2.9 and 3.4) provides further information, assessment lists, and species locations related to priority species surveys conducted on Site.

6.12.1 Existing Environment

The ACCDC report completed as part of the desktop review identified the following records of SAR, SOCI, and special areas within 5 km of the Site; eight records of seven vascular flora, two records of nonvascular flora, 148 records of 36 vertebrates, three records of two invertebrates, and one location sensitive occurrence of a bat hibernaculum.

Of the ACCDC records, nine SAR were identified within 5 km of the Site; blue felt lichen, chimney swift (*Chaetura pelagica*), bank swallow (*Riparia riparia*), barn swallow *(Hirundo rustica),* Canada warbler *(Cardellina canadensis),* rusty blackbird *(Euphagus carolinus*), common nighthawk *(Chordeiles minor)*, olive-sided flycatcher *(Contopus cooperi)*, and Eastern wood-pewee *(Contopus virens).*

Priority species were observed during targeted field surveys (Figure 9) and incidentally during other field surveys. In total, no vascular plant priority species, two lichen priority species and 14 avian priority species were observed. These include the following:

- Frosted glass-whiskers lichen (SARA & COSEWIC Special Concern; ACCDC S1?)
- Fringe lichen (ACCDC S3S4)
- Cape may warbler (S2B)
- Canada jay (S3)
- Pine siskin (S2S3)
- Swainson’s thrush (S3S4B)
- Olive-sided flycatcher (S2B)
- Red crossbill (S3S4)
- Bay-breasted warbler (S3S4B)
- Blackpoll warbler (S3S4B)

- Yellow-bellied flycatcher (S3S4B)
- Boreal chickadee (S3)
- Ruby-crowned kinglet (S3S4B)
- Red-breasted nuthatch (S3)
- Turkey vulture (S2S3B)
- Wood thrush (SUB)

6.12.1.1 Flora

During field surveys, one SOCI vascular plant species was observed, the Nova Scotia agalinis (S3S4). No priority vascular plant species were observed within the Project footprint. Typical habitats for the Nova Scotia agalinis are edge habitats of woods roads, as well as acidic soils in damp locations (Munro et al., 2014). One observations of Nova Scotia agalinis occurred on the edge of a road along the eastern property boundary, but outside of the Project footprint

6.12.1.2 Lichens

A total of 22 lichen species were observed within on the Site. Two were determined to be priority species, the frosted glass whiskers (Atlantic population; SARA & COSEWIC Special Concern; S1?) and fringe lichen (S3S4). The frosted glass whiskers is located outside of the Project footprint, however, the fringe lichen is located within the expansion area. One additional priority lichen species, blue felt lichen (SARA & COSEWIC Special Concern; NSESA Vulnerable; ACCDC S3), was identified 8 m north of the Site. No predicted BFL polygons are present on Site, however, one exists in the Aquatic Study Area.

6.12.1.3 Mammals

Mainland Moose

The Site is within a mainland moose concentration area and core habitat, but there are no mainland moose shelter patches on Site. The ACCDC report states that mainland moose have been observed 20.1 km from the Site. No sign of mainland moose was observed during winter transect surveys or during the PGI surveys. Wildlife species, including mainland moose, were assessed through incidental wildlife observations and recorded on Site during all biophysical surveys.

Bats

The ACCDC report identifies a bat hibernaculum as being located within 5 km of the Site (location sensitive) and notes that bat species were identified within 4.4 km of the Site. NSDL&F confirmed that individual occurrences and monitoring occurrences of SAR bats were made under 5 km from the Site, but no known hibernacula are located within 5 km of the Site. No bats or potential hibernacula were identified during field surveys.

The NSDNR records indicated that there are no AMOs located within the Site, the closest is located 4.8 km southeast, therefore there is no potential for bats to be using uncapped and unflooded AMOs as hibernacula.

6.12.1.4 Avifauna

The ACCDC report identified eight avian species within 5 km of the Site. During field surveys, a total of 14 priority avifauna species were observed. Of the 14 priority avian species documented in the Site and surrounding area two were SAR [wood thrush (SARA Threatened; ACCDC SUB); and, olive-sided flycatcher (SARA Special Concern, NSESA Threatened; ACCDC S2B)] and 12 SOCI were observed.

All species observed during field surveys are native species in this region; they are typical species commonly found within the Site habitat and its surroundings. Except for a flock of common grackle observed, no obvious concentrations of one particular bird group were identified, nor was an identifiable migratory pathway noted. Given the mobile nature of the avifauna, and the non-unique nature of the landscape proposed for impact, it is believed that any displaced SAR or SOCI species will be able to utilize equivalent habitat if displacement occurs.

6.12.2 Potential Effects, Proposed Mitigation, Monitoring and Follow-Up

Potential Effects

Localized impacts to one priority lichen species; fringe lichen (ACCDC S3S4) located within the Project footprint due to land clearing and excavation. Effects are considered minor as a small, specific group of individuals within an ecosystem would be affected and mitigation measures.

Potential effects to migratory birds include direct habitat loss or nest disturbance through clearance and maintenance as well as indirect disturbance to their habitat such as noise, changes to the local environment, or habitat fragmentation. The attraction of ground nesting birds could occur through unsuitable waste management and unattended or unvegetated stockpiles of material left during the breeding season. Negligible effects, to a specific group of individuals within an eco-region for relatively short and intermittent intervals, are anticipated with standard mitigation applied.

With regards to mainland moose, no moose signs have been documented within the proposed expanded quarry development area or within the existing active quarry footprint. Given the lack of mainland moose shelter patches on Site and lack of indication of moose in the area, potential effects are considered negligible.

Proposed Mitigation

Where disturbance of lichens is not avoidable with respect to extraction areas, consultation with NSDL&F and NSECC will take place regarding potential mitigation options such as management plans or transplantation and monitoring activities and studies.

Detailed mitigation measures applied to ensure negligible impacts to priority avian species, such as work scheduled outside of nesting season, and to wildlife such as minimizing the Project footprint and impacted area to the absolute necessary delineation.

Monitoring and Follow-up

Scotian recognizes the value of priority species and will take steps as required to mitigate those species found on-site through consultation with ecologists and NSDL&F. Ongoing issues of importance to local flora and faunal species will likely be brought forward by the community, academia, and regulators. Scotian commits to an open and consultative approach to seeking resolutions on all issues raised.

6.13 Socio-Economic Environment

The socio-economic environment is being assessed as a VC because it relates to the potential effects of the project on human health and local economy.

6.13.1 Existing Conditions

Demographics

The Project is located approximately 2.3 km west of the community of Westwood Hills, Upper Tantallon, and 2.5 km northwest of the village of Head of St. Margarets Bay, NS.

The Study Area is in the Halifax Regional Municipality in western Halifax County, which is comprised of approximately 200 communities including the urban core (Halifax-Dartmouth-Bedford-Sackville) surrounding suburban communities, such as Upper Tantallon, and rural communities such as Hubbards or Middle Musquodoboit

The communities located within 10 km of the Site are suburban/rural and include Black Point, Ingramport, Boutiliers Point, Head of St. Margarets Bay, Tantallon, Glen haven, French Village, Lewis lake, Still water Lake, Upper Tantallon and Hammonds Plains. The nearest First Nations communities are Gold River IR 21 (AFN), located approximately 38 km to the southwest in Lunenburg County, and Wallace Hills IR 14A (Sipekne'katik), located 10 km northeast of the Site in Hammonds Plains. Upper Tantallon is the local suburban centre 3 km east and southeast of the Site.

Statistics Canada completed a Census in 2020; however, the breakdown of data for the smaller Census Tracts (CT) is not yet available for this data (Statistics Canada, 2020). The total population base of this Halifax Census Metropolitan Area (CMA) was 448,518 in the 2020 Census, or 45.8% of the province. The population of Halifax shows the fastest growth of 2% when compared to other municipalities between 2019 and 2020 and the Nova Scotia population has increased by 1% (Nova Scotia, 2020).

The 2016 population and employment data is provided in Table 13 below for three CTs adjacent the Site that includes the communities in western HRM from Upper Tantallon/Hubbards (CT 0143.01), Hubley/Tantallon/Seabright (CT 0143.02), and Stillwater Lake/Hammonds Plains (CT 0132.10).

Table 13 2016 Population Statistics

	CT 0143.01	CT 0143.02	CT 0132.10	Total
Population	5442	6568	5481	17491
Population Change (2011)	9.4 %	7.2 %	3.3 %	6.7 %
Total Dwellings	2397	2747	1877	7021
Area (km^2)	279.91	110.14	67.55	457.60
Population Density	19.44	59.63	81.14	38.22

The Project is located in CT 0143.01, the largest area, which consists of a mainly forested lands and coastal communities. All three CT areas have seen continued development over the last 30 years and subdivisions still have many lots to develop, thus increasing the local population. As density increase then services such as municipal sewer and water may follow.

The Halifax CMA has a median age of 41.8, (Nova Scotia – 45.5). In 2016, 20.5 % of the population were under the age of 20, and 15.7% of the population was 65 years or older. The male (48.4%) and female (51.6%) population is nearly equal. The area is predominantly English speaking (first language) (96.7%).

The cultural origins of the area are mainly European (69%); North American Aboriginals (6.7%%) identify as either First Nations (4.7%) or Métis (2%); and approximately 24.3% are of other ethnic origins (Statistics Canada, 2019). The population of the Halifax CMA is mobile noting 15% having moved within the previous year as compared to 26.4% having moved in the area 5 years previously.

Of the population between 25 and 64 years of age, at least 22.0% have attained a high school diploma only and 70% have received a post-secondary education (apprenticeship or trade certificate – 12%, college diploma/university certificate – 38%, university degree (bachelor's or higher) – 50%).

The average full time employment income in 2015 of people 15 years or older $46,429. The average family income is $86,753 (after tax average - $70,099).

Unemployment rate averaged 7.3% on a participation of 67% of the population. compared to 10 % unemployment with 61.3 % participation for Nova Scotia (Statistics Canada, 2021).

The Project will continue to provide employment and indirect employment will continue in related industries such as heavy equipment supply and maintenance. Hauling activity varies according to market demand. The quarried material is typically used for local construction projects, such as road building and municipal, transportation, infrastructure, and commercial developments. Financial spin-off activities may occur, which can be seen as a benefit to the economic development of the area.

Land Use

Land use within 2 km of the Project consists of lakes, forested lands and previously logged areas on Crown land. Nova Scotia Power maintains several dams and power generating facilities within 2 km of the Site. Cottages are located on the island in Island Lake to the northwest of the Site.

The Site is located within the St Margarets Bay Plan Area - Halifax Planning Strategy. Generalized future land use is Resource and the zoning designation is Mixed Resource 2 (MR-2) for the Site. The resource designation has been applied to the interior or backlands of the plan area and are mostly undeveloped and forested. The Site is in an area that was predominantly owned by Bowater Mersey paper Company Limited and now belongs to the Crown. The area has seen commercial logging from the 1930s to the early 21st century. Aggregate deposits contribute to the overall resources base of the area. The Municipal Planning Strategy (MPS) states that "aggregates play an important role in the supply of building materials for the metropolitan area and given the geology of the area, extractive activity will continue and increase in the future" (Halifax 2019). The Nova Scotia Planning does not give municipalities much control over pits and quarry operations other than to regulate the construction of structures. The MR-2 Zone permits resource uses and resource industries such as extraction facilities and bulk storage.

Viewscape

Visual impacts refer to a change in the character and scenic value of the landscape and the effects of those changes on people. The direct visual impacts of any development will affect the landscape through intrusion or obstruction in some manner, the reactions of viewers, and the overall impact on visual amenity (Zhang et al., 2000). The visual environment was identified as a VC because the Project will result in changes to the landscape that may affect scenery as viewed by others. The landscape is the visual presentation of an area of land. Scenery refers to the aesthetic qualities of the landscape. Visual impacts refer to a change in the character and scenic value of the landscape and the effects of those changes on people. The direct visual impacts of any development will affect the landscape through intrusion or obstruction in some manner, the reactions of viewers, and the overall impact on visual amenity (Zhang et al., 2000).

The viewshed analysis (Appendix G) assumes two scenarios: 1) trees removed from the quarry development area; and 2) full Project development. The analysis is based on forest heights from the currently available data, but conditions could change over time as some forested areas are harvested and other forests areas regenerate. Also, stand heights may increase over time, thereby limiting visual impact. Viewsheds may eventually only consist of tree canopy, and any changes (e.g. growth, logging, and other development) may alter the predicted effect.

Given the current conditions used in the analysis and the fully developed quarry, it is expected that the Project will not visually impact the area. Given the distance from the Site to each of the Observer locations analyzed, the Project may be in the viewshed but may not be discernible on the horizon from other features. The Westwood Hills subdivision does not have a lot of open vistas that can be seen from the existing quarry. It is assumed that where the Site can be seen from residences, the viewshed that includes the Project is limited in size and accessibility.

Extractive Industries

A review of the NSDNR AMO Database, NS Mineral Occurrences Database, and the Mineral Resource Land Use Atlas indicate that there are no former mine shafts or other mineral resource operations within 5 km of the Study Area. Mineral occurrences in the area have been noted for arsenic (near Sandy Lake) and copper (along Highway 103). The Sandy Lake Arsenic Occurrence (D12-020), located approximately 600 m form the northeast corner of the Site, is a showing of arsenopyrite and pyrite. The Tantallon Copper Occurrence (D12-014) is a copper and iron showing (azurite, bornite, chalcopyrite, pyrite) located in a highway cut approximately 1 km south of the Site.

Currently there are no Mineral Claims in proximity of the Site. An Exploration Claim (EL:54260) is located at 2 km southwest of the Site in Boutiliers Point. The nearest quarries to Tote Road Quarry are Kynock's in Hammonds Plains (11 km) and Nova Scotia Sand and Gravel in Windsor Road (29 km).

Agriculture

Agricultural operations have not been identified in the region surrounding the Site.

Forestry

The regional area, especially to the north and west is forested with some seasonal cottages located around lakes There is evidence of recent and historic forest harvesting. The area was formerly owned by Bowater Mersey Paper Co Ltd. These forested lands are now provincial Crown land that has developed forest management plans for the area.

Transportation

The Project is located near Highway 103. The Site can be accessed via an access road to both Highway 103 and 3A the Ingramport interchange (Exit 5A Truck volume for the Project is expected to remain the same as for the existing quarry). A Transportation Assessment was not completed as part of this registration document, as the Project is not expected to have a significant impact on pre-existing traffic volumes in the area.

Recreation and Tourism

The Site is in western Halifax County, which provides access to the Atlantic Ocean at St. Margarets Bay. The Bay was once home to small subsistence communities and cottages but with rapid development occurring in this region has expanded with many subdivisions and residential coastal developments. While commercial fishing (mainly lobster) still does occur in the outer Bay, recreational fishing and boating are the main activities on the inner Bay. Many sandy beaches are located along the shores of the Bay and are used extensively in the summer months.

Rails-to-Trails is a mulit-use recreational trail system that extends throughout the province. A 33 km segment from Hubley to Hubbards, the St. Margarets Bay Area Rails-to-Trails, is located about 1 km south of the Site. The trail has multiple points of entry and provides interpretive panels along the trail that explore the area's history, ecology, attractions, and points of interest. The trail is used for walking, running, hiking, bicycling, horseback riding. Cross country skiing, snowshoeing and ATVs, and is wheelchair accessible. The Crown lands located north of Highway 103 also provide recreational access, to hiking, camping, horseback riding, and ATV/off road activities in all seasons.

The Safety Minded ATV Association operates out of Head of St. Margarets Bay and is a member of the ATV Association of Nova Scotia.

Recreational fishing and hunting are permitted in the area surrounding the Site. The Site falls under Recreational Fishing Area 3 (Halifax and Lunenburg County) as per the *Recreational Fishing Regulations*, Schedule "A" under Section 81 of the *Fisheries and Coastal Resources Act, S.N.S. 1996, c.25.* Nova Scotia's recreational fish stocking program was reviewed and only Lewis Lake 7 km SW of the Site has been stocked in the past with speckled trout. Deer hunting season extends from the last Friday in October to the first Saturday in December inclusive. Deer hunting on Sundays is prohibited, except for the first two Sundays in the season (last Sunday in October and first Sunday in November).

Several protected areas are located within 20 km of the Project Site, including Old Annapolis Road Nature Reserve (4.5 km), Jerry Lawrence Provincial Park (5 km), Five Bridges Lake Wilderness Area (5.5 km), Cleveland Beach Provincial Parks (9 km), Queensland Beach Provincial Park (12 km), Panuke Lake Nature Reserve (16 km), and Sackville River Wilderness Area (16 km), The Ingramport Wilderness Area is in review and pending regulatory approval. The final boundaries for this are not yet finalized; however, the Site is within 1 km of the proposed Wilderness Area.

Human Health and Public Safety

The NS Health Authority provides a variety of medical, elder care, and out-patient services through the QEII Hospital network which is serviced by the Halifax Infirmary.

This part of HRM is protected by the Royal Canadian Mounted Police (RCMP), based in Upper Tantallon. The total crime severity index, including violent and property crime, ranged is 2131 per 100,000 people and is lower when compared to Halifax (3823 per) and Nova Scotia (4220 per). The bulk of the crimes (71%) are non-violent.

Halifax Regional Fire and Emergency Service has fire stations located in Upper Tantallon, Black Point and Hammond's Plains that are near the Site. Other stations in HRM can be called out depending on the complexity and severity of an incident.

Impacts to human health as a result of Project activities include potential effects to air quality, specifically fugitive dust on country foods, and from accidents and malfunctions.

6.13.2 Potential Effects, Proposed Mitigation, Monitoring and Follow-Up

The effects of the Project to the local socio-economic conditions may be observable in several key areas. No significant adverse effects are anticipated from the Project on land use.

Local Employment and Economic Activity

The socio-economic impacts of the Project to the local economy will be limited because of the sporadic nature of the operations. Given the existing quarry and relative life of expanded operations, and the conceptual reclamation plan, it is unlikely the Project will impact current land values. The Project is designed to meet the needs of the proponent in servicing the local market. Scotian uses local trucking contractors in its operation. Since the operational requirement of the Project will not be changing, it is not anticipated that there will additional opportunities for local employment.

Recreation and Tourism

Recreational use of the Site is restricted where it is private property and due to the existing quarry. Recreational use on adjacent lands includes fishing and/or hunting, hiking, horseback riding, biking and ATV use. No tourist sites are in close proximity to the Study Area, and the Project is not expected to impact

tourism in the area. The future final land use of the site will be determined in conjunction with the needs of the local community and other stakeholders. Project related actives will be consistent with the existing quarry and no impacts to recreation and tourism are anticipated.

Visual Impacts

Effects to visual quality of the local area that result from the Project, and the operation, de-commissioning and reclamation include changes to the short-term and long-term viewscapes in the local area. Stockpiles may result in a potential change in the visual environment; however, a barrier of trees within the prescribed setbacks will shield the site from view. Based on the viewshed analysis completed for the Project, there will be negligible impact to the surrounding areas.

Land Use

Quarry operations often involve changing the land use of an area. In some cases, a quarry will require lands that may have been used for recreation, agriculture or other purposes. In the case of this Project, a pre-existing quarry is being expanded from an approved 4 ha quarry to a 24 ha quarry on lands owned by the Proponent. After closure of the quarry, final reclamation is intended to return the site to a condition that reflects the surrounding landscape. Disturbed areas will be regraded and revegetated or put to other uses as warranted by future plans for the Site.

Transportation

The average number of trucks transporting aggregate associated with the Project will vary depending on market demand. It is not anticipated that the number of trucks transporting aggregate will increase from existing operations. The Project is not anticipated to result in significant impact to pre-existing levels of traffic. Scotian will maintain a clear line of communication through their Project Manager for any complaints to be recorded and evaluated in accordance with legislation and permit requirements.

6.14 Archaeological and Cultural Resources

Physical and cultural heritage is provincially regulated under the Special Places Act. Given the proximity of the Site to known archaeological resources near Sandy Lake (1 km northeast), the region is identified as a moderate to high potential for cultural resources and thus the Site is being screened for archaeological potential. Based on this, archaeological and cultural resources was selected as a VC.

Archaeological screenings and reconnaissance of the Site was conducted by CRM Group Ltd., in accordance with the terms of Heritage Research Permit Number A2021NS054, to research, locate and identify archaeological resources within the proposed impact area, and to offer resource management recommendations. Background research was conducted in the spring of 2021 to identify the archaeological potential based on environmental setting, site history, and indigenous land use. Reconnaissance fieldwork, consisting of a visual inspection, was undertaken on May 17, 2021. The Archaeological Screening and Reconnaissance Report (Appendix H) summarizes the findings and recommendations for the Project.

6.14.1 Existing Conditions

CRM archaeologists conducted background research to review the environmental conditions and cultural history of the Study Area, with the primary purpose of identifying zones of archaeological potential. In addition, a visual inspection of the site was used to evaluate the archaeological potential of the proposed expansion area and to investigate any topographical or cultural features identified during the background study.

The Site falls within the St. Margarets Bay Ecodistrct, which is predominately characterized by red spruce forests on the slopes of hills, hemlock near watercourses, white pine in areas with drier soils and black

spruce in areas with poorly drained soils (Neily et al., 2017; NSDL&F, 2019). The Site investigated for the proposed Project was primarily comprised of regenerative softwood stands, wetlands, and disturbed areas. Disturbed portions of the Site include the existing quarry footprint, gravel roads, and historic timber harvesting.

The Site is regarded as having elevations ranging from approximately 120 – 148 masl. The ecodistrct is located at the base of a larger upland regions, and tilts southerly towards the oceanic coastlines of St. Margarets Bay and Mahone Bay. The most recent LiDAR data of the Site shows the undulating, and generally sloped, nature of the Area. The southwest section of the ecodistrict, including the Site, is underlain by Meguma Group rock (mainly greywacke/quartzite and slate) (Neily et al., 2017).

The Site is located approximately 1 km east of Island Lake, and approximately 1 km southwest of Sandy Lake – part of the Indian River drainage area which consists of several long north-south oriented lakes extending along a fault line.

Based on the environmental setting (rocky, wet and slope nature of the terrain), the distance from any navigable source of water, and the lack of any evidence of historic developed, the Site is considered to exhibit low potential for encountering archaeological resources. Further, the previous development and ground disturbance (resulting from forestry and quarrying activities) supports the ascription of low potential for encountering archaeological resources.

6.14.2 Potential Effects, Proposed Mitigation, Monitoring and Follow-Up

Potential Effects

The Project is not likely to encounter archaeological and historical features in the area.

Proposed Mitigation

Based on the results noted above, the Site has been cleared of any requirements for further archaeological investigation. In the event that the layout of the Project change beyond the area assessed, an Archaeological Resource Impact Assessment will be completed on those areas.

In the unlikely event that archaeological deposits or human remains are encountered during activities associated with Project activities, all work in the associated areas will be halted and immediate contact will be made with the Special Places Program.

Monitoring and Follow-up

Personnel involved in all ground disturbances related to site preparation and quarry activities will be made aware of the unlikely potential for archaeological and/or cultural resources to be encountered during operations, as required. The appropriate actions to be taken in identifying and reporting such features will be discussed with site personnel.

No additional work or mitigation relative to archaeological and historical features is required to allow the Project, as described, to proceed.

6.15 Mi’kmaq

Assessment of the potential for the Project to interact with an affect Indigenous Peoples is included in consideration of its socioeconomic, socio-cultural, and/or traditional importance; in recognition of potential or established Aboriginal and treaty rights; and due to the nature of potential Project-VC interactions.

Baseline information for Indigenous Peoples was gathered through the ongoing engagement with the Mi'kmaq of Nova Scotia, completion of a Mi'kmaq Ecological Knowledge Study (MEKS), and publicly available Indigenous Knowledge related to the Mi'kmaq of Nova Scotia.

Mi'kmaq Ecological Knowledge Study

Membertou Geomatics Solutions (MGS) is conducting, in accordance with the Mi'kmaq Ecological Knowledge Study Protocol 2nd edition, a MEKS, of an area defined by a 5 km radius (MEKS Study Area) extending around the Site. The purpose of a MEKS is to identify and document land and resource use, which is recognized as holding great importance to the Mi'kmaq people. Historical review and research of the Site and surrounding area was conducted to identify which, if any, areas are significant to the Mi'kmaq people. The MEKS was initiated in the summer of 2021 and due to the COVID pandemic, engagement and interviews have not been completed. MGS is evaluating options to conduct interviews with Mi'kmaq knowledge holders. Where the study is on-going, a Draft Summary of the MEKS Historic Review report is provided in Appendix I.

6.15.1 Existing Conditions

The Site and the MEKS Study Area are adjacent to the Traditional Mi'kmaq Territory boundary between Eskikewa'kik and Sipekne'katik. The Site is located within the Indian River watershed and the Eskikewa'kik District. The Eskikewa'kik District includes all lands and waters draining into the Atlantic Ocean from the St. Margarets Bay including Big Indian Lake, Chebucto (Halifax), Eastern Shore, Strait of Canso to Cape Blue on St. Georges Bay. The District includes the entire Musquodoboit River watershed, a portion of the Shubenacadie River to and including the Stewiacke River watershed draining into Cobequid Bay.

There is a long history of Mi'kmaq presence within the Study Area and St Margarets Bay with a Pre-Contact timeline potentially going as far back as 3,500-5,000 Years Before Present. The area contains a high point with a table form landscape feature which is a natural attraction as a vantage point and may have had cultural and spiritual attraction to Early Peoples.

The seasonal migration inland led the Mi'kmaq upriver systems to the shores of interior lakes during the winter where small family groups hunted game and fished the rivers and lakes. Some of the larger river systems have since been dammed for power generation and during routine maintenance, the lake levels are lowered revealing early Mi'kmaq seasonal settlements.

Maritime Woodland Period sites have been found on the shores of Sandy Lake, north of Head of St. Margarets Bay and the Indian River System entering St Margarets Bay. A Sandy Lake site was dated at 1,500 to 1,000 years before present and contained artifacts of stone flakes, pottery, tools and food bones while the Indian River sites consisted of evidence of seasonal camp locations. An additional group of archaeological sites are known to be located along the shores of Wrights Lake and on the peninsulas of Head of St. Margarets Bay which date to the Archaic Period. The Site is adjacent to known Pre-Contact archaeology sites including Wrights Lake to the east.

The nearest traditional hunting territories to the Site and last known assignees were Joe Brooks assigned the area south of Mount Uniacke (Territory #25), and Tom Phillips assigned the area of Panuke Lake (Territory #23). Further information on land use and hunting activities will be collected as part of the interview process.

6.15.2 Potential Effects, Proposed Mitigation, Monitoring and Follow-Up

Potential Effects

Findings of the Draft MEKS revealed Mi'kmaq traditional use activities occur adjacent to the Site, and larger MEK Study Area. There is the potential that operations associated with the Project could affect Mi'kmaq traditional use however, engagement and discussions with Mi'kmaq will aid in minimizing, and where possible, eliminating any potential impacts to traditional land and resource use. Traditional use activities of the Mi'kmaq identified within the Study Area will be considered and reflected upon throughout the overall EA process.

Proposed Mitigation

As outlined in Section 5.0, discussions and engagement with Mi'kmaq communities and organizations is ongoing in order to minimize, and where possible, eliminate any potential impacts to traditional land and resource use. These discussions will continue beyond the EA stage, should the EA be granted.

Monitoring and Follow-up

Discussion and engagement with Mi'kmaq organizations is ongoing in order to minimize and, where possible, eliminated any potential impacts to traditional land and resources use. Scotian Materials acknowledges the importance and value of effective engagement and envisions a long and mutually beneficial engagement program for the Project.

6.16 Other Projects in the Area

Scotian is aware of two quarries operating in the region: Kynock's in Hammonds Plains (11 km) and Nova Scotia Sand and Gravel in Windsor Road (29 km). Nova Scotia Power operates a series of dams and hydroelectric generating stations on the Indian River system (1km) and Cape Cod Siding produces finished wood siding products in Hammonds Plains (12 km).

Significant adverse project-related effects in conjunction with other undertakings in the area are not likely to occur since this is an on-going project and assuming the effective application of mitigative measures as outlined in this document.

7. Summary of Effects of the Project on the Environment

Table 14 outlines the criteria used to determine predicted impact significance in relation to VCs and Project interactions. The prediction of environmental effects is developed through professional judgment and the application of proposed mitigation measures. With respect to determining impact significance in relation to temporal boundaries, short-term impacts are defined in recognition of the intermittent nature of the proposed operation (i.e., blasting, ongoing progressive reclamation).

Table 14 Impact Significance Criteria

Type of Environmental Component			
Impact Significance	Physical	Biological	Socio-economic
Significant	Parameter affected within most of Ecozone for several decades	Whole stock or population of Ecozone affected over several generations	Whole population of region affected over several generations
Moderate	Parameter affected within most of Ecozone for one or more decades	Portion of population of eco-region affected over one or more generations	Community affected over one or more generations
Minor	Parameter affected within most of Ecozone for less than one decade	A specific group of individuals within an ecosystem affected during less than one generation	A specific group of individuals within a community affected during less than one generation
Negligible	Parameter affected within some part of eco-region for a short period of time	A specific group of individuals within an eco-region affected for a short time period	A specific group of individuals within a community affected for a short time period

Source: Noble, 2015, Pg. 169

Activities associated with Project will be conducted in accordance with terms and conditions of the EARD, an IA, adherence to the NS Pit and Quarry Guidelines, and specific mitigative measures described in this assessment and all other applicable legislation, policies, and guidelines.

Assuming the mitigative, monitoring, and progressive reclamation measures specified in this report are implemented, and the Project is operated according to provincial guidelines and approvals, no significant adverse residual environmental or socio-economic effects are likely. Effects are expected to be of small magnitude, low frequency, short duration, and/or of limited geographical extent. The Project will result in economic benefits, including continued employment and an economic source of quality aggregates to local demand markets.

A summary of anticipated impacts and associated mitigation measures is provided in Table 15 below.

Table 15 Summary of Potential Impacts and Mitigation Measures

VC	Project Phase	Type of Potential Effect	Mitigation, Monitoring, and Natural Limiting Factors	Significance Including Mitigation and Natural Limitations
Geology	C, O, D/C	Erosion, Acid Rock Drainage	• Erosion potential considered low due to the soils/overburden, low slopes, and poor site drainage • Implementation of Erosion and Sediment Control Plan • ARD not expected based on-site geology • Ongoing acid generating potential monitoring of site aggregate • Progressive reclamation	Negligible
Atmospheric Conditions and Air Quality	C, O, D/R	Dust, particulates, GHG emissions	• During periods of heavy activity and/or dry or windy periods, water spray will be used to reduce dust. • Consideration shall be given to the strategic placement of overburden and aggregate stockpiles to act as wind barriers to crushing activities. • Appropriate truck loading and hauling procedures shall be followed to reduce the generation of dust during trucking activities. • When not in use, machinery and light vehicles shall not be left idle so as to reduce emissions. • All vehicles and machinery shall be maintained in proper working order to reduce emissions. • Monitoring of particulate emissions will be conducted in accordance with the IA, and as required by NSECC in accordance with the NS Pit and Quarry Guidelines and Nova Scotia Air Quality Regulations.	Minor

VC	Project Phase	Type of Potential Effect	Mitigation, Monitoring, and Natural Limiting Factors	Significance Including Mitigation and Natural Limitations
Light	O	Increased intermittent ambient light	• Use of lights will be limited to the amount necessary to ensure safe operation. • Lights on-site infrastructure will be installed downward facing, to reduce attraction to birds. • Wherever possible, motion-sensing lights will be installed to ensure lights are not turned on when they are not necessary. • Lighting, when required, should be shielded to shine down and only to where it is needed without compromising the safety of the employees. • Lighting not in use will be turned off. • Efficient sources of light, such as LED, will be utilized wherever practicable, to reduce overall magnitude of light.	Negligible
Noise	C, O, D/R	Increase in intermittent background noise levels	• Applicable guidelines and regulations will be followed as established by NSECC approvals to operate. • Regular maintenance of vehicles and equipment. • Barrier berms will be established to minimize noise propagation where appropriate. • Scotian will continue to control operations and equipment to ensure noise levels are kept within regulated limits and applicable guidelines as determined by NSECC. • All blasts will be monitored for concussion and ground vibrations. • Blast Notifications will be distributed to community members of upcoming blasts on Site. • Scotian will maintain a clear line of communication through their Project Manager for noise complaints to be recorded and evaluated in accordance with legislation and NSECC specific requirements. • Noise monitoring will be conducted in accordance with the IA and as required by NSECC.	Minor

VC	Project Phase	Type of Potential Effect	Mitigation, Monitoring, and Natural Limiting Factors	Significance Including Mitigation and Natural Limitations
Surface Water Resources	C, O, D/R	Loss of wetland habitat Changes in drainage areas contributing to watercourse/wetlands Erosion and increased sediment loading	• The amount of exposed soil shall be kept to a minimum. • Working areas are stabilized / gravelled. • The Project was developed in consideration of the wetlands to the north. The elevation of the quarry floor will be benched to reduce potential surface water/groundwater interactions. • Drainage ditches and swales will be utilized to the greatest extent practicable to divert surface water, originating up-gradient of the Site, around the quarry perimeter, thereby minimizing contact of water with the quarry floor and working faces. A settling pond will capture surface flow and allow for suspended sediment to settle out of the water column. An outflow is constructed in the settling pond to allow treated water to return to the surrounding environment. Reclamation will proceed incrementally as operations continue. The reclamation phase will include a management plan for water features left on-site to address quality and erosion and sediment control. Additional details on timelines and a formal reclamation plan will be developed as part of the IA process as guided by conditions of an EA approval. • For wetlands that will be disturbed in the expansion of the quarry, a Wetland Compensation Plan will be developed as required once the Project is developed in the catchments of WL2 and WL3. Compensation plans will be filed with NSECC as part of the IA process if the EA approval is granted. • Additional wetland surveying, monitoring, or follow-up will be developed in accordance with all approvals issued in consultation with NSECC. • Surface water monitoring will be conducted according to the Site IA and the NS Pit and Quarry Guidelines.	Minor

VC	Project Phase	Type of Potential Effect	Mitigation, Monitoring, and Natural Limiting Factors	Significance Including Mitigation and Natural Limitations
Fish and Fish Habitat	C, O, D/R	Loss of wetland habitat Changes in drainage areas contributing to watercourse/wetlands Erosion and increased sediment loading	• During operations, erosion and sedimentation control measures will be followed to ensure there is no potential for impact to surface water quality, and therefore no potential for impact to fish and fish habitat. Any further requirement to monitor for potential fish and fish habitat will be conducted according to the Site IA and applicable regulations.	Minor
Groundwater Resources	O, D/R	Lowering of groundwater table Decreasing well yields Contamination via accidental spill	• Any surface water resulting from precipitation or snowmelt events will be controlled by means of quarry floor grading, berms, and ditching and will contribute to groundwater recharge at this elevation. • The Project was developed in consideration of the wetlands to the north. The elevation of the quarry floor will be benched to reduce potential surface water/groundwater interactions • Effects to the groundwater quality as a result of site preparation, operation and reclamation of the expanded quarry will be limited in extent. The key sensitive receptor is the closest residential well located approximately 2.3 km from the planned maximum extent of the expanded Quarry boundary, as such no impacts to groundwater are anticipated. Any release of POL will be dealt with effectively and immediately removing the impacted sediments and disposing of in an approved manner and in accordance with provincial legislation. • Proper fuelling procedures shall be followed, and fuelling shall occur in designated areas, away from potential water receptors. Spill kits shall be maintained on-site while the Site is operational in the event of an accidental spill or release. • Water quantity impacts are not predicted for domestic wells. Scotian will maintain a clear line of communication through their Project Manager for any complaints related to domestic wells, to be recorded and evaluated in accordance with legislation and applicable NSECC specific requirements. If required, a groundwater monitoring program will be further defined in accordance EA approval, the IA and as required by NSECC.	Minor

VC	Project Phase	Type of Potential Effect	Mitigation, Monitoring, and Natural Limiting Factors	Significance Including Mitigation and Natural Limitations
Vegetation and Vascular Plans	C, D/R	Localized habitat disturbance or removal	• A mix of native species of plants will be used for revegetation efforts during the Site reclamation process. Scotian will stockpile available grubbings for use in final cover to create a diverse landscape in line with that represented locally. • The reclamation plan, including any additional vegetation and/or habitat surveying, monitoring, or follow-up, will be developed in accordance with the NS Pit and Quarry Guidelines, the IA process, and with any NSECC granted approvals.	Negligible
Lichens	C, O	Localized habitat disturbance or removal	• A 100 m setback from all operations will be established for the protection of the blue felt lichen identified outside of the Site, in the northern extent of WL1, and frosted glass whiskers, identified in two locations; both of which are east of WL1 (i.e., in upland habitat) and north of the proposed Project. • The reclamation plan will include any additional lichen surveys, monitoring, or follow-up required, developed in consultation with and approved by NSDL&F and NSECC.	Minor
Wildlife	C, O, D/R	Localized habitat disturbance or removal	• Minimize the Project footprint to the absolute necessary delineation • Clearing of vegetation and overburden will be restricted to areas absolutely necessary to carry out the Project • Implement erosion and sediment control measures, and dust prevention / abatement measures • Good housekeeping practices (no food waste or garbage left exposed to attract animals) • When not in use, machinery and light vehicles shall not be left idle so as to reduce emissions and noise • Lighting, when required, should be shielded to shine down and only to where it is needed without compromising the safety of employees • Standard mitigation measures for noise (including blasting) • Reclamation of disturbed areas through progressive reclamation	Minor

VC	Project Phase	Type of Potential Effect	Mitigation, Monitoring, and Natural Limiting Factors	Significance Including Mitigation and Natural Limitations
			• Regular Site monitoring will be required to ensure nothing is left to attract terrestrial fauna. The final reclamation phase of the Project will return the area to a condition that is consistent with the natural surroundings and reasonably restored to pre-existing conditions, thus restoring habitat temporarily disturbed by the Project. The reclamation plan will include any additional wildlife surveying, monitoring, or follow-up, as required.	
Birds	C, O, D/R	Localized habitat or nest disturbance or removal	• Clearing activities will occur outside of the nesting season (April 1 to August 15) or as determined by regulators. • If clearing is required during the nesting time frame, NSECC will be consulted for appropriate protocol, which likely would involve pre-construction nest surveys and the requirement to leave barriers around nests, if identified. • Stockpiles will be examined during the nesting season to ensure that ground-nesting birds are not present, and disturbance avoided until after the nesting season. • No one shall disturb, move or destroy migratory bird nests. If a nest or young birds are encountered, work shall cease in the immediate area of the nest and NSDL&F contacted. • If priority birds are located within the Project footprint and would potentially be impacted during the site preparation, operation, or reclamation phases of the Project, a management plan will be created in discussion with NSDL&F and if necessary, such species would be avoided.	Negligible
Priority Species	C, O, D/R	Localized habitat disturbance or removal	• Where disturbance of lichens is not avoidable with respect to extraction areas, consultation with NSDL&F and NSECC will take place regarding potential mitigation options such as management plans or transplantation and monitoring activities and studies. • Detailed mitigation measures applied to ensure negligible impacts to priority avian species, such as work scheduled outside of nesting	Minor

VC	Project Phase	Type of Potential Effect	Mitigation, Monitoring, and Natural Limiting Factors	Significance Including Mitigation and Natural Limitations
			season, and to wildlife such as minimizing the Project footprint and impacted area to the absolute necessary delineation. • Scotian recognizes the value of priority species and will take steps as required to mitigate those species found on-site through consultation with ecologists and NSDL&F. Ongoing issues of importance to local flora and faunal species will likely be brought forward by the community, academia, and regulators. Scotian commits to an open and consultative approach to seeking resolutions on all issues raised.	
Socio-Economic	C, O, D/R	Potential viewscape impacts Potential increase in truck traffic	• Prescribed setbacks and topography will limit impacts to the viewscape. • Truck traffic is routed primarily along an access road and not in close proximity to residences, no additional trucks are anticipated for the area. • Scotian will maintain a clear line of communication through their Project Manager for any complaints to be recorded and evaluated in accordance with legislation and permit requirements	Negligible
Archaeological and Cultural Resources	C	Damage to archaeological and/or cultural resources	• Project is not likely to encounter archaeological resources and/or historical features on or near the Project Site • In the event that archaeological deposits or human remains are encountered during activities associated with the Tote Road Quarry, all work in the associated area should be halted and immediate contact made with the Special Places Program of the Nova Scotia Department of Communities, Culture, and Heritage	Negligible
Mi'kmaq	C, O, D/R	Impacts to traditional land and resource use	• Discussion and engagement with Mi'kmaq organizations is ongoing in order to minimize and where possible eliminate any potential impacts to traditional land and resource use	Minor
Project Phases: C= Construction, O = Operation, D/R= Decommissioning and Reclamation				

8. Accidents and Malfunctions

Possible malfunctions or accidents that could potentially arise during aggregate extraction projects include slope failures, fuel spills, extreme weather events, vehicle accidents, and fire.

Slope Failure

Causative factors related to slope failures are typically:

- Failure of quarry faces or stockpiles due to improper design
- Operational procedures

Improperly designed and operated quarries can pose a safety hazard to workers during construction and operation. Mitigating factors to prevent accidents are:

- Slopes will be established using a standard of best management practices and methodologies, combined with Scotian's experience in aggregate extraction
- The quarry will be operated in accordance with legislated health and safety requirements
- Face height limits and minimum setbacks will be established
- Quarry face inspections will occur regularly
- A site-specific Emergency Response Plan will be prepared

The risk of slope failure resulting from construction and operation is expected to be low. The risk during operations will be reduced further by preventive measures, monitoring and the utilization of standardized methods in the quarry design. With mitigative measures and the low probability of slope failure, the effects of slope failure during construction and operation are not considered to be significant.

Fuel Spills

POL will be used on-site to power and operate equipment such as trucks, generators, crushers, loaders, etc. There are no plans for the bulk storage of liquid petroleum fuels on-site. No hazardous materials will be permanently stored on site. Fuel will be transferred to quarry equipment by mobile fueling trucks as required. Small quantities of oils and lubricants may be on site during crushing to maintain equipment but will be removed once that activity is completed.

Spills may contaminate soils and groundwater and, through runoff contaminate watercourses. Contaminants may adversely affect the local habitat and migratory birds. Loss of POLs may volatilize and adversely impact the ambient air quality.

Fuelling will not occur within 30 m of a waterbody or wetland. Oils and lubricants will be stored, if required, in accordance to manufacturer's recommendations and applicable legislation. Contractors and staff who undertake refuelling and maintenance activities will be encouraged to do so on level terrain and at a suitable distance from environmentally sensitive areas. Scotian has established policies for Contingency and Emergency Response on its work sites and quarry operations. These plans, filed with NSECC for the Tote Road Site in the original IA application, have been developed to address the potential loss of POL on-site. The Contingency and Emergency Response Plan will be updated to reflect the Project and will be included in the submission for the IA Amendment.

The risk of a spill during site activities is expected to be low. Should petroleum impacted soil or groundwater be identified, the affected material will be handled, transported and disposed of according to all applicable legislation. The effects of accidental spills of POL during construction and operation of the quarry are not considered to be significant.

Extreme Weather

Heavy or extreme rainfall has the potential to overwhelm erosion and sediment control measures, thus causing threat of impact to nearby waterbodies and wetlands. Contingency Plans may include monitoring surface runoff during heavy rainfall to evaluate the need for improvements in controls. The risk of an extreme weather event to cause an impact on the environment is not considered to be significant given the appropriate controls are in place.

Vehicle Accidents

The Site is accessible via a new resource road from Exit 5A at Ingramport. Vehicle accidents are a potential risk to worker health and safety, and interactions with birds and wildlife through collisions. Road design including sight lines and speed limits will minimize the potential for vehicle accidents. The risk of a vehicle accident to cause an impact on the environment is not considered to be significant with the appropriate planning, training and mitigation implemented.

Fires

Accidental fires may be caused by site equipment or affect the site during any quarry phase. Fires have the potential to effect worker health and safety, wildlife, surface water quality and air quality. Mitigating factors include compliance with site specific health and safety guidelines, regular equipment maintenance, adhering to fire bans, and contingency planning. The risk of accidental fires and impacts from a fire in a quarry are low and is considered not significant.

9. Effects of the Environment on the Project

Climate Change

The surrounding environment may contribute to adverse effects on the Project; however discussions on potential environmental effects on the Project are usually limited to climate and meteorological conditions. Climate change is more likely to affect projects with longer duration or higher intensity climate events. Reclaimed areas or temporary storage piles may be affected by future severe weather events if not planned for properly. Climate change is not anticipated to significantly affect the operation of the Project over its lifetime. Short period events, *e.g.* heavy rainfall, blizzards or thunder storms, may temporarily shut down operations for safety reasons. Precipitation (rain, snow) and associated runoff may cause temporary delays in some activities such as construction, operation (extraction, processing, transportation), and reclamation.

The national average annual temperature has increased by 1.7 ºC since records began in 1948, however, in Atlantic Canada, the annual average temperature has only increased by 0.7ºC (the lowest trend) for the same period (1948 – 2016) (Zhang et al., 2019). The Atlantic Region has experienced slight cooling in the last 50 years due in part to the melting of the ice caps in Greenland and Northern Canada. The cooler air and water temperatures associated with the melted ice have been flowing past Atlantic Canada causing the cooling trend. As oceans warm and water expands, the melting ice may accelerate sea-level rise in the region, however given the elevation of this Project related impacts are highly unlikely. Annual precipitations have tended to be wetter since the mid-1970s (NRCan, 2019).

During the various Project phases (construction, operation, reclamation) numerous mitigation measures may be employed to minimize potential effects of the environment on the Project. These measures may reduce the risk to acceptable levels through the installation of engineered controls that account for projected storm events. Scheduling of activities should also account for weather interruptions and since the activities of this Project are all conducted out-of-doors the weather has been and will be a factor.

Earthquakes

Earthquakes are mapped through Natural Resources Canada (NRCan) – Earthquakes Canada. Eastern Canada is in a stable continental region and has a relatively low rate of seismic activity. Approximately 350 earthquakes will occur in Eastern Canada each year, with an average of about 30 seismic events exceed magnitude 3 annually in Eastern

Canada (NRCan, 2022). Although Nova Scotia is a relatively quiet earthquake zone, larger quakes have been reported historically.

Tote Road falls within the Northern Appalachian Seismic Zone, which also includes most of New Brunswick and New England extending down to Boston (NRCan, 2022). According to the Seismic Hazard Map completed by Geological Survey of Canada in 2015, all of Nova Scotia is classified as low seismic hazard. The closest recent recorded events to the Project was a Magnitude 2.3 quake in December 2021 located near Falkland Ridge, Annapolis County, approximately 75 km west of the Site, and a magnitude 2.1 quake near Palmer Lake, Annapolis County, approximately 58 km west-northwest of the Site. No significant earthquakes (M <5.0) have occurred in Nova Scotia between 1600 and 2006 (Lamontagne et al., 2007; NRCan, 2022). There is, therefore, little likelihood of earthquakes being an effect on the Project.

Wildfires

Wildfires are limited in NS but there is the potential for this to affect the Project by limiting when work may be conducted during such an event. On-site equipment may be lost if it cannot be evacuated / removed before an approaching fire. Fire protection may be available from water in on-site ponds.

Flooding

The Site is elevated from major waterbodies thus will not be affected by any seasonal flooding events. Extreme precipitation may cause a temporary rise in local groundwater elevations – thus affecting operations.

10. Other Approvals Required

The Proponent is required to register this Project as a Class I Undertaking pursuant to the Nova Scotia *Environment Act* and *Environmental Assessment Regulation*s. Other relevant provincial regulations include the *Activities Designation Regulations*, which may require an amendment to the existing IA from NSECC for the operation of the quarry.

A wetland alteration approval will be required for WL2 and WL3 once the propose Project is developed within the catchments of those wetlands.

No additional municipal approvals are known to be required.

There are no known triggers under the Canada *Impact Assessment Act* (IAA).

11. Funding

No public or government funding is involved in the execution of this undertaking. All costs will be borne by Scotian Materials Limited.

12. Additional Information

No additional information is provided in support of this document.

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All of Which is Respectfully Submitted

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