DEXTER CONSTRUCTION COMPANY LIMITED
COLPTON QUARRY EXPANSION,
7275 HIGHWAY 325, COLPTON, LUNENBURG COUNTY
NOVA SCOTIA

Registration Document for a Class 1 Undertaking Under Section 9 (1)
of the Nova Scotia Environment Assessment Regulations

JANUARY 2024

TABLE OF CONTENTS

FIGURES

TABLES

DRAWINGS

Drawing 1 Site Location Plan (Appendix B)

Drawing 2 Future Expansion Area (Appendix B)

APPENDICES

Appendix A Property Information

- Company Profile – Nova Scotia Registry of Joint Stock Companies
- Existing Industrial Approval

Appendix B Drawings

Appendix C Rock Sulphur Content Analysis Results

Appendix D Biophysical Assessment (Envirosphere 2023)

Appendix E Nova Scotia Department of Communities, Culture and Heritage, Special Places. Review Letter regarding Heritage Research Permit A2022NS073 Colpton Quarry Expansion Archaeological Resource Impact Assessment 2022.Heritage Research Permit A2022NS073 Colpton Quarry Expansion Archaeological Resource Impact Assessment 2022.

Appendix F Water Balance Assessment (J. Fraser, Consulting Hydrogeologist, 2023)

Appendix G Public Consultation Documentation

1.0 INTRODUCTION

Dexter Construction Company Limited (herein after referred to as "Dexter") of Bedford, Nova Scotia is proposing to expand the existing Colpton aggregate quarry located in the Colpton area of Lunenburg County, Nova Scotia. The existing quarry is located off Highway 325, approximately 22 km northwest of the Town of Bridgewater in Lunenburg County, Nova Scotia at approximately UTM Zone 20, NAD83, Easting 356935 and Northing 4922470 and is located on PID 60320637. The quarry is currently operating under an Industrial Approval (IA), No. 2010-074832-01 issued to Dexter Construction Company Limited, for a quarry of less than four (4) hectares. An approval to expand the quarry is required under the Nova Scotia Environmental Assessment Regulations. The registration of this Environmental Assessment ("EA") is in response to Schedule A of the Environmental Assessment Regulations, Undertaking B.2., "*A pit or quarry that is larger than 4 ha. in area for extracting building or construction stone*."

Dexter is a private Canadian company. It is incorporated under the laws of Nova Scotia and registered to do business in Nova Scotia under the Nova Scotia Corporations Registration Act. Dexter's Company Profile Report from the Nova Scotia Registry of Joint Stock Companies is attached in **Appendix A** "Property Information." Municipal Enterprises Limited (Municipal) is an affiliated company of Dexter and therefore Municipal may be referred to within the appendices.

Proponent Address:

927 Rocky Lake Drive,
P.O. Box 48100
Bedford, NS, B4A 3Z2
Phone: 902-835-3381

Proponent Contact:

Gary Rudolph, P. Eng.
Director of Aggregates and Pavement Rehabilitation
927 Rocky Lake Drive,
P. O. Box 48100
Bedford, NS, B4A 3Z2
Phone: 902-835-3381

Consultant Contact:

Mr. J. H. Fraser, M. A. Sc., P. Geo.
Consulting Hydrogeologist
Phone: 772-812-1981 (Cell)

The Colpton quarry operates under an existing Nova Scotia Environment and Climate Change (NSECC) Industrial Approval (Approval No. 2010-074832-01), which has a current expiry date of June 18, 2031. A copy of the Industrial Approval is also attached in **Appendix A** "Property Information".

2.0 THE UNDERTAKING

2.1 Description of the Undertaking

Dexter proposes to expand its existing Colpton quarry to produce aggregate, primarily used in the local highway and construction industry. The proposed undertaking ("*the quarry")* involves the

expansion of the existing NSECC approved quarry from a less than four-hectare quarry to a 42.0-hectare quarry. Other than the proposed increase in size, it is expected that continued use of the quarry will be identical, or very similar, to historic use of the site. A plan showing the existing NSECC approved quarry permit area is included in **Appendix A**. The 42.0-hectare boundary of the proposed quarry expansion area is illustrated in **Appendix B**.

2.2 Location

The quarry and proposed expansion area is located on Municipal-owned land (PID's # 60320637 and 60321213), approximately 71 hectares) at 7275 Highway 325 in Colpton, Lunenburg County, Nova Scotia, NAD83 UTM ZONE 20, 4922470 Northing, 356935 Easting. The site is shown in **Figures 1 & 2** (below) and **Drawing 1, Appendix B**). There is no designated municipal zoning in this area of Colpton, Lunenburg County.

Figure 1 – Project Location

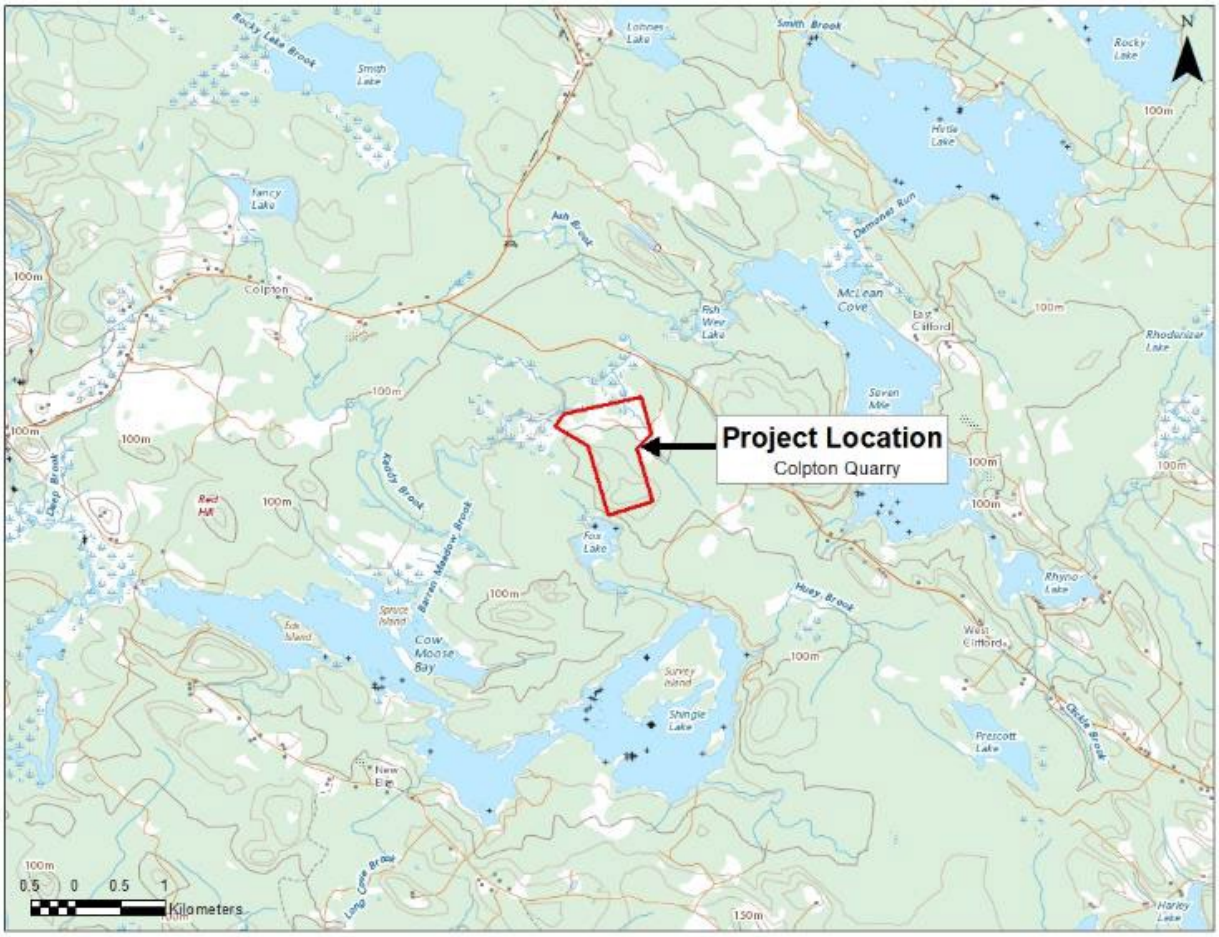
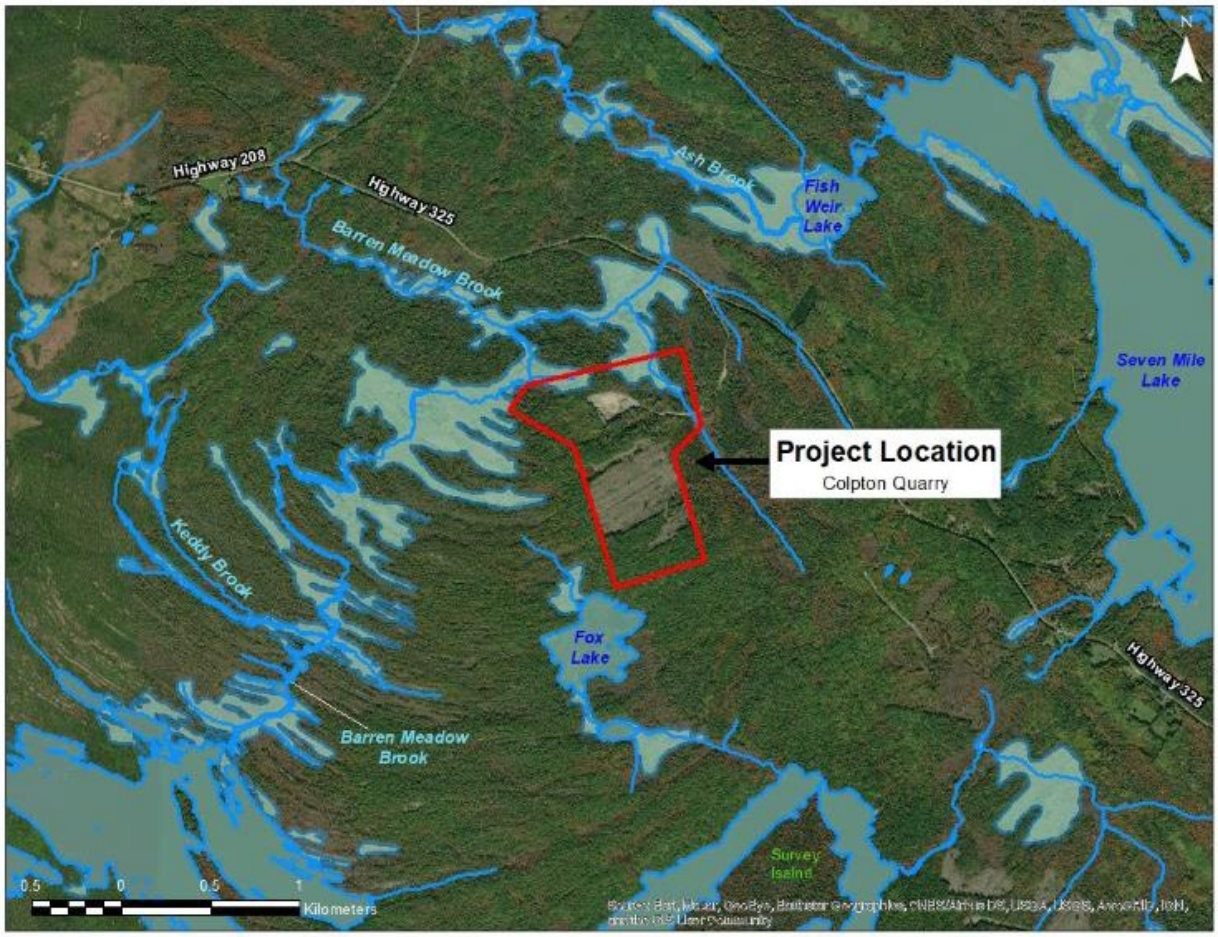


Figure 2 – Site Location and Adjacent Land Use.



3.0 SCOPE OF THE UNDERTAKING

Dexter intends to expand the existing Colpton quarry for the continuing purpose of extracting and supplying aggregate for the local construction industry. Other than the proposed increase in size, it is expected that continued use of the quarry will be identical, or very similar, to historic use of the site.

The existing quarry was originally developed by Dexter in the late 2000's and has been operated as a NSECC approved quarry since 2010. When the quarry was initially developed the property was owned by East Coast Land Developments and leased to Dexter. In 2021 Dexter acquired the quarry property and the lands associated with the proposed quarry expansion area. A working highwall has been developed in the northern portion of the property, advancing to the south. The site is operated periodically during the road construction season to provide construction aggregates for local projects as well as Nova Scotia Department of Public Works (NSDPW) projects in the area. The quarry is currently operating under a NSECC Industrial Approval (2010-074832-01) for a less than four-hectare quarry. The scope of this application is for expansion of the existing quarry to a maximum 42.0-hectare area. Quarry activities will continue to include clearing and grubbing of vegetation and overburden, use of a portable crusher and/or screener for crushing and screening of aggregate products, stockpiling of aggregate products, operation of a portable truck scale and scale house, trucking of aggregate products and the operation of a

portable asphalt plant (with separate a NSECC approval). The existing quarry highwall is approximately 15 m high. During past operations, Dexter has extracted an average of approximately 25,000 to 50,000 tonnes of aggregate per year from the quarry during years in which the quarry was active. There are no off-site related support facilities, other than the provincial highway network.

It is Dexter's intent to continue quarry operations on the property. It is anticipated that future operations will involve the extraction of up to 50,000 tonnes/year during years in which the quarry is active. However, the annual quantity may vary depending on local demand and associated project requirements.

3.1 Purpose/Need of the Undertaking

Dexter proposes to expand the existing Colpton quarry to produce aggregate, primarily used in the road and local construction industry. The primary benefit will be to the people of Nova Scotia via the continued construction and maintenance of the Provincial highway system.

3.2 Consideration of Alternatives

Quarries are established where quality aggregate reserves are identified, and applicable environmental and logistical considerations are satisfied. Dexter maintains a strategic network of NSECC approved aggregate quarries around the province to support local infrastructure projects. The development of an aggregate quarry is an important asset to the local community. An alternative to the proposed quarry expansion is to develop a new quarry nearby. Considering quality, environmental, and logistical constraints, it is preferred to proceed with an expansion of the existing quarry rather than the development of a new quarry nearby.

Dexter operates rock quarries throughout Nova Scotia and Atlantic Canada and uses modern industry standard methodologies in all phases of the extraction, processing, and delivery processes. Alternative processes are always being considered in terms of their efficiency, cost effectiveness and environmental mitigation advantages. Operations at the Colpton quarry will be assessed on an on-going basis to ensure that the best available techniques are being utilized in all phases of operations.

3.3 Scope of the Environmental Assessment

The scope of the environmental assessment is in keeping with the NSECC document entitled "Guide to Preparing an EA Registration Document for Pit and Quarry Developments in Nova Scotia" as well as Dexter's experience with respect to similar projects over the past several decades. The NSECC guidance document states that an "Environmental Assessment (EA) is a planning and decision-making tool used to promote sustainable development. By predicting and evaluating the environmental effects of an undertaking before it begins there is the opportunity to mitigate potential impacts of the undertaking on the environment".

The scope takes into consideration that the quarry is, at present, operational, and subject to an existing Industrial Approval (IA) (**Appendix A**). It is noted that the existing IA includes conditions related to operational sound levels, separation distances, particulate emissions, surface water quality, groundwater management, blasting, reclamation, regulatory reporting as well as site-specific conditions. Prior to quarry expansion, the existing IA will be amended based on the results derived from the various studies and assessments that form this EA, and EA Approval conditions. The amended IA will outline the operational requirements of the future quarry operation.

It is also noted that the proposed quarry expansion will not change the scope of operations at the site. Other than the proposed increase in area, it is expected that continued use of the quarry will be very similar to historic use of the site.

The following sections of this document provide a description of the project, an overview of the human uses and biophysical features of the local environment; outline the key "Valued Environmental Components" addressed by the EA document; and present an evaluation and summary of the benefits and potential impacts to the environment during all phases of the proposed undertaking. In support of the EA a Biophysical Assessment (**Appendix D**), an Archaeological Resource Impact Assessment (ARIA) **(Appendix E**), and Water Balance Assessment (**Appendix F)** were completed.

Envirosphere Consultants Limited (Envirosphere) was retained by Dexter to undertake a Biophysical Assessment as part of the proposed expansion of the Colpton Quarry. Information for the Biophysical Assessment (**Appendix D**) was obtained from consultants' personal knowledge, from various field surveys, from reviews of available information and knowledge of typical quarry operations. The environmental assessment follows *Guide to Preparing an EA Registration Document for Pit and Quarry Developments in Nova Scotia* (NSE September 2009) and uses assessment methodology typical for environmental assessment screenings of this kind. For this assessment a list of VECs, and project activities and outcomes for the expansion of the existing quarry were developed. Potential for interactions of these activities with VECs was identified. Where interactions were identified, and there was potential for significant impacts, mitigating actions or activities have been suggested that will avoid the impact or reduce it to acceptable levels before the project proceeds. The process ensures that all potentially significant impacts on VECs are identified and all potential impacts on them have been considered, and sufficient mitigation planned. These aspects of the project are fully dealt with in Section 6 – Valued Environmental Components and Effects Management.

Cultural Resource Management Group Limited (CRM Group) was retained by Dexter to undertake an ARIA as a part of the proposed expansion of the Colpton quarry. The assessment involved background research, Mi'kmaw engagement and field reconnaissance to identify, document, interpret and make management recommendations for potential cultural resources within the proposed impact area (Archaeological Resource Impact Assessment. CRM, 2022 – **Appendix E**).

The ARIA was conducted according to the terms of Heritage Research Permit A2022NS037 (Category "C") issue to CRM (Emily Redden) through the Special Places Program of the NS Department of Communities, Cultural and Heritage (Special Places). The report describes the ARIA of the Colpton quarry expansion study area, presents the results of these efforts and offers cultural resource management recommendations. Based on these results, CRM provided the following specific recommendations for the study area:

1. It is recommended that the study area, as defined in the CRM report be cleared of any requirement for future archaeological investigation.
2. If any further changes are made to the layout of the study area beyond the area assessed in this report, it is recommended that those proposed areas be subjected to an Archaeological Resource Impact Assessment.
3. In the event that archaeological deposits or human remains are encountered during construction activities associated with the Colpton Quarry, all work in the associated

area(s) should be halted and immediate contact made with the Special Places Program (John Cormier: 902-424-4542).

Consulting Hydrogeologist J. H. Fraser prepared a Water Balance Assessment for the proposed Colpton Quarry expansion area. This Water Balance presents an assessment of the estimated effects on the surrounding water features resulting from the proposed quarry expansion. The analysis is intended to identify any potential changes in the surface and groundwater flow regime and to provide input into the design and implementation of surface water control infrastructure as the site is further developed. The Water Balance Assessment for the Colpton Quarry is included as **Appendix F**.

3.4 Other Approvals Required

The existing Colpton Quarry is subject to an existing Industrial Approval (IA) (**Appendix A**), which includes conditions related to operational sound levels, separation distances, particulate emissions, surface water quality, groundwater management, blasting, reclamation, regulatory reporting as well as several site-specific conditions. Prior to quarry expansion, the existing IA will be amended based on the results derived from the various studies and assessments that form this Environment Assessment, and the EA Approval conditions. The amended IA will outline the operational requirements of the future quarry operation. It is expected that the amended IA will include additional conditions for specific surface water monitoring and groundwater monitoring. Environmental monitoring information that is collected from the site will be provided to NSECC as part of an annual report.

It is understood that additional environmental approvals, permits, and/or authorizations may be required in the future. Wetland alteration approvals will be obtained, if required, prior to the removal of any wetland habitat associated with the proposed quarry expansion. At this time, no other approvals, permits, and/or authorizations are expected to be required in support of this application.

In addition to the respective site approvals, Dexter also operates the quarry in accordance with applicable environmental laws and regulations, including the NSECC Pit and Quarry Guidelines. If the Dexter fails to comply the conditions of approval, the IA may be suspended or revoked. Failure to comply may also result in penalties as set out in the *Nova Scotia Environment Act* and associated regulations.

Dexter is required to notify NSECC of any adverse effect or the potential for adverse effect which the Company becomes aware of while operating under the IA and must notify NSECC if any of the conditions specified in the IA are violated or exceeded.

Dexter is required to bear all costs associated with meeting the requirements of the approval; no cost is borne by the Nova Scotia taxpayer.

4.0 PUBLIC CONSULTATION AND FIRST NATIONS ENGAGEMENT

4.1 Methods of Involvement

Dexter has engaged the public and the Mi'kmaq of Nova Scotia, as outlined below. Community and First Nations engagement to date has focussed on notifying local elected officials and community representatives. Engagement efforts have included email correspondence and in person meetings. As part of the Biophysical Assessment, local community members in the

immediate vicinity of the Quarry were contacted by Envirosphere to provide comments on their interactions with the quarry over the years.

With respect to the First Nations Community, Dexter has followed the Proponent's Guide: The Role of Proponents in Crown Consultation with the Mi'kmaq of Nova Scotia. In this regard Dexter has advised Chief Deborah Robinson (Acadia First Nation) of its intent to file the Registration Document for a Class 1 Undertaking under Section 9 (1) of the NS Environmental Assessment Regulations. Dexter also sent this letter to Ms. Twila Gaudet, Director of Consultation with the Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO), Chief Lorraine Augustine of the Native Council of Nova Scotia, and Ms. Salima Medouar, Consultation Advisor with the Nova Scotia Office of L'Nu Affairs. A follow up letter was also sent to all noted First Nation representatives on January 9, 2024, advising of the EA registration date, public viewing locations, and timelines for the submission of comments. A copy of First Nations correspondence is included in **Appendix G**.

Table 1. Colpton Quarry Environmental Assessment - Public, First Nations, and Regulatory Engagement Summary.

First Nations Contact	Description of Engagement	Summary of Engagement
Acadia First Nation Chief Deborah Robinson	July 21, 2023 Engagement Letter – sent via Canada Post	• Engagement letter, including brief description of project and anticipated timelines, offer to discuss the project, and commitment to send a follow up notification letter prior to EA registration. • No response received
	January 9, 2024 Notification Letter – sent via email	• Notification letter, including EA registration date, copy of draft public notice and publish locations, location of hard and electronic copies available for review, deadline for submission of comments, offer to meet to discuss
Kwilmu'kw Maw-klusuaqn Negotiation Office Ms. Twila Gaudet Director of Consultation Mr. Shawn Taylor Consultation Projects Support Officer	July 21, 2023 Engagement Letter – sent via Canada Post	• Engagement letter, including brief description of project and anticipated timelines, offer to discuss the project, and commitment to send a follow up notification letter prior to EA registration. • No response received
	October 31, 2023 Meeting (with Shawn Taylor)	• Meeting to discuss the Colpton Quarry expansion project. • Discussed the scope of existing operations and the proposed expansion. • Reviewed select constraint mapping (LiDAR DEM, wetlands and watercourses, and species of interest) and drone photos. • Discussed the proximity of the quarry to mainland moose habitat. Following the meeting Dexter forwarded a sketch showing mainland moose habitat in relation to the quarry. • Discussed the proximity of the quarry to adjacent wetlands, potential reclamation opportunities, and future wetland monitoring. • Discussed geology, potential for acid generating rock, and efforts to sample and assess rock samples for ARD. • KMK noted that an MEKS will likely be requested during the EA review process. • Confirmed that Dexter will follow up with a Notification Letter when environmental studies have been complete and EA registration date has been confirmed.
	January 9, 2024 Notification Letter – sent via email	• Notification letter, including EA registration date, copy of draft public notice and publish locations, location of hard and electronic copies available for review, deadline for submission of comments, offer to meet to discuss
Native Council of Nova Scotia Chief Lorraine Augustine Ms. Vanessa Mitchell	June 23, 2023 Meeting (with Vanessa Mitchell and Christina Davis)	• Meeting to discuss on-going pit and quarry expansion projects. • High level discussion of typical Industrial Approval requirements and the requirement for an EA to expand the site. • Explained the scope of existing operations and the scope of proposed expansion.

First Nations Contact	Description of Engagement	Summary of Engagement
Executive Director, MAARS & Projects Ms. Christine Davis Habitat Impact Advisor		• Confirmed that Dexter will follow up with a Notification Letter when environmental studies have been complete and EA registration date has been confirmed.
	July 21, 2023 Engagement Letter – sent via Canada Post	• Engagement letter, including brief description of project and anticipated timelines, offer to discuss the project, and commitment to send a follow up notification letter prior to EA registration. • No response received
	January 9, 2024 Notification Letter – sent via email	• Notification letter, including EA registration date, copy of draft public notice and publish locations, location of hard and electronic copies available for review, deadline for submission of comments, offer to meet to discuss
Office of L'Nu Affairs Ms. Gillian Fielding Consultation Advisor	July 21, 2023 Engagement Letter – sent via Canada Post	• Engagement letter, including brief description of project and anticipated timelines, offer to discuss the project, and commitment to send a follow up notification letter prior to EA registration.
	July 21, 2023 Engagement Letter – sent via email	• Forwarded a copy of early engagement letter via email.
	January 9, 2024 Notification Letter – sent via email	• Notification letter, including EA registration date, copy of draft public notice and publish locations, location of hard and electronic copies available for review, deadline for submission of comments, offer to meet to discuss

Public Stakeholder	Description of Engagement	Summary of Engagement
Municipality of the District of Lunenburg Ms. Pam Hubley Deputy Mayor Council – District 4 Ms. Cathy Moore Council – District 5	October 30, 2023 Email	• Provided email notification of the proposed project and upcoming registration. • Offered to meet to discuss project in greater detail.
	January 16, 2024 Meeting	• Provided a hard copy of the Colpton Quarry Expansion Project EARD, drone photo of the site, and Dexter quarry discussion package. • High level history of the site. Developed approximately 15-years ago by Dexter Construction. Reviewed the location of the Quarry in relation to the other sites in the area. • High level overview of NSE Quarry Approvals (Industrial Approval (<4 ha) vs. Environmental Assessment Approval (>4 ha), including summary of T&C's in a typical Industrial Approval, and anticipated T&C's in an EA Approval. • Discussed the scope of the expansion (proposed expansion from 4-hectares to 42-hectares. Noted that there are no anticipated operational changes (frequency, duration, level of activity, etc.) other than an increase in the site footprint. Site will continue to be seasonally operated on an as needed basis to support Dexter work in the area. • Noted that Dexter intends to register the project for Environmental Assessment on January 24, 2024. Aligned with this will be a newspaper notice inviting comments from the public, and public viewing locations. The document will also be available electronically.
Provincial Representative Hon. Becky Druhan MLA – Lunenburg West Minister of Education and Early Childhood Development	October 30, 2023 Email	• Provided email notification of the proposed project and upcoming registration. • Offered to meet to discuss project in greater detail.
	January 9, 2024	• Email to notify of registration date and placement of public notices.

Regulatory Stakeholder	Description of Engagement	Summary of Engagement
NSECC EA Branch Ms. Allison Fitzpatrick EA Coordinator **NSECC ICE Division** Mr. Adam McKechnie Inspector Specialist **NSECC Water Resources Branch** Mr. Joe Xie Ms. Tessa Bermarija Mr. Gordon Check Senior Hydrogeologist **NSECC Wetlands Branch** Mr. John Gallop Wetland Specialist **NSNRR** Mr. Peter Kydd Regional Biologist Mr. Stephen Freeman Land Services	September 6, 2023 Site Visit	• Site visit and tour of the Colpton Quarry (actively crushing with portable crusher) • Provided details on the history of the site, the quarrying process, surface water management, wetlands and significant habitat, and the status of EA registration.

Stakeholders Comments

No stakeholder comments regarding the project have been received to date. General questions regarding the project have been discussed with local elected officials, First Nation representatives, and regulatory stakeholders. Dexter will document any concerns received during the public consultation portion of the EA process and provide a copy to NSECC.

No comments regarding the project have been received from the First Nations Community to date. Dexter will continue to liaison with the First Nation Community when appropriate, and forward any comments received regarding the Project to NSECC.

4.2 Future Steps

On the date of Registration, the public will be notified of the EA Registration by an advertisement in the Chronicle Herald and the South Shore Breaker. A copy of the newspaper advertisement is included in **Appendix G.**

5.0 DESCRIPTION OF THE UNDERTAKING

5.1 Existing Quarry Operations

Existing quarry operations involve blasting, crushing, and stockpiling of aggregate, and associated trucking on an as required basis. In addition, a portable NSECC approved asphalt plant may occasionally be situated on the property. The quarry is operated in accordance with an existing Industrial Approval (IA) (Approval No. 2010-074832-01). A copy of the IA is attached in **Appendix A.** The quarry operates in accordance with applicable environmental laws and regulations, including the Nova Scotia Pit and Quarry Guidelines. These Guidelines apply to all pit and quarry operations in the province and provide separation distances for operations,

including blasting, surface water discharge limits, suspended particulate matter limits, sound level limits and requirements for a reclamation plan and security bond. Dexter is committed to the utilization of Best Management Practices in all phases of their operations, including the on-site management of air quality, greenhouse gas emissions, noise, dust, and water quality and will operate in accordance with applicable Federal and Provincial legislation and standards.

Operation of the quarry occurs on an as-required basis. Blasting occurs on average one to two times per year during years in which the site is active. Off-site quarry related activities and facilities include the use of the provincial highway network. The existing quarry high wall is approximately 15 m in height.

Site operations and historic aggregate excavation has not encountered the deep bedrock water table as evidenced by the lack of water ponding on the quarry floor, no observed seepage from the quarry highwall, and no upwelling of water through the quarry floor.

With respect to the characteristics of the quarry bedrock, a rock sample from the quarry was analysed for sulphur content to determine if the material was sulphide bearing. The results of this analysis yielded a sulphur concentration of 0.041 % (1.25 kg H_2SO_4/tonne), which is below the minimum (0.4 % S; 12.51 kg H_2SO_4/tonne) defined by NSE as sulphide bearing material. A duplicate sample yielded a sulphur concentration of 0.036 % (1.11 kg H_2SO_4/tonne), which is also below the minimums noted above. The laboratory results of this sample are included in **Appendix C.**

5.2 Future Quarry Operations

Dexter proposes to expand the Colpton quarry for the extraction, production, storage, and removal of aggregate, primarily used in the road and local construction industry. Dexter is proposing to expand the existing quarry to a maximum 42.0-hectares, which includes the existing production and operational footprint, set-up, and storage (stockpiles) areas, and provisions for surface water control.

Although totally dependent on local market conditions, it is anticipated, at this time, that future development will involve the production of up to approximately 50,000 tonnes of aggregate per year, during years in which the site is active. The quarry highwall would be advanced in a southerly direction from the existing face. **Drawing # 2, Appendix B** identifies the proposed 42.0-hectare expansion area.

Quarry operations will generally coincide with the road construction season; therefore, it is reasonable to anticipate periodic, seasonal operations within a similar time frame (April – December). The quarry will operate when and as required within the typical 32-week construction season, depending on local demand and project requirements. A typical project (often an NSPW Contract) will require crushing activities at the quarry for a period of two to three weeks at a time. Although uncommon, during crushing activities the site may be operated 24 hours per day, possibly 7 days per week. Following crushing activities, aggregate products would be loaded and hauled from the quarry for several weeks, or as required by the project. During load and haul activities the site is typically operated during daylight hours (approx. 12 hours per day), possibly 7 days per week. Dexter is committed to the utilization of Best Management Practices in all phases of their operations, including the on-site management of air quality, greenhouse gas emissions, noise, dust, and water quality, and will operate in accordance with applicable Federal and Provincial legislation and standards.

Consistent with current operations, aggregate production would commence with drilling and blasting, utilizing a qualified blasting contractor to conduct this work. The blasting contractor would be responsible for blast designs and methods in accordance with the General Blasting Regulations contained in the Nova Scotia Occupational Health and Safety Act, 1996. Blasting would also be conducted in accordance with the Pit and Quarry Guidelines. Blasting and noise level guidelines respecting the time of day/day of the week will be followed and blast monitoring will be conducted for every blast event. The existing Industrial Approval stipulates blasting control and monitoring requirements.

The blasted rock will be transported to a portable crushing spread for processing. The various aggregate products will be stockpiled in designated areas within the quarry. Material within the quarry will be hauled and moved with a front-end loader. Products will be transported from the quarry by tandem and tractor trailer trucks approximately 1,100 metres via a gravel road to Highway 325 and will be routed as necessary through the provincial highway and roadway network to support local projects. The number of trucks hauling aggregate will be determined on a job-by-job basis, however as the site is not expected to increase in level of activity, trucking activity is not expected to increase from past use.

Aggregate excavation will not take place below the deep bedrock water table. If aggregate extraction below the groundwater is required in the future, a Hydrological Study will be completed and an application to amend the IA will be submitted to NSECC. Prior to quarry expansion, a network of groundwater monitoring wells will be installed around the quarry to confirm the local groundwater quality, baseline elevations and flow direction.

6.0 VALUED ENVIRONMENTAL COMPONENTS AND EFFECTS MANAGEMENT

6.1 Evaluation and Categorization of VEC's

The Environmental Assessment for this project involved review of the Industrial Approval for the existing quarry (**Appendix A**), testing for Potential Acid Rock Production (**Appendix C**), the preparation of a Biophysical Assessment (**Appendix D**), an Archaeological Resource Impact Assessment **(Appendix E**), Water Balance Assessment (**Appendix F**), and a variety of Stakeholder Engagement as outlined in **Table 1** and **Appendix G**. The environmental assessment follows the "Guide to Preparing an EA Registration Document for Pit and Quarry Developments in Nova Scotia (NSECC September 2009). For this assessment a list of VECs and project activities for the proposed quarry expansion were developed and the potential for interactions of these activities with VECs were identified. Where interactions were identified and there was potential for significant impacts, mitigating actions or activities have been identified that will avoid the impact or reduce it to acceptable levels before the project proceeds. This process ensures that potentially significant impacts on VECs are identified and potential impacts on them have been considered and sufficient mitigation planned and implemented.

The list of Valued Environmental Components considered for the assessment, and interactions with project components, are presented in **Table 2**. The environmental effects and potential impacts of the project along with their significance and suggested mitigations are outlined in the following sections.

TABLE 2- Valued Environmental Components (VECs) for Colpton Quarry Expansion.

BIOPHYSICAL	SOCIO-ECONOMIC
Air Quality, Noise and Light	Mi'kmaq First Nation
Groundwater	Recreational, Tourism and Viewscape
Hydrology	Recreational, Commercial & Mi'kmaq Fishing
Water Quality	Archaeological, Cultural and Historical
Freshwater Aquatic Environments and Wetlands	Economy, Land Use and Value
Terrestrial Environments	Transportation
Fish and Fish Habitat	Residential Use
Flora and Fauna Habitat	Commercial/Industrial Use
Species at Risk	Water Supplies & Residential Wells
Natural Areas and Wilderness	Parks & Protected Areas
	Forestry, Hunting and Trapping

6.2 Socio-economic Components

6.2.1 Mi'kmaq First Nation

Background

The Mi'kmaq maintain interest in all lands in Nova Scotia and claim they have never surrendered, ceded, or sold the Aboriginal title, and that they claim all of Nova Scotia. As co-owners of the land and its resources, they expect that any potential impacts to rights and title be addressed. Mi'kmaq occupied much of Nova Scotia prior to European contact, and lands were used to varying degrees for habitation, hunting, and fishing. In more recent times, treaties made with the British and continued through Canadian law have maintained their rights.

The general area was, in all probability, used by Mi'kmaq, both as a food source and as a transportation corridor; however, there is low potential for occurrence of Mi'kmaq archaeological resources within the proposed quarry expansion area (CRM, 2002).

The quarry is not located near established First Nations Reserves and First Nations activities are not expected to be directly affected by the Colpton Quarry. Best management practices used at the site will reduce any potential impacts quarry activities may have on water quality, quantity and/or fish habitat, and will be validated through a surface water management and monitoring program that will be established through the subsequent Industrial Approval process. Land around the Colpton Quarry may be used by Mi'kmaq living in the area and/or other residents for nature-based activities such as walking, ATV use, bird watching and hunting or fishing (either recreationally or for subsistence). The land area affected is small in relation to the available wildlife habitat in the area and would not likely affect wildlife of fish populations, potentially used by Mi'kmaq. Activities are seasonal and therefore would not interfere with other uses such as hunting, trapping and snowmobile and recreational vehicle use during the winter and spring. Since quarry operations are not expected to change in scope or to increase in frequency or intensity from past use, there is unlikely to be a change in the cumulative effects of other activities in the area; consequently, none of these effects are considered significant.

Significance and Mitigation

There is low potential for occurrence of Mi'kmaq archaeological resources within the quarry site as outlined in the ARIA (CRM, 2022). In the unlikely event that artifacts are uncovered at the site, all work will stop, and discoveries will be reported to the appropriate authorities and mitigation will be enacted to the satisfaction of all parties involved. There is also a low potential for contamination of surface water or groundwater that may affect fish resources or water quality, however the quarry will include both surface and groundwater monitoring as well as the use of Best Management practices to avoid accidental release of contaminants as well as vehicle accidents. The proponent has and will continue to engage with the Mi'kmaq as the quarry operates in the future.

6.2.2 Recreational Activities

Background

Lands in the general vicinity have been managed by the Province of Nova Scotia, the federal government, and conservation organizations and groups to protect natural environment values and associated wildlife and species of conservation concern and to provide the public with opportunities to experience them. Residents of the area also have the opportunity to live in a relatively untouched natural environment with a low population density leading to local uses such as hunting and fishing, walking, and hiking as well as home-based recreation (e.g., gardening) concentrated around roads and population centres in the area. The principal effects of the quarry on tourists and locals using the area for recreation would be from truck and vehicle traffic and noise associated with the operation of heavy equipment; however, these interactions are a small component of a range of other industrial activities including logging trucks and equipment and general high-volume along Highway 325 to which locals are exposed. Noise from routine operations at the quarry would not be heard in the nearby communities of West Clifford, Colpton or Pleasant River. Noise from blasting may be heard over a wider area, one to two times a year. Unlike other activities, the effects of the quarry would occur principally when the quarry is operating, while other activities in the area could occur year-round. Operations at the quarry would be cyclic, likely occupying several weeks to months during the construction season during the years in which the site is active. The site is regulated and monitored through an Industrial Approval issued by the Province. Although quarry operations could likely be heard near the quarry and residents would experience truck traffic and other effects of the quarry operations, the frequency and scope of the quarry is not expected to increase from past use and any impact on normal activities of residents as a result of the proposed quarry expansion are expected to be negligible.

Significance and Mitigation

Although quarry operations may be heard and residents may experience truck traffic and other effects of quarry operations, the frequency and scope of activities within the quarry is not expected to increase from past use, and any impact on normal activities of residents because of the proposed quarry expansion are expected to be negligible.

Signage will be in place at the entrance to the quarry during periods of site activity to ensure that visitors to the quarry are aware of on-going activities. Road users will be informed of temporary increased trucking activity by signage placed along Highway 325, in accordance with NSDPW requirements.

6.2.3 Tourism and Viewscape

Background

Expansion of the existing Colpton quarry is not expected to have a significant impact on tourism and viewscape. The level of activity at the quarry would remain the same as at present. The principal interactions would be noise and truck traffic transporting aggregate to job sites. Some operations at the quarry may be heard nearby but would likely not be noticeable by tourists in vehicles passing by. Blasting, which may be heard at greater distances, is of short duration and occurs infrequently – one to two times a year. The expansion will not result in a change in the frequency of activity, or visibility of the quarry. Overall, the impacts on viewscape and tourism are expected to be negligible.

Significance and Mitigation

Overall, the effects on tourism and viewscape are expected to be negligible. The limited visibility of the quarry from Highway 325, and lack of visibility from other nearby areas will not change. Signage will be in place during periods of site activity to ensure that residents are aware of seasonal quarry activities and associated trucking and transportation routes.

Other on-site mitigation to control and mitigate potential nuisance impacts will include Best Management Practices, including dust and noise control, and the on-going progressive rehabilitation of quarry areas no longer required for activity and/or future development.

6.2.4 Commercial, and Mi’kmaq Fishing

Background

Recreational fishing in watercourses near the quarry is not expected to be affected by activities at the quarry. The amount of runoff from the quarry is small and of high quality and will have a negligible impact on the watercourses and fish habitat downstream. Surface waters at the site have high quality, including low turbidity and neutral pH, which would lead to good water quality downstream for fish. Overall, a negligible impact of the quarry on recreational, commercial and Mi’Kmaq fishing is expected.

Significance and Mitigation

The effects of the quarry expansion are expected to have a negligible impact on recreational, commercial and Mi’kmaq fishing. Mitigation will include the use of Best Management Practices on-site (i.e., pollution prevention, emergency response procedures, dust control, progressive rehabilitation). It is expected that a condition of EA approval will be to develop a surface water management plan for the site. A surface water management plan will be developed as part of the subsequent Industrial Approval (IA) process and will include specific surface water controls. Surface water, groundwater, and blasting will be monitored as per the Terms and Conditions of the amended IA.

6.2.5 Archaeological / Cultural / Historical

Background

The land proposed for the quarry expansion has low potential for pre-contact and/or early historic First Nations or European archaeological resources (CRM 2022). The site is not expected to have been a prime area used by Mi'kmaq pre-contact.

Significance and Mitigation

The impact of the proposed quarry expansion on archaeological, cultural, or historical features is expected to be negligible. If an archaeological, cultural, or historical feature of significance is encountered during quarry activities, the impact will be reduced by halting operations and consulting with the Province and experts in the field to ensure the artifact or feature is not disturbed and is adequately documented and preserved. If the feature is suspected to be of Mi'kmaq origin, the appropriate Mi'kmaq authorities will be contacted.

6.2.6 Economy, Land Use, and Value

Background

Activities at the Colpton quarry will not restrict or negatively impact forestry or industrial activity in the area. The quarry supports construction activities through the use of aggregate from the quarry for projects in the area at a competitive cost due to the proximity of the quarry. When the quarry is operating, construction crews will typically use local accommodations and services as well as local trucks. The existing quarry has been operating at the site for many years with little or no impact, while providing economic development and a source of aggregate for local construction projects.

Significance and Mitigation

Overall, due to the small land area affected relative to the total land area available in the vicinity, the lack of restriction on industrial activities, as well as no expected change in traffic levels, the proposed quarry expansion is expected to have a negligible impact on economy, land use and value. Mitigation including minimizing the quarry footprint within the NSECC approved quarry permit area, and the progressive rehabilitation of areas no longer required for aggregate production or site related activities, will minimize impacts on economy, land use and value.

6.2.7 Transportation

Background

The Colpton quarry currently generates a comparatively low level of truck traffic on highways in the area. Activity at the quarry is not expected to increase from historic levels, and consequently traffic volumes are not expected to increase significantly from historic levels. The intersection of the quarry access road with Highway 325 has good sightlines and has been safely used since the quarry's inception. The potential for hazardous encounters due to the long stretch of highway on either side which does not have significant on-turning traffic can be mitigated by applicable warning signs placed far in advance of the access road to indicate the likely presence of heavy equipment and trucks turning.

Significance and Mitigation

Overall, the impact of the project on transportation is expected to be minimal, with little or no change from previous operations at the quarry. During periods of site operation, signage for truck and equipment operators, as well as the surrounding communities will be placed to help inform the public that the quarry is active. Safe use of the road and avoidance of accidents is essential, both for human impacts and the potential impacts of vehicle accidents and spills on the local watercourses and environments. Warning signs and speed limits can be placed in areas leading to the quarry, when the quarry is operating, to improve safety. Equipment and truck operators for the quarry will be given instruction on safe procedures.

6.2.8 Residential Use

Background

There are no permanent residences within 800 meters of the quarry and the nearest residence is in the community of West Clifford some two kilometres distant. Therefore, overall, there are negligible concerns regarding the effects on groundwater wells or impacts of blasting on structures. Skyshine from the quarry, on rare occasions when the quarry may be operated at night, might be seen by residents of West Clifford, Colpton and Pleasant River.

Significance and Mitigation

Overall, the impact of the project on residential use is expected to be minimal, with little or no change from previous operations at the quarry. However, mitigation measures such as maintaining appropriate operational buffers, controlling vehicle speed and engine braking, securing equipment to prevent banging (e.g., doors and chains), covering loads, wetting working areas, etc. will be implemented, ensuring that quarry operations comply with noise and dust limits according to the Pit and Quarry Guidelines. Attention will be given to dust management through standard dust mitigation strategies (water spray, reducing speeds, gravelling working areas, etc.). Noise and dust monitoring will be conducted as per the terms and conditions of the Industrial Approval for the approved quarry. Lights, if required, at the site, may be seen by immediate residents, but would be controlled by proper environmental management practices at the site (i.e., downward directional lighting).

Quarry activities such as blasting, are not expected to impact residential water supplies, as homes are located at a significant distance from the site. All blasting events will continue to be monitored for concussion and ground vibration to ensure blasting limits are achieved as per the Industrial Approval (IA). It is expected that a condition of EA approval will be to develop a groundwater monitoring program for the site. As part of the subsequent IA process, a groundwater monitoring program will be developed, and a network of groundwater monitoring wells will be constructed to establish baseline groundwater quality as well as existing groundwater table elevations. The monitoring well network will allow for on-going monitoring to ensure that any potential groundwater impacts are identified.

The quarry will include signage with company contact information should any members of the community wish to register complaints or concerns. A complaint resolution procedure will be put in place by Dexter to address any complaints and concerns received.

6.2.9 Industrial Use and Commercial Use

Background

There are no businesses in the vicinity of the quarry which could be affected. The quarry contributes to the net economic benefit in the community through supporting local trucking operations and providing access to aggregate and other quarry products as well as maintaining the quarry access road.

Significance and Mitigation

The impact of the project on commercial and industrial use is expected to be minimal, with little or no change from previous operations at the quarry. The continued use of Best Management Practices as well as strict adherence to the terms and conditions of the Industrial Approval will ensure that this is maintained through future operations.

6.2.10 Water Supplies and Residential Wells

Background

Surface water and wells associated with the nearest residences are too far from the quarry and in a different groundwater regime to be affected by quarry activities, including blasting. Groundwater recharge generated by the quarry is likely to be of high quality (low conductivity and dissolved solids and neutral in pH).

Significance and Mitigation

The impact of the project on water supplies and residential wells is expected to be minimal, with little or no change from previous operations at the quarry. Best management practices and Industrial Approval conditions for all operations, including blasting will be followed. Established operational procedures for fuelling will be followed and a contingency plan will be maintained to mitigate reasonable impacts on aquifers at the site. It is expected that a condition of EA approval will be to develop a groundwater monitoring program for the site. As part of the subsequent Industrial Approval (IA) process, an on-site groundwater monitoring program will be developed, and a network of groundwater monitoring wells will be constructed to establish baseline groundwater quality as well as existing groundwater table elevations. The monitoring well network will allow for on-going monitoring to ensure that any potential groundwater impacts are identified.

6.2.11 Parks and Protected Areas

Background

The proposed expansion of the Colpton quarry site will not change the intensity or frequency of activity at the site and therefore the degree of any interactions with the managed parks and protected areas in the immediate vicinity is not expected to change. With no expected change in the scope or frequency of quarry activity due to expansion, road traffic activity due to the quarry is not expected to change or be high enough in volume to disrupt tourist traffic. Occasional blasting (one to two times a year) may be heard by local residents, but noise at levels generated from routine operations at the quarry is not expected to be heard. Occurrences of blasting are brief and infrequent and not likely to be a significant concern to visitors/users of those areas. The quarry will be reclaimed at the end of its useful life. Expansion of the quarry will not affect the integrity of any nearby protected areas.

Significance and Mitigation

The impact of the project on parks and protected areas is expected to be minimal, with little or no change from previous operations at the quarry. Mitigation will include the use of Best Management Practices for all aspects of the quarry operation. Monitoring of surface water, groundwater, and blasting events will be conducted as per the terms and conditions of the IA.

6.2.12 Resource Use – Forestry, Hunting, and Trapping

Background

Use of the land in the proposed expansion area will remove the potential for future forestry use of the site, at least until after the quarry is closed and rehabilitated in future; however, the area occupied by the quarry is relatively small in relation to the available forest resources in the area, and the overall impact on economic return is expected to be small. The quarry will occupy a relatively small area of habitat for furbearing and game species and will not have a significant impact on hunting and trapping.

Significance and Mitigation

The impact of the project on resource use such as forestry, hunting and trapping is expected to be minimal, with little or no change from previous operations at the quarry. Mitigation will involve the minimization of the footprint of the quarry footprint within the NSECC approved quarry permit area, and the progressive rehabilitation of areas no longer required for aggregate production or site related activities.

6.3 Biophysical Components

6.3.1 Air Quality, Noise, and Light

Background

Quarry activities are not expected to change from the previous scope of operations. Various project activities have the potential to generate dust, emissions, noise, and light. The operation of heavy equipment (e.g., earth movers, crushers), rock drilling and blasting, as well as onsite routine operations contribute to noise, dust, and particulate levels. Dust emissions are expected to be localized and short term and are expected to be minimal from routine operations. Exhaust emissions will occasionally be generated by the operation of vehicles and equipment.

Noise, dust, and emission levels from the expanded quarry are expected to be similar to those already produced at the site, since there is no anticipated change in the scope of the quarry. Blasting is expected to occur infrequently (1-2 times per year during years in which the site is active).

Occasional night-time operations may be required. Light during night-time operations—particularly during times of low-hanging cloud and fog—can attract migrating birds traveling over water towards the rest of the mainland of Nova Scotia.

Significance and Mitigation

Overall, the impact of the project on air quality, noise and light is expected to be similar to the existing operation, with little or no change from previous operations at the quarry. With appropriate mitigation applied, potential impacts on air quality, noise, and light are expected to be minimal.

Dust management will be achieved through the use of water spray systems designed to reduce air borne dust originating from crushing operations and construction vehicle movement, by gravelling working areas, and reducing vehicle and equipment speed. Monitoring of airborne particulate emissions will be conducted at the request of NSE and in accordance with the Pit and Quarry Guidelines and the site Industrial Approval (IA). Industry standards and best practices will be followed during all phases of operations.

Noise mitigation will include maintaining appropriate operational buffers, maintaining vehicles and heavy equipment in operational order, and giving attention to traffic patterns around the site to reduce the need for heavy equipment to use back-up signals. The operation will ensure that heavy equipment does not exceed the noise limits specified in the Nova Scotia Pit and Quarry Guidelines. Blasting and the associated noise, is expected to occur infrequently (1-2 times year, during years in which the site is active). All blasting events will be monitored for concussion (noise) and ground vibration. Noise monitoring will be conducted at the request of NSE, in accordance with the terms and conditions of the Industrial Approval.

Vehicles and heavy equipment will follow efficient operating procedures such as not idling unnecessarily when not in use and avoiding use of engine braking. Given the location of the quarry and the scope of the planned operations, these emissions will be minimal (i.e., restricted to several pieces of heavy equipment, earth movers, trucks etc. as well as operation of portable crushers) and will be localized and similar in type and amount to those produced during previous operations. Ambient air quality monitoring will be conducted at the request of NSE, in accordance with the terms and conditions of the Industrial Approval.

With respect to light emanating from the site during infrequent night-time operations, measures will be taken to ensure use of directional lighting, which minimizes emanation of light upward and laterally over the horizon.

6.3.2 Groundwater

Background

Activities associated with the project including forest clearing, grubbing and removal of overburden, and blasting, can influence groundwater flow locally in the vicinity of the quarry, but are not expected to influence groundwater aquifers over a broader area. The amount of recharge area involved in project activities is moderate in relation to the overall size of the aquifers in the general vicinity. The quarry floor will continue to add recharge in approximately the same amount as at present. Groundwater can potentially be impacted by spills and/or leaks from operating equipment; however, activities will be managed to reduce the likelihood of spills.

Site operations and historic aggregate excavation has not encountered the deep bedrock water table as evidenced by the lack of water ponding on the quarry floor, no observed seepage from the quarry highwall, and no upwelling of water through the quarry floor.

Future aggregate excavation will not likely take place below the deep bedrock water table. In addition, there will be no pumping of groundwater and therefore no dewatering of the associated bedrock aquifer.

Significance and Mitigation

Overall, the impact of the project on groundwater is expected to be similar to the existing operation, with little or no change from previous operations at the quarry. With appropriate mitigation applied, potential impacts on groundwater are expected to be negligible.

The quarry excavation will not enter the groundwater table, so on-going pumping will not be required. If aggregate extraction below the groundwater water table is required in the future, a Hydrological Study will be completed and an application to amend the IA will be submitted to NSECC.

It is expected that a condition of EA approval will be to develop a groundwater monitoring program for the site. As part of the subsequent Industrial Approval (IA) process, an on-site groundwater monitoring program will be developed, and a network of groundwater monitoring wells will be constructed to establish baseline groundwater quality as well as existing groundwater table elevations. The monitoring well network will allow for on-going monitoring to ensure that any potential groundwater impacts are identified.

Dexter has developed a Contingency Plan for pit and quarry operations. The Contingency Plan includes procedures and processes for responding to environmental emergencies including spill or release occurrences that could potentially impact groundwater in the area. Spill response, clean-up, and reporting will be in accordance with applicable NSECC Regulations. The Contingency Plan will be included with subsequent IA applications for review by NSECC.

6.3.3 Hydrology / Water Quality

Background

Expansion of the quarry will modify the existing hydrology at the site, resulting in an artificial though managed regime of surface water movement and runoff at the site. The proposed expansion area and its potential effect on flow to local surface water will be minimal and therefore not significantly disrupted. In particular, prior to the quarry reaching mid-development conditions (i.e. 21-hectares), only one catchment area will be affected with an anticipated increase in runoff from existing conditions anticipated to be in the range of approximately 10% (Water Balance Assessment, 2023) (**Appendix F**).

If aggregate washing is required, wash water will be managed within the site itself such that all wash water is retained on-site and can be re-used in the aggregate washing process. Surface water runoff from the quarry is inherently intermittent and is not expected to affect overall flow characteristics in downstream areas significantly.

With respect to the characteristics of the quarry bedrock, a rock sample from the quarry was analysed for sulphur content to determine if the material was sulphide bearing. The results of this analysis yielded a sulphur concentration of 0.041 % (1.25 kg H_2SO_4/tonne), which is below the minimum (0.4 % S; 12.51 kg H_2SO_4/tonne) defined by NSE as sulphide bearing material. The laboratory results of this sample are included in **Appendix C** along with a duplicate sample, which was also below the minimum requirement. The quarry rock to be excavated is not acid producing and therefore will not have a negative effect on surface water or groundwater quality.

Significance and Mitigation

Overall, the impact of the proposed quarry expansion on the local hydrology (i.e., flow and quality) is expected to be similar to the existing operation. With appropriate mitigation applied, potential impacts on local hydrology are expected to be minimal.

The Water Balance Assessment estimates that runoff from the quarry will increase as a result of quarry expansion. It is expected that a condition of EA approval will be to develop a surface water management plan for the site, which will include consideration for a progressive increase in the amount of runoff from the quarry. The surface water management plan will be developed as part of the subsequent IA process and will include specific surface water controls and erosion and sediment control strategies. A monitoring program will be included with the surface water management plan. Surface water monitoring locations will be identified and monitored to establish baseline surface water quality. The surface water monitoring network will allow for on-going monitoring to ensure that any potential hydrology impacts are identified.

The Water Balance Assessment estimates that there will be a reduction in water flow within Catchment Area D (i.e. to Fox Lake), however given local topography any changes within this catchment area are not expected to occur until after the quarry has reached mid-development conditions (i.e. 21-hectares / anticipated to be 20+ years). Since quarry expansion into the Fox Lake catchment area will not be for many years and natural conditions may evolve or change in the preceding years, re-assessment of the Fox Lake catchment area to identify potential effects and develop mitigation will be conducted when the quarry development is in closer proximity to the catchment area. This re-assessment will be completed prior to quarry expansion within the Fox Lake catchment area.

Water usage will be primarily for dust control via spray systems on crushing spreads and application of water on roads. Water will either be sourced onsite through retained surface water in the fractured quarry floor or imported from offsite. The application of water for dust control will be at a rate that does not produce significant amounts of runoff that need to be managed. Anticipated water usage at the site is not expected to be at a frequency or volume that would require a water withdrawal approval.

6.3.4 Freshwater Aquatic Environments and Wetlands

Background

There are no permanent streams within the proposed quarry expansion area. Intermittent watercourses downstream from the quarry are not expected to be impacted significantly. Quantities of runoff arising from the site in future from the outer slopes of berms and grubbing piles will be approximately the same as at present and will remain in the same watershed. The quarry is unlikely to generate significant quantities of contaminants or suspended sediments that could impact any freshwater habitat. Development is intended to be to the south which will therefore avoid valuable wetlands and aquatic habitat at the north end of the study area.

Seven wetlands were identified within the Study Area; however, the proposed quarry expansion area has been modified to eliminate direct impacts to all wetlands except for a 0.01-ha seasonal pond. Quarry expansion will occur to the south, advancing the quarry away from wetlands to the north of the site. Given the presence of several species at risk, and known critical habitat for endangered species, it is anticipated that the wetlands to the north of the site will be designated as Wetlands of Special Significance (WSS). The proposed quarry expansion project will not impact any WSS.

Significance and Mitigation

Overall, the impact of the project on the local freshwater aquatic environments and wetlands is expected to be negligible.

Potential impacts to local freshwater aquatic environments and wetlands will be mitigated via the maintenance of forested buffer zones and using surface water and sediment control and monitoring procedures as outlined in the Hydrology and Water Quality Section.

Water flow will be maintained to wetlands surrounding the northern portion of the quarry. It can be inferred from the Water Balance Assessment conducted for the proposed quarry expansion that there will not be a reduction in runoff to these wetlands. It is expected that a condition of EA Approval for the site will include the development of a Wetland Monitoring Plan to monitor for indirect impacts to nearby wetland habitat. The Wetland Monitoring Plan will be developed as part of the subsequent IA Amendment Application.

Dexter has developed a Contingency Plan for pit and quarry operations. The Contingency Plan includes procedures and processes for responding to environmental emergencies including spill or release occurrences that could potentially impact surface water and groundwater in the area. Spill response, clean-up, and reporting will be in accordance with applicable NSECC Regulations. The Contingency Plan will be included with subsequent IA applications for review by NSECC.

6.3.5 Terrestrial Environments

Background

The proposed quarry expansion will utilize areas which are mainly cutover medium-aged deciduous and mixed forest types which are common in the general vicinity, and locally at the site and the quarry will not remove a large proportion of either type. Because the forest was recently logged, the forest removed in future will be a regenerated one. No unique habitats were identified at the site. Dust from operations may affect adjacent forest communities although the impacts are likely to be negligible. Other potential impacts include releases of chemicals from blasting and runoff from materials stored at the site, accidental spills from vehicles operating during quarrying operations, grubbing, road construction, pit preparation and damage to the natural forest ecosystem and associated species, changes to runoff patterns locally and associated effects to the local surface water and groundwater regimes.

Significance and Mitigation

Overall, the impact of the project on the local terrestrial environments is expected to be minimal. Mitigation to address the potential effects noted above will include the provision of pollution prevention and emergency control procedures; the use and maintenance of vegetated buffer zones; the removal of forest cover in small stages according to a site development plan; clearing of vegetation outside of the breeding seasons for birds; and rehabilitation of the site after use. Species specific breeding bird surveys will be conducted, as necessary, prior to excavation.

6.3.6 Fish and Fish Habitat

Background

None of the proposed project activities will physically impact potentially fish-bearing streams, and there is no fish habitat in the proposed expansion area. Surface runoff from the site mostly enters

groundwater. Runoff from the active quarry enters a quarry sump. Overflow from the sump exits via a culvert into catchments north of the quarry. No fish were found in the quarry sump and fish habitat in the watercourses nearby are unlikely to be impacted.

A Water Balance Assessment (**Appendix F**) has been completed as part of the EA process, which indicates that the expansion will not affect the supply of water to adjacent areas significantly as the proposed increase in runoff is approximately 10%. Near to mid-development (i.e. expansion to 21-hectares) changes in infiltration and runoff due to quarry expansion are expected to be minimal and within the anticipated range of seasonal variance. This suggests that there will be only minor changes in the quantity of runoff from the quarry possibly contributing flow to the local flowages. The working face of the current active quarry is more than 200 meters from the nearest fish-bearing stream, which is considered a safe separation from blasting activities. Overall, the effects of the quarry expansion on fish and fish habitat are expected to be negligible.

Significance and Mitigation

It is expected that a condition of EA approval will be to develop a surface water management plan for the site. A surface water management plan will be developed as part of the subsequent Industrial Approval (IA) process and will include specific surface water controls. A monitoring program will be included with the surface water management plan. Surface water monitoring locations will be identified and monitored to establish baseline surface water quality. The surface water monitoring network will allow for on-going monitoring to ensure that runoff from the quarry meets guidelines for maintenance of Freshwater Aquatic Life and the limits stipulated in the IA.

The Water Balance Assessment estimates that there will be a reduction in water flow within Catchment Area D (i.e. to Fox Lake), however given local topography any changes within this catchment area are not expected to occur until after the quarry has reached mid-development conditions (i.e. 21-hectares / anticipated to be 20+ years). Since quarry expansion into the Fox Lake catchment area will not be until late in the present development scenario and natural conditions may evolve or change in the preceding years, re-assessment of the Fox Lake catchment area to identify potential effects and develop mitigation will be conducted when the quarry development is in closer proximity to the catchment area. This re-assessment will be completed prior to quarry expansion within the Fox Lake catchment area. If it is determined that there may be impacts to fish or fish habitat in the Fox Lake catchment area appropriate permitting will be completed at this time.

All guidelines for activities and timing of blasting in the quarry will be followed and each blast will be monitored for concussion and ground vibration.

Dexter has developed a Contingency Plan for pit and quarry operations. The Contingency Plan includes procedures and processes for responding to environmental emergencies including spill or release occurrences that could potentially impact fish and fish habitat in the area. Spill response, clean-up, and reporting will be in accordance with applicable NSECC Regulations. The Contingency Plan will be included with subsequent IA applications for review by NSECC. In addition, safe driving practices for all vehicle operators will be implemented to minimize the potential of accidents, especially in the vicinity of key quarry intersections.

6.3.7 Flora and Fauna Habitat

Background

Expanding the Colpton Quarry will progressively remove existing terrestrial ecosystem (plants and animals) in the footprint of the quarry. With time, areas no longer suitable for quarry operations will be remediated through a site reclamation plan which will be established as a condition of the quarry Industrial Approval. Plant and animal communities that arise in the remediated areas will likely differ to some degree from those at present; however, a goal of remediation will be to ensure that conditions (soil types and topography) are reasonably restored to pre-existing conditions, to allow natural communities to re-establish. During recovery and revegetation of abandoned areas, the seeding in and succession of forest species will provide habitat for a moderate diversity of species which will change with time.

Removal of forest cover is a feature that quarry development shares with logging activities, which affects local ecosystems to a moderate degree, and is allowed in Nova Scotia. Expansion of the Colpton Quarry will result in only a comparatively small change in the coverage of natural and mature forest stands in the area and is expected to have comparatively small impact on interior forest birds and wildlife. During operations, modified areas of the quarry offer potential nesting sites for certain species of birds and other wildlife, including hunting spaces for species such as owls and nesting for ground nesting birds such as nighthawks. Night operations and use of lights have various effects, including attracting insects which otherwise would need darkness to mate and reproduce. Other quarry activities such as blasting and vehicular operation and movement are not expected to interact significantly with wildlife and therefore are not a concern.

Significance and Mitigation

The effects of quarry construction and operations on flora and fauna habitat with appropriate mitigation are expected to be negligible. Potential impacts will be mitigated as outlined below.

Areas no longer suitable for quarry operations will be progressively remediated. A Reclamation Plan has been established and updating the Plan every three years is a condition of the quarry Industrial Approval. Normal management practices regarding forest clearing, such as avoidance of cutting or major clearing activities during critical breeding periods of songbirds from mid-April to mid-September, will reduce loss of nesting birds in forest areas. Quarry employees will be educated on the need to check areas for activity and nests including both ground- and tree-nesting birds, before undertaking activities which would disturb established surfaces. Lighting used at the site should focus downward and below the normal horizon, to limit visibility by birds and insects from a distance.

It is expected that a condition of EA approval and the Industrial Approval for the quarry, will be to develop a Wildlife Management Plan for the site. The Wildlife Management Plan will establish appropriate mitigation measures to manage wildlife resources (avian species and their nests, species at risk, non-native plant species, etc.). Dexter has also developed a Contingency Plan for its pit and quarry operations. The Contingency Plan includes procedures and processes for responding to environmental emergencies including spill or release occurrences that could potentially impact flora and fauna in the area. Spill response, clean-up, and reporting will be in accordance with applicable NSECC Regulations. The Contingency Plan will be included with subsequent IA applications for review by NSECC.

6.3.8 Species at Risk

Background

The Colpton quarry is near a complex of wetlands and terrestrial environments which are largely in a natural condition and as well support a relatively large number of species of conservation concern, ranging from non-flowering plants (lichens) to higher level organisms of vertebrate groups including birds (Olive-sided Flycatcher) and herptiles (Blanding's Turtle, Eastern Ribbon snake, Snapping Turtle). Common Nighthawk, a ground nesting bird species is relatively common, north, and east of the existing quarry, but will be avoided by the quarry expansion to the south.

No American Marten and Canada Lynx (both provincially listed as Endangered) which can occur in Queens County have been recorded within 25 km of the site and neither have been trapped recently in the area and therefore the quarry will not have a significant potential for impacting them or their habitat. Lights during night operations during migration periods (April – June, August – September) would attract various bird species and insects, which could include species at risk. Blasting events, although infrequent (1-2 times/year during years in which the quarry is active) are also of concern to species at risk.

Significance and Mitigation

Overall, the effects of the quarry construction and operations on species at risk are expected to be negligible. Potential impacts will be mitigated as outlined below.

Quarry expansion will occur to the south, advancing the quarry away from wetlands and habitat for species at risk identified to the north of the site. These wetlands will not be physically disturbed as part of the proposed quarry expansion, and it is anticipated that a condition of the EA approval will be to develop a Wetland Monitoring Plan to ensure that there are no indirect impacts to the wetlands.

Employees will be made aware of the need to check areas for activity and nests before undertaking activities which would disturb established surfaces. Activities such as logging, and site clearing should be scheduled outside the April to mid-September nesting period for breeding birds. Lighting used at the site should focus downward and below the normal horizon, to limit visibility from a distance. With respect to blasting, this activity will be minimized when possible and concentrated in the spring and fall when species are generally absent (i.e., outside breeding and migratory periods).

It is expected that a condition of EA approval will be to develop a Wildlife Management Plan under the Industrial Approval (IA) process. The Wildlife Management Plan will establish appropriate mitigation measures to manage interactions with wildlife resources (avian species and their nests, species at risk, non-native plant species, etc.). If wildlife and/or species at risk concerns arise for which potential mitigation is unknown, Dexter staff will liaise with the appropriate regulatory groups and knowledgeable consultants to determine appropriate action.

6.3.9 Natural Areas and Wilderness

Background

Natural areas in the vicinity of the site are important for conservation of a wide range of species and ecosystem types and the comparative absence of development is appreciated by locals,

tourists, and Nova Scotians with an interest in conservation and outdoor experiences. The proposed expansion of the Colpton quarry will affect a small proportion of the natural landscape at the site at any given time, is a modified environment in the sense that it has experienced past and recent logging and is not likely to have effects via the atmosphere or through ground and surface water on adjacent relatively pristine areas. Consequently, it will have a negligible effect both on ecosystems and on human use and interests in adjacent environments. The proposed expansion of the Colpton Quarry will affect a small proportion of the natural landscape at the site and will have a limited effect on visitors to the area who are looking for nature experiences. It is noted that site operations which generate noise and dust will have some, but limited, effects on natural areas and wilderness.

Significance and Mitigation

Overall, the effects of the quarry construction and operations on natural areas and wilderness are expected to be negligible. Potential impacts will be mitigated as outlined below.

Mitigation to reduce potential impacts of the quarry on Air Quality, Noise, and Light, will be applied to reduce potential impacts on Natural Areas and Wilderness. This will include routine procedures and best management practices such as dust control and light management will help to minimize impacts on natural and wilderness values at the site. A quarry Reclamation Plan will be maintained, including provisions for progressive reclamation where appropriate, to rehabilitate areas no longer required for aggregate production. In addition, quarry reclamation will also consider values important in conservation of biological communities and ecosystems, as well as changes in physical conditions that could affect those communities.

7.0 IMPACTS OF THE ENVIRONMENT ON THE PROJECT

The Colpton quarry will not be impacted in general by weather, including extreme weather events expected to occur more frequently as a result of climate change. Quarry design, which includes site water management will allow flows generated from extreme rainfall events to be managed accordingly. Aggregate products produced and stockpiled at the site are stable under varying conditions of rainfall and wind.

As part of the subsequent Industrial Approval (IA) process, a surface water management plan and Erosion and Sediment Control Plan will be developed for the site, which will include consideration for extreme rainfall events. Integrity of any runoff management structures at the site will be inspected on a regular basis, in particular following major weather events. Corrective action will be undertaken, if needed, in a timely manner. Dry conditions, if encountered, however, may require access to outside water sources for dust control and routine operations which will be sourced from distant locations which will not impact the water balance of the nearby important wetlands. The site is comparatively well protected from high winds due to its central location in Nova Scotia, but wind will be considered in contingency planning for the site. Although extreme rainfall events may currently lead to high flows in watercourses near the site, such flows will be manageable through site design and infrastructure in accordance with the conditions of the Industrial Approval.

Changing climate may increase the operating season for transportation projects, and the need for aggregates produced by the quarry.

8.0 POTENTIAL CUMULATIVE IMPACTS

Because of the remoteness of the location, all the potential impacts of the quarry operation (dust, noise, lights, blasting, traffic volume) are unlikely to be compounded by other development or human activity. Considering that site operations are not expected to increase in frequency or scope from past use, and the amount of construction and roadwork in the area is not anticipated to increase significantly, the cumulative effect of these other developments (and other local activity) is not expected to change from past levels.

9.0 INDUSTRIAL APPROVAL CONDITIONS, MONITORING, AND REPORTING

Monitoring is an integral part of the operation of the Colpton Quarry and is dictated by the Pit and Quarry Guidelines and the Industrial Approval (IA) for the site. Typical monitoring at quarry sites includes surface water monitoring, groundwater monitoring, and blast monitoring (concussion and vibration). Noise and dust monitoring is typically conducted at the request of NSECC.

Surface water monitoring will be conducted as per the terms and conditions of the IA and is expected to include both background (upstream) and downstream water quality in watercourses potentially affected by quarry operations. It is expected that a condition of EA approval will be to develop a surface water management plan for the site, through the IA process. A surface water monitoring program will be included with the surface water management plan. Surface water monitoring locations will be identified and monitored to establish baseline surface water quality. The surface water monitoring network will allow for on-going monitoring to verify that surface water runoff from the quarry does not have an impact of downgradient receptors.

Groundwater monitoring will be conducted as per the terms and conditions of the IA. It is expected that a condition of EA approval will be to develop a groundwater monitoring program for the site under the IA process, and a network of groundwater monitoring wells will be constructed to establish baseline groundwater quality as well as existing groundwater table elevations. The monitoring well network is expected to include three industry standard monitoring wells. The monitoring well network will allow for on-going monitoring to ensure that potential groundwater impacts are identified.

Blast monitoring will be conducted as per the terms and conditions of the IA. Blast monitoring is required for all blasting events and includes measurement of air concussion and ground vibration at the nearest structures located around the quarry. Additionally, seismographs may be setup at other selected locations in the surrounding community to ensure that the blast parameters meet with those dictated by the stipulations in the Industrial Approval.

Other specific parameters that may be monitored will be included in the amended Industrial Approval.

All monitoring results are maintained by Dexter and provided to NSECC as part of an Annual Report for the Quarry. If a monitored parameter exceeds a limit noted in the IA, Dexter is required to immediately notify NSECC of the exceedance.

10.0 FUTURE PUBLIC AND FIRST NATION INVOLVEMENT

Public consultation and First Nation engagement efforts undertaken to date are documented in Section 4 of this EA Registration Document. Project stakeholders, the general public, and the Mi’kmaq of Nova Scotia will have an opportunity to provide feedback on the proposed quarry

expansion project by providing written comments to the NSECC EA Branch during the project review period.

It is expected that a condition of EA approval will be to develop a Complaint Resolution Procedure for receiving, documenting, and responding to feedback received related to the quarry.

Quarry approvals typically include provisions to implement a Community Liaison Committee (CLC) at the request of NSECC. If a CLC is required, Dexter will seek participation from the local community as well as First Nations representatives.

11.0 PROJECT CLOSURE / RECLAMATION

The quarry will be reclaimed in accordance with NSECC requirements and industry standards. Dexter maintains a Reclamation Plan for the quarry. As per the Terms and Conditions of the Industrial Approval (IA), the Reclamation Plan is updated every three years and submitted to NSECC for review. The Reclamation Plan includes provisions for progressive reclamation of areas that are no longer required for aggregate production or supporting activities. A quarry permit bond which reflects the total site disturbed area is maintained. The value of the bond is updated every three years in accordance with the updated Reclamation Plan to ensure that the bond value reflects the size and scope of future reclamation efforts at the site.

12.0 APPROVAL OF UNDERTAKING

Dexter will comply with all provisions of the Nova Scotia Environment Act and Regulations. Following successful EA approval, an application for an amendment to the existing Industrial Approval will be submitted to NSECC.

13.0 FUNDING

No public or other government funding is involved in the execution of this undertaking. All costs are borne by Dexter.

14.0 PROPONENT SIGNATURE

JANUARY 4th 2024 Gary Rudolph

Date

Gary Rudolph, P.Eng.
Director of Aggregates and Pavement Rehabilitation
Dexter Construction Company Limited

APPENDIX A
PROPERTY INFORMATION

Environmental Assessment Registration Document:
Colpton Quarry Expansion
Colpton, Lunenburg County
Nova Scotia

NOVA SCOTIA

81 Logan Road
Bridgewater NS
Canada B4V 3T3

902-543-4685 P
902-527-5480 F
www.novascotia.ca

APPROVAL

Province of Nova Scotia
Environment Act, S.N.S. 1994-95, c.1 s.1

APPROVAL HOLDER: DEXTER CONSTRUCTION COMPANY LIMITED

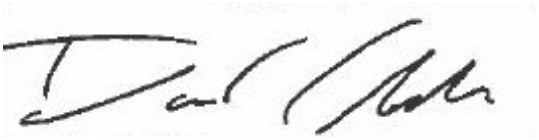
SITE PID: 60320637

APPROVAL NO: 2010-074832-01

EXPIRY DATE: June 18, 2031

Pursuant to Part V of the *Environment Act*, S.N.S. 1994-95, c.1 s.1 as amended from time to time, approval is granted to the Approval Holder subject to the Terms and Conditions attached to and forming part of this Approval, for the following activity:

Industrial - Construction - Quarry



Administrator: David Clarke

Effective Date: June 18, 2021

The Minister's powers and responsibilities under the Act with respect to this Approval have been delegated to the Administrator named above. Therefore, any information or notifications required to be provided to the Minister under this Approval can be provided to the Administrator unless otherwise advised in writing.

TERMS AND CONDITIONS OF APPROVAL

Nova Scotia Environment

Approval Holder: DEXTER CONSTRUCTION COMPANY LIMITED

Project: Highway 325, Colpton

Site:

PID	Civic #	Street Name	Street Type	Community	County
60320637	7275	HIGHWAY 325	HWY.	COLPTON	LUNENBURG COUNTY

Approval No: 2010-074832-01

File No: 92100-30-BRI-2010-074832

Reference Documents

- Application submitted March 17, 2021 and attachments.
- Appendix 8 Reclamation Plan
- Appendix 4 Registry of Joint Stocks - Company Profile
- Appendix 7 Quarry Contingency and Emergency Response Plan
- Colpton Quarry, IA Renewal Application - Supporting Documentation Approval No. 2010-074832 by Dexter Construction Company Limited (5 pages)
- Appendix A Contact List
- Appendix 3 Property Details
- Appendix 5 Site Plan
- Appendix 6 NSE Pit and Quarry Guidelines
- Appendix B Site Locations
- Appendix 1 Existing Industrial Approval
- Appendix 2 Site Location

1. Definitions

a. Abandonment means cessation of production of aggregate for a period of 36 months or notification of abandonment has been received by the Department in accordance with the Approval and Notification Procedures Regulations.

b. Act means Environment Act. 1994-95, c.1, s.1 , and includes, unless the context otherwise requires, the regulations made pursuant to the Act, as amended from time to time.

c. Active Area means the area occupied by the working face, disturbed areas, rehabilitated areas, any structure, processing facility, pollution abatement system, settling pond, aggregate stockpile and/or overburden associated with the Quarry and Quarry activities. The active area excludes the scale, scale house, and access roads.

d. Department means the Department of Environment, and the contact for the Department for this approval is:
Nova Scotia Environment
Western Region, Bridgewater Office
81 Logan Road
Bridgewater, Nova Scotia B4V 3T3

Phone: (902) 543-4685
Fax: 902-527-5480

e. Disturbed Area means an area in an unnatural state, affected by human activity associated with the Quarry.

f. Minister means the Minister of Environment and includes any person delegated the authority of the Minister.

g. Overburden means material, including organics, overlying a deposit of aggregate.

h. Site means a place where a designated activity and/or undertaking is occurring or may occur.

i. Surface Watercourse means a watercourse as defined in the Environment Act, excluding groundwater.

j. Undisturbed means in a natural state, unaffected by human activity, or rehabilitated to the satisfaction of the Department.

2. Scope

a. This Approval (the "Approval") relates to the Approval Holder(s) and their application and all documentation submitted to the Department prior to the issuance of this approval for the Quarry situated at or near Highway 325, Colpton.

b. The Approval Holder(s) shall ensure the designated activity is carried out in accordance with this Approval and reference documents, including the application and supporting documentation.

3. General

a. The Approval Holder(s) shall conduct the Designated Activity in accordance with the following provisions:

   i. The Act, as amended from time to time;

   ii. Any standard adopted by the Department, as amended from time to time, which includes but is not limited to the following:

   iii. Nova Scotia Environment and Labour Pit and Quarry Guidelines, 2003, as amended from time to time.

b. Nothing in this Approval relieves the Approval Holder(s) of the responsibility for obtaining and paying for all licenses, permits, approvals or authorizations necessary for carrying out the work authorized to be performed by this Approval which may be required by municipal by-laws, provincial or federal legislation, or other organizations. The Minister does not warrant that such licenses, permits, approvals or other authorizations will be issued.

c. No authority is granted by this Approval to enable the Approval Holder(s) to commence or continue the designated activity on lands which are not in the control or ownership of the Approval Holder(s). It is the responsibility of the Approval Holder(s) to ensure that such a contravention does not occur. The Approval Holder(s) shall provide, to the Department, proof of such control or ownership upon expiry of any relevant lease or agreement. Failure to retain said authorization may result in this Approval being cancelled or suspended.

d. If there is a discrepancy between the reference documents and the terms and conditions of this Approval, the terms and conditions of this Approval shall apply.

e. Any request for renewal or amendment of this Approval is to be made in writing, to the Department, at least ninety (90) days prior to the Approval expiry.

f. The Approval Holder(s) shall not transfer, sell, lease, assign or otherwise dispose of this Approval without the written consent of the Minister. The sale of a controlling interest of a business or a transfer of the approval from a parent company to a subsidiary or an affiliate is deemed to be a transfer requiring consent.

g. If the Minister cancels or suspends this Approval, the Approval Holder(s) remains subject to the penalty provisions of the Act.

h. The Approval Holder(s) shall advise the Department in writing prior to any proposed extensions or modifications to the Activity and/or the Site. An amendment to this Approval may be required before implementing any extension or modification.

i. The Approval Holder(s) shall immediately notify the Department of any incidents of non-compliance with this Approval.

j. The Approval Holder(s) shall bear all expenses incurred in carrying out the environmental monitoring required under the terms and conditions of this Approval.

k. Unless specified otherwise in this Approval, all samples required to be collected by this Approval shall be collected, preserved and analysed, by qualified personnel, in accordance with recognized industry standards and procedures that are all deemed acceptable to the Department.

l. Unless written authorization is received otherwise from the Minister, all samples required by this Approval shall be analyzed by a laboratory that meets the requirements of the Department's "Policy on Acceptable Certification of Laboratories" as amended from time to time.

m. The Approval Holder(s) shall ensure that this Approval, or a copy, is present on Site while personnel are on Site.

n. The Approval Holder(s) shall ensure that personnel directly involved in the designated activity are made fully aware of the terms and conditions of this Approval.

o. Upon any changes to the Registry of Joint Stock Companies information, the Approval Holder(s) shall provide a copy to the Department within five business days.

4. Separation Distances

a. The Approval Holder(s) shall not conduct the designated activity within the following separation distances unless otherwise exempted or varied by conditions of this approval:

i. Public or common highway - 30 m

ii. Watercourse (top of watercourse bank) or Wetland (boundary) - 30 m undisturbed

iii. Property line (of PID) including property lines abutting a public or common highway - 30 m undisturbed

iv. Dug or Drilled well not including site monitoring wells or non-potable process water wells located on the site - 90 m

b. The Approval Holder(s) shall not blast within the following separation distances unless the Approval Holder(s) has obtained written letters of permission from the property owner of the structure on or before the date of Approval:

i. All water supplies and other off-site structure - 800 m

5. Air Quality

a. The Approval Holder(s) shall ensure that air emissions from the designated activity do not contribute to an exceedance of the maximum permissible ground

level concentrations of contaminants specified in Schedule A of the Air Quality Regulations.

b. Monitoring of ambient air contaminants shall be conducted at the request of the Department. The number and location of the monitoring station(s) shall be established by a qualified person retained by the Approval Holder(s) and the proposed plan submitted to the Department for acceptance; this may include point(s) beyond the property boundary of the Site.

c. The use of oil as a dust suppressant is prohibited.

d. The Approval Holder(s) shall retain a qualified person to develop a plan to monitor ambient total suspended particulate matter at the request of the Department, in accordance with the EPA standard: EPA/625/R-96/010a, "Compendium of Methods for the Determination of Inorganic Compounds in Ambient Air, Method IO-2.1 Sampling of Ambient Air for Total Suspended Particulate Matter (SPM) and PM10 Using High Volume (HV) Sampler", as amended from time to time.

    i. The plan shall be deemed acceptable by the Department and implemented upon request.

6. Noise

a. The Approval Holder(s) shall ensure that noise generated from the designated activity complies with the equivalent sound level criteria identified in the Nova Scotia Environment and Labour "Guidelines for Environmental Noise Measurement and Assessment" dated May 18, 2005, as amended from time to time.

b. The Approval Holder(s) shall monitor noise at the request of the Department. The number and location of the monitoring station(s) for noise measurement shall be established by a qualified person retained by the Approval Holder(s). The proposed plan must be deemed acceptable by the Department.

7. Surface Water

a. The Approval Holder(s) shall ensure the Site is developed and maintained to prevent contaminants from being discharged into a water resource or beyond the property boundary.

b. Monitoring during construction and operations is to be carried out during any discharge events.

c. Monitoring during construction and operations: The Approval Holder(s) shall ensure that the following water quality limits are met in the water resource downstream of construction activities:

    i. Total Suspended Solids, Clear Flows (Normal Background Conditions):

        (a) Maximum increase of 25 mg/l from background levels for any short term exposure (24 hour or less);

(b) Maximum average increase of 5 mg/l from background levels for longer term exposure (inputs lasting between 24 hours and 30 days);

ii. Total Suspended Solids, High Flow (Spring Freshets and Storm Events)

(a) Maximum increase of 25 mg/l from background levels at any time when background levels are between 25 mg/l and 250 mg/l ;

(b) Maximum increase of 10% over background levels when background is >250 mg/l;

d. Additional surface water monitoring may be required at the request of the Department.

e. No authority is granted by this Approval to enable the Approval Holder(s) to discharge surface water onto adjoining lands without the authorization of the affected landowner(s).

f. The Approval Holder(s) shall install and maintain erosion and sediment controls in line with industry best practices (e.g., Nova Scotia Environment Erosion and Sediment Control Handbook for Construction Sites) with the following considerations:

i. The controls shall be installed prior to the commencement of the construction activities;

ii. The controls shall remain in place until areas disturbed by construction activities are stabilized so that the risk of release of sediment to a water resource has been mitigated;

iii. Control features shall be installed as per applicable product specifications or manufacturer's directions; and

iv. Control materials shall be clean, non-erodible, non-ore-bearing, non-watercourse derived and non-toxic.

g. The Approval Holder(s) shall immediately contact the Department should sulphide bearing material be encountered on the Site.

h. The Approval Holder(s) shall ensure that surface water runoff that may be impacted by petroleum hydrocarbons from the Site is collected and directed for necessary treatment prior to discharge from Site.

i. Erosion and sediment controls shall be inspected regularly, as required, and prior to and after any discharge events. These inspections shall confirm the erosion and sediment controls are working as designed and intended. Records outlining results of these inspections and actions taken to correct any deficiencies shall be kept for the duration of the approval and made available to the Department upon request.

j. Work at the site shall only take place when erosion and sediment controls are functional. Contingency erosion and sediment control materials shall be kept on Site in case of failure.

k. Any silted water pumped from work areas shall be directed to vegetated areas, settling ponds, or other treatment devices that mitigate the risk of release of sediment to a water resource.

l. The Approval Holder(s) shall limit the size of the disturbed area and the removal of riparian vegetation to the area of construction activities as outlined in the supporting documentation.

m. The Approval Holder(s) shall ensure that the following activities take place at a distance of a minimum of 30 metres from a surface watercourse or wetland in an area such that a release will not enter a surface watercourse or wetland:

i. Fuel storage, refueling, and/or lubrication of equipment;

ii. Washing of machinery or equipment; and

iii. Storage of equipment, excavated/stockpiled materials, and potential contaminants.

8. Groundwater

a. The Approval Holder(s) shall replace, at their expense, any water supply which has been lost or damaged as a result of the designated activity, as authorized and required by the Department.

b. The Approval Holder shall not excavate within 0.5 metres above the measured maximum annual water table elevation unless an amendment to this Approval is received, or unless otherwise authorized in writing by the Department.

9. Operation

a. The Approval Holder(s) shall ensure that legible signage is posted at the entrance to the Site that includes, but is not limited to,

i. information pertaining to the days and hours of operation;

ii. and emergency contact numbers.

b. The Approval Holder(s) shall cease site work and contact the Department immediately if it is determined that an area of historical, archaeological or paleontological importance may exist or is discovered at the site.

c. The boundaries of the Active Area shall be either:

i. Marked with permanent visible markers placed at changes in direction, with no more than 100 metres between the permanent markers; or

ii. mapped on a scale drawing with a list of UTM NAD83 coordinates (with sub-meter accuracy) for each corner of the Site.

10. Blasting

a. The Approval Holder(s) shall have a technical blast design prepared by a qualified person which ensures the ground vibration and air concussion limits in this Approval can be achieved.

b. At the request of the Department, the Approval Holder(s) shall submit a copy of the blast design.

c. At the direction of the Department, the Approval Holder(s) shall modify or cease blasting.

d. The Approval Holder(s)shall conduct a pre-blast survey of all structures within 800 metres of the point of blast including a water quality analysis of any wells serving these structures. The survey shall be conducted in accordance with the Department's "Procedure For Conducting a Pre-Blast Survey" and the results of this survey sent to the Department prior to blasting on the Site. Additional water quality parameters may be required by the Department staff.

e. No blasting will be performed if thermal inversion conditions are anticipated at the time of the proposed blast.

f. No blasting shall occur on Sunday, on a statutory holiday prescribed by the Province, or on any day between 1800 and 0800 hours.

g. The Approval Holder(s) shall ensure that all blasts are monitored for concussion and ground vibration to ensure that the limits in the Blasting Limits Table are not exceeded.

h. The Approval Holder(s)shall provide the Department with UTM NAD83 coordinates for the blast monitoring stations prior to the initial blast and again if the blast monitoring station locations change.

i. The monitoring station for blasting shall be as indicated in the Blasting Limits Table. Additional monitoring stations for blasting may be specified as required by the Department.

j. Records of individual blast results shall be maintained by the Approval Holder(s) and made available to the Department upon request.

11. Reporting

a. The Approval Holder(s) shall provide an Annual Report summarizing the following information, as required by the terms and conditions of this Approval, for each calendar year:

   i. all groundwater and surface water monitoring data and reports;

   ii. a description of any complaints received and the follow up actions taken;

   iii. a summary and interpretation of analytical results obtained in accordance with this Approval;

iv. a summary and interpretation of any instances of non-compliance with this approval and corrective action taken.

v. hectares disturbed and rehabilitated to date;

vi. estimates of hectares planned for disturbance or rehabilitation in the upcoming year;

vii. a summary of any communication with the Mi'kmaq of Nova Scotia;

viii. any other information requested by the Department.

b. The annual report described herein shall be submitted to the Department on or before April 1 of the following year.

c. All monitoring results shall include interpretation by a qualified person deemed acceptable by the Department.

12. Rehabilitation and Closure

a. The Approval Holder(s) shall review the most recent version of the rehabilitation plan for the designated activity at a minimum of every three years and update the plan accordingly based on current conditions. Updates to the rehabilitation plan must be acceptable to the Department.

b. An update to the rehabilitation plan is required by June 17, 2024.

c. The Approval Holder(s) shall review the amount of financial security provided to the Department at a minimum of every three years and adjust the amount accordingly based on the estimated costs of rehabilitation provided in the most recent version of the rehabilitation plan.

d. The amount of financial security shall be equal to the cost estimate of the site rehabilitation plan as amended from time to time and shall be no less than $6,250 per hectare of actual and planned disturbed area.

e. The Approval Holder(s)shall maintain for the site a financial security in a form and amount acceptable to the Department.

f. The existing financial security, and any subsequent financial securities, are to be renewed prior to expiration. The present security expires on December 1, 2021.

g. The rehabilitation plan shall include but not be limited to the following:

i. objectives for final land use;

ii. contouring and drainage patterns;

iii. soil stabilization methods including but not limited to revegetation and slope grades;

iv. objectives for existing structures and access roads; and

v. a detailed cost estimate including unit cost breakdown of labor, equipment, supplies, and services to perform the rehabilitation activities as completed by an outside service provider (third party).

h. The rehabilitation plan shall be implemented by the Approval Holder(s) once deemed acceptable by the Department.

i. Unless otherwise approved by the Department, updated rehabilitation plans shall meet the following criteria :

i. The site shall be contoured and stabilized:

(a) for long term erosion control;

(b) to mitigate impacts of offsite drainage to adjacent lands, wetlands, and watercourses; and

(c) to blend with natural topography.

ii. Except for engineered features (i.e., wetlands, ponds), all disturbed areas shall be returned to at least one metre above the water table.

iii. If an open pond is to remain on the site, at least 2 exit ramps shall be constructed, on opposite sides of the pond with maximum slope of 5:1 to enable safe exit.

13. Air Emissions

a. When required by the Department, the Approval Holder(s) shall conduct source testing in accordance with a standard deemed acceptable to the Department.

Blasting Limits			
Parameters	**Maximum**	**Monitoring Frequency**	**Monitoring Station**
Concussion (Air Blast)	128 dBL	Every Blast	Within 7 m of the nearest structure not located on the Site
Ground Vibration	0.5 in/sec (12.5 mm/s)	Every Blast	Below grade or less than 1 m above grade in any part of the nearest structure not located on the Site

NOVA SCOTIA
Registry of Joint Stock Companies

Profile Report

Entity details

Information as of	11 January 2024
Registry ID	1109762
Business/Organization Name	DEXTER CONSTRUCTION COMPANY LIMITED
Incorporation Date	18 November 1977
Annual Return due Date	31 December 2024
Type	Limited Company
Status	Active
Registered Office	600-1741 LOWER WATER STREET, HALIFAX, NOVA SCOTIA, B3J 0J2, CANADA
Mailing Address	PO BOX 997, HALIFAX, NOVA SCOTIA, B3J 2X2, CANADA

Directors and Officers

Name	Position	Civic Address	Mailing Address
CARL POTTER	Director, Chairman	927 ROCKY LAKE DRIVE BEDFORD NOVA SCOTIA B4A 3Z2 CANADA	
DAVID A. WOOD	Vice President, CFO and Treasurer	927 ROCKY LAKE DRIVE BEDFORD NOVA SCOTIA B4A 3Z2 CANADA	
DAVID PANGMAN	Vice President, Finance	927 ROCKY LAKE DRIVE BEDFORD NOVA SCOTIA B4A 3Z2 CANADA	
HAROLD JOHNSON	Vice President	927 ROCKY LAKE DRIVE BEDFORD NOVA SCOTIA B4A 3Z2 CANADA	
KEN MACLEAN	Vice President and Secretary	927 ROCKY LAKE DRIVE BEDFORD NOVA SCOTIA B4A 3Z2 CANADA	

Recognized Agent

Name	Position	Civic Address	Mailing Address
CHRISTINE POUND	Recognized Agent	600-1741 LOWER WATER STREET HALIFAX NOVA SCOTIA B3J 0J2 CANADA	PO BOX 997 HALIFAX NOVA SCOTIA B3J 2X2 CANADA

NOVA SCOTIA
Registry of Joint Stock Companies

Activity

Activity	Date
Company Annual Renewal Statement	15 December 2023
Company Notice Filing - Notice of Shares Redemption/Acquisition	03 May 2023
Company Notice Filing - Notice of Increase In Share Capital	03 May 2023
Company Special Resolution - Change in Share Structure	03 May 2023
Company Annual Renewal Statement	06 January 2023
Company Notice Filing - Notice of Increase In Share Capital	18 April 2022
Company Special Resolution - Addition to Capital	18 April 2022
Company Special Resolution - Addition to Capital	11 April 2022
Company Special Resolution - Addition to Capital	11 April 2022
Company Special Resolution - Acquire Own Shares	10 February 2022
Company Continuance (Existing Entity)	25 January 2022
Extra-provincial Renew My Registration	10 January 2022
Annual Statement Filed	11 December 2020
Annual Statement Filed	03 June 2020
Annual Statement Filed	02 January 2020
Change of Directors	06 November 2019
Annual Renewal	03 January 2019
Annual Statement Filed	03 January 2019
Annual Renewal	04 December 2017
Annual Statement Filed	04 December 2017
Change of Directors	18 October 2017
Annual Renewal	13 December 2016
Annual Statement Filed	13 December 2016
Annual Renewal	18 December 2015
Annual Statement Filed	18 December 2015
Address Change	25 August 2015
Appoint an Agent	25 August 2015
Change of Directors	10 July 2015
Annual Renewal	09 December 2014
Annual Statement Filed	09 December 2014
Annual Statement Filed	29 November 2013
Annual Renewal	26 November 2013

Change of Directors	12 September 2013
Change of Directors	18 March 2013
Annual Statement Filed	26 November 2012
Annual Renewal	26 November 2012
Change of Directors	22 June 2012
Annual Statement Filed	05 January 2012
Annual Renewal	14 December 2011
Annual Renewal	08 November 2010
Annual Statement Filed	08 November 2010
Change of Directors	14 May 2010
Annual Renewal	22 December 2009
Annual Statement Filed	22 December 2009
Change of Directors	21 July 2009
Annual Renewal	04 December 2008
Change of Directors	01 February 2008
Annual Renewal	23 November 2007
Annual Statement Filed	23 November 2007
Annual Renewal	14 November 2006
Annual Statement Filed	14 November 2006
Change of Directors	25 September 2006
Annual Renewal	22 November 2005
Annual Statement Filed	22 November 2005
Annual Renewal	04 November 2004
Annual Statement Filed	04 November 2004
Annual Renewal	13 November 2003
Annual Statement Filed	13 November 2003
Annual Renewal	17 December 2002
Annual Statement Filed	17 December 2002
Change of Directors	03 April 2002
Annual Renewal	21 January 2002
Annual Statement Filed	21 January 2002
Annual Renewal	27 November 2000
Annual Statement Filed	27 November 2000
Annual Renewal	29 November 1999

Annual Statement Filed	29 November 1999
Annual Renewal	16 November 1998
Annual Statement Filed	16 November 1998
Annual Renewal	03 December 1997
Annual Statement Filed	03 December 1997
Annual Renewal	30 January 1997
Annual Statement Filed	30 January 1997
Annual Report Filed	27 December 1995
Registered Office Change	29 December 1994
Reinstated	07 March 1989
Revoked for Non-Payment	30 December 1988
Agent Filed	28 April 1983
Change of Directors	09 March 1981
Registered	18 November 1977
Incorporated in Other Jurisdiction	22 December 1961

Related Registrations

Relationship	Name
Business Name	DEXTER PAVING
Business Name	NOVA SCOTIAN UTILITY CONSTRUCTION CORP.
Business Name	LENIHAN'S PAVING
Business Name	ROAD REDI

DEXTER
DEXTER CONSTRUCTION COMPANY LIMITED

MUNICIPAL ENTERPRISES LTD

December 11, 2023

To whom it may concern,

Re: Letter of Authorization – Environmental Permitting Applications

Please be advised that Gary Rudolph, P. Eng., Director of Aggregates, is hereby authorized by Dexter Construction Company Limited, Municipal Enterprises Limited, and Sovereign Resources Inc. (together referred to as the "Owner") to sign any "Application for Approval" for environmental approvals, permits and associated documentation related to regulatory approval processes for pits and quarries in the Province of Nova Scotia. This authorization pertains to Environmental Assessments, new applications and the renewal or amendment of existing approvals and is effective as of today's date until the earlier of the Owner's withdrawal of this authorization or December 31, 2024.

The undersigned is an officer of Dexter Construction and Municipal Enterprises and a director of and Sovereign Resources and has the power to make the above authorization.

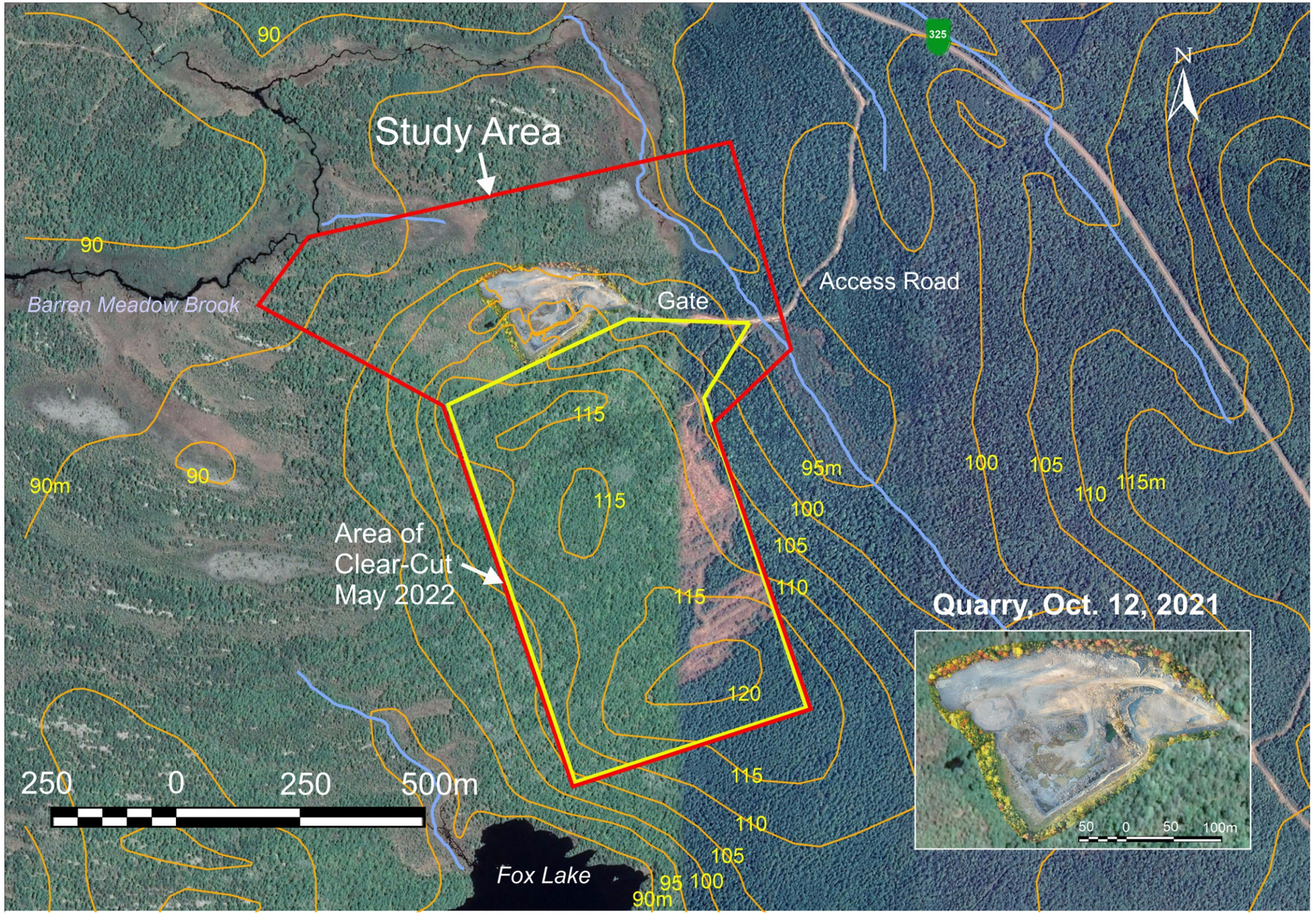
Sincerely,

DEXTER CONSTRUCTION COMPANY LIMITED,
MUNICIPAL ENTERPRISES LIMITED, AND
SOVEREIGN RESOURCES INC.

David Wood
Chief Financial Officer

APPENDIX B
DRAWINGS

Environmental Assessment Registration Document:
Colpton Quarry Expansion
Colpton, Lunenburg County
Nova Scotia



DEXTER CONSTRUCTION COMPANY LIMITED
COLPTON QUARRY EXPANSION
Colpton, Lunenburg County,,
Nova Scotia

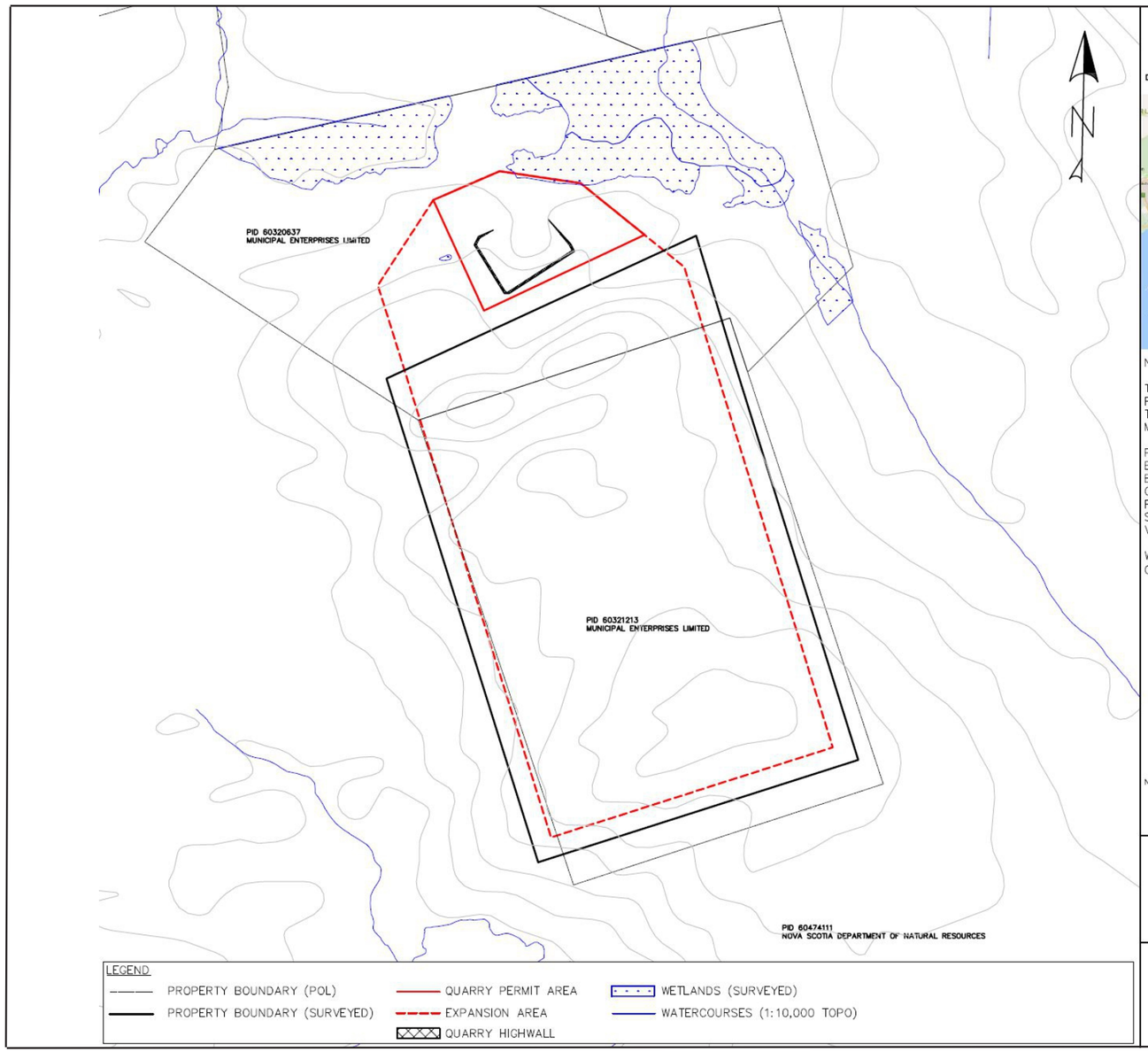
SITE DETAILS & PROPOSED EXPANSION AREA

Map by:
Envirosphere Consultants Limited
Windsor, Nova Scotia
May 2022

Air Photo: GoogleEarth 2019 & 2022

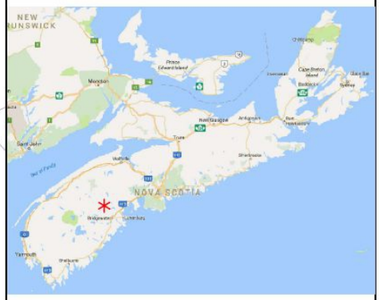
DEXTER
DEXTER CONSTRUCTION COMPANY LIMITED

Appendix B - Drawing 1



COLPTON QUARRY
SITE PLAN
LUNENBURG COUNTY, NOVA SCOTIA

DATE: DECEMBER 8, 2023 DRAWN BY: RHETT THOMPSON, P.ENG



NOTES:

TOPOGRAPHIC DATA AND WATERCOURSES OBTAINED FROM NS GEOMATICS CENTER 1:10,000 TOPOGRAPHIC MAP. TOPOGRAPHY LINES ARE AT 5 METER INTERVALS

PID 60321213 PROPERTY BOUNDARIES SURVEYED BY BERRIGAN SURVEYS LIMITED. ALL OTHER PROPERTY BOUNDARIES SHOWN ARE AN APPROXIMATE GEOGRAPHICAL REPRESETNATION ONLY, OBTAINED FROM NOVA SCOTIA PROPERTY ONLINE, AND ARE SUBJECT TO A LEGAL BOUNDARY SURVEY FOR VERIFICATION.

WETLANDS SURVEYED BY ENVIROSPHERE CONSULTANTS (COLPTON QUARRY EA 2023)

NOTE: THIS IS NOT A LEGAL SURVEY

DEXTER

DEXTER CONSTRUCTION COMPANY LIMITED

DEXTER CONSTRUCTION COMPANY LIMITED
COLPTON QUARRY EXPANSION
Colpton, Lunenburg County
Nova Scotia

APPROVED QUARRY SITE PLAN

DEXTER

DEXTER CONSTRUCTION COMPANY LIMITED

Appendix B - Drawing 2

APPENDIX C
ROCK SULPHUR CONTENT ANALYSIS RESULTS

Environmental Assessment Registration Document:
Colpton Quarry Expansion
Colpton, Lunenburg County
Nova Scotia

DALHOUSIE UNIVERSITY
Inspiring Minds

Minerals Engineering Centre

Dalhousie University
1360 Barrington Street
5273 DaCosta Row
Chemical Engineering Bldg. Rm. 3305
PO Box 15000, Halifax, NS
B3H 4R2

minerals.engineering.dal.ca
Tel: 902.497.3958
Email: mec@dal.ca

04-Aug-21

Dexter Construction Co. Ltd.
927 Rocky Lake Drive
P.O. Box 48100
Bedford, NS
B4A 3Z2
Atten: Jeff MacEwan

Re: Results of analysis on submitted samples.
Acid producing potential based on total sulphur, or sulphide sulphur content if available.

PO#
Job#

	Wt. %			kg H2SO4/t
Sample	S(Total)	Sulphate	Sulphide	Acid Prod. Potential
[redacted]	<0.001			<0.03
[redacted]	0.003			0.09
[redacted]	0.038			1.16
[redacted]	0.035			1.07
Colpton Quarry July12(shot rock)	0.041			1.25
Colpton Quarry July12(shot rock)Dup	0.036			1.11

	Wt. %
Certified Ref. Sa.	S(Total)
KZK-1 (0.80% S)	0.799

Digitally signed by Daniel Chevalier, MASc
Date: 2021.08.04 13:27:39 -03'00'

Daniel Chevalier, MASc
Manager, Minerals Engineering Centre

DALHOUSIE UNIVERSITY
Inspiring Minds

Minerals Engineering Laboratory

Dalhousie University
1360 Barrington Street
5273 DaCosta Row
Chemical Engineering Bldg. Rm. 3305
PO Box 15000, Halifax, NS
B3H 4R2

minerals.engineering.dal.ca
Tel: 902.497.3958
Email: mec@dal.ca

11-Sep-23

Dexter Construction
927 Rocky Lake Drive
P.O. Box 48100
Bedford, NS
B4A 3Z2
Atten: Chris Mullins

Re: Results of analysis on submitted samples.
Acid producing potential based on total sulphur, or sulphide sulphur content if available.

PO#
Job# 2301027-9270

	Wt. %			kg H2SO4/t
Sample	S(Total)	Sulphate	Sulphide	Acid Prod. Potential
Colpton Quarry Blast 2023-01	0.063			1.93
Colpton Quarry Blast 2023-01 Dup.	0.066			2.02

	Wt. %
Certified Ref. Sa.	S(Total)
KZK-1 (0.80% S)	0.800

Daniel Chevalier, MASc
Manager, Minerals Engineering Laboratory

APPENDIX D
BIOPHYSICAL ASSESSMENT REPORT
(Envirosphere Consultants Limited, 2023)

Environmental Assessment Registration Document:
Colpton Quarry Expansion
Colpton, Lunenburg County
Nova Scotia

Biophysical Assessment:
Colpton Quarry Expansion
Colpton,
Lunenburg County, Nova Scotia –
PIDs 60320637 and 60321213

April 2023

Prepared for:

Municipal Group
Bedford, Nova Scotia

Prepared by:

Envirosphere Consultants Limited
P.O. 2906, Unit 5 – 120 Morison Drive
Windsor, Nova Scotia B0N 2T0
Tel: (902) 798-4022 | Fax: (902) 798-2614
www.envirosphere.ca

P.O. 2906, Unit 5 – 120 Morison Drive
Windsor, Nova Scotia B0N 2T0
Tel: (902) 798-4022
Fax: (902) 798-2614
Email: enviroco@ns.sympatico.ns.ca
www.envirosphere.ca

TABLE OF CONTENTS

List of Figures:

List of Tables:

1 INTRODUCTION

Municipal Enterprises Limited, Bedford, Nova Scotia (Municipal), is proposing to expand its quarry in the Colpton area, Lunenburg County. The quarry is presently operating under an industrial approval for a quarry less than four hectares (ha) in size. An approval to expand the quarry beyond the current size is required under the Environmental Assessment Regulations of the Nova Scotia *Environment Act.* Municipal contracted Envirosphere Consultants Limited of Windsor, Nova Scotia, to prepare a biophysical and socio-economic overview and assessment of the proposed quarry expansion in support of the Environmental Assessment application. This report contains the results of the overview and assessment. It presents a description of the methodology and scope, existing environment, environmental effects, cumulative effects, discussion, and conclusions. The assessment provides a sufficient level of detail to ensure that all information necessary to allow adequate review of the project is provided; to demonstrate how the assessment was conducted; and to document the information on which the conclusions were based.

2 INFORMATION SOURCES

Information for the biophysical and socio-economic overview and assessment was collected from various sources, including interviews with representatives of the Nova Scotia Department of Natural Resources and Renewables (NSNRR); contacts with organizations, businesses and individuals in the area; review of published information including soil surveys, reports on geology, archaeology, and natural history (e.g. *Natural History of Nova Scotia*); use of relevant websites and databases (e.g. Nova Scotia Open Data Portal; Nova Scotia Department of Natural Resources and Renewables (NSNRR) Significant Habitat and Wetland Databases, Atlantic Canada Conservation Data Centre, Communities, Culture and Heritage Nova Scotia (CCHNS)—Nova Scotia Museum of Natural History; and use of maps, digital data on land use, and property ownership, aerial photos, and 1:50,000 topographic maps. Site visits and walkovers by project personnel were carried out on June 19-20, 2022 and October 17-18, 2022 (late spring/early summer and fall botany surveys); May 14, 2022 and May 29, 2022 (owls and breeding birds); May 17-18, 2022 (wildlife survey); July 6-7, 2022 (site reconnaissance); and September 19, 2022 (lichen survey). Key project personnel included Patrick Stewart (M.Sc.), Hayley Doyle (B.Sc. Environmental Science), and Heather Levy (B.Sc. Hons. Environmental Science) (background review, site reconnaissance, wetlands, water quality & fish habitat assessment); Ruth Newell, M.Sc. (botany survey); Mark Pulsifer, M.Sc. (wildlife); Chris Pepper (lichens); and Fulton Lavender and Richard Hatch (bird surveys).

3 SITE LOCATION AND STUDY AREA

The Colpton Quarry in Lunenburg County is located approximately 22 kilometers northwest of the Town of Bridgewater, Lunenburg County, Nova Scotia at approximately UTM Zone 20, NAD83, Easting 356939 and Northing 4922500 and PIDs 60320637 and 60321213. The quarry is accessed by a gravel road leading off Highway 325. The study area for the assessment is shown on Figure 1; on satellite imagery from October 2022 (Figure 2); and in Figures 3 to 5. The proposed quarry expansion will be located entirely within the EA study area (Figures 1 and 2) and south of the existing quarry.

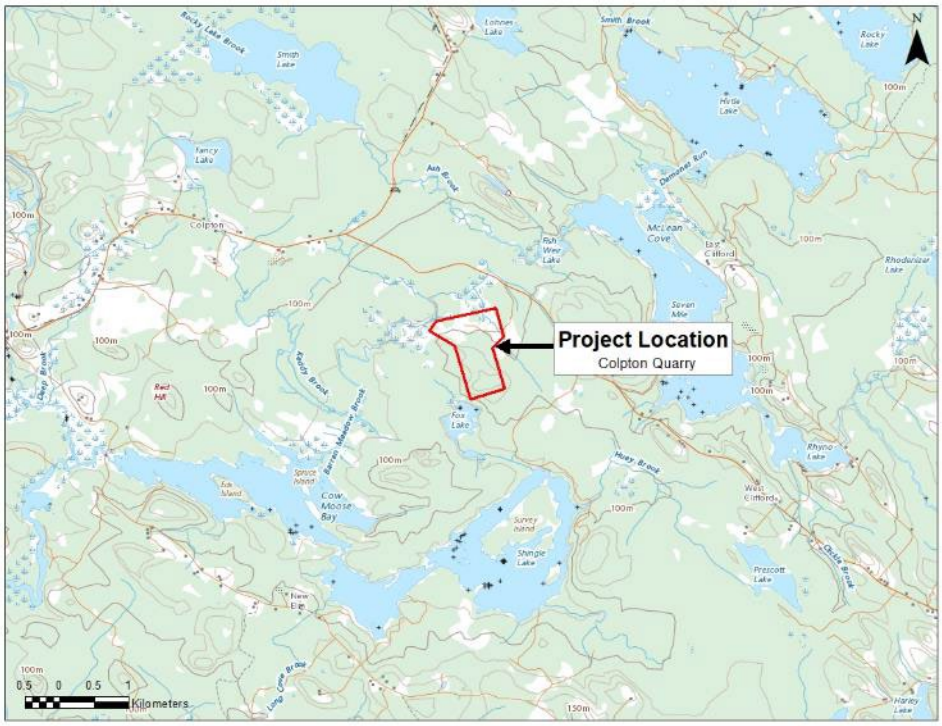


Figure 1. Project location shown on NTS 1:50,000 mapping (21A07).

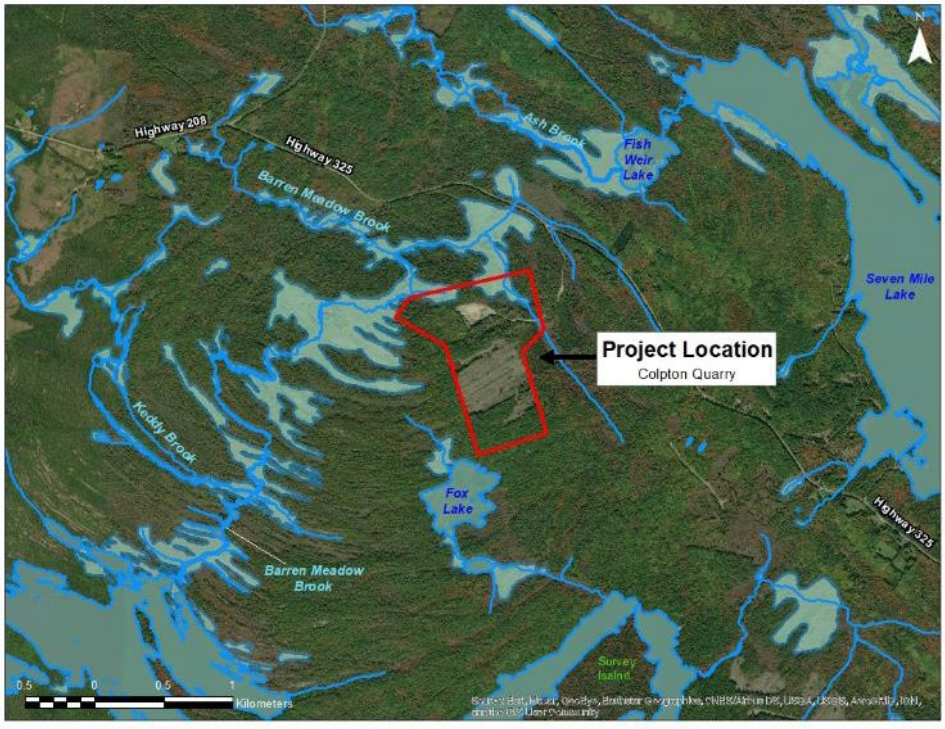


Figure 2. Study area in relation to local site features in recent satellite image.

Figure 3. View of the Colpton Quarry, facing southwest, July 6, 2022.

Figure 4. View of northeast end of the Colpton Quarry, July 6, 2022.

Figure 5. Stockpile areas near the west end of the quarry, July 6, 2022.

4 EXISTING ENVIRONMENT

4.1 PHYSICAL ENVIRONMENT

4.1.1 CLIMATE AND WINDS

The Colpton Quarry is located inland, about 35 kilometers from the Atlantic Coast, within the central, broad drumlin landscape which stretches from Kejimkujik National Park in the west to New Ross in the east. The site is located in the LaHave Drumlins Ecodistrict (740) (NSDNR 2015) (Lunenburg Drumlins Ecodistrict; Webb and Marshall 1999) which generally has early, warm springs followed by a relatively mild winter and a mean annual temperature of 6.6 °C. Average daily temperatures are moderate, ranging from a low of -5.2 °C in January to 19.0 °C in July and an annual average of 7.1 °C (Canadian Climate Normals 2022) (Figure 6). The LaHave Drumlins Ecodistrict has a high annual average precipitation of 1535.7 mm (measured at Bridgewater), about 13% coming as snow, mainly in January (Canadian Climate Normals 2022). Most precipitation comes as rain in the fall to early winter (October to December) and early spring (March-May) and as snow in January-February. Extreme daily precipitation events can be expected, as in most parts of Nova Scotia, in particular due to a tendency for more extreme weather events to occur as a result of global climate change. Wind patterns are similar to other locations on the south shore of Nova Scotia—generally strongest in winter, predominantly from the west to northwest (December-February), shifting to west in the spring (March-May). Predominantly southwest winds occur in June to August shifting back to the west for the fall (September-November) (Environment and Climate Change Canada 2016).

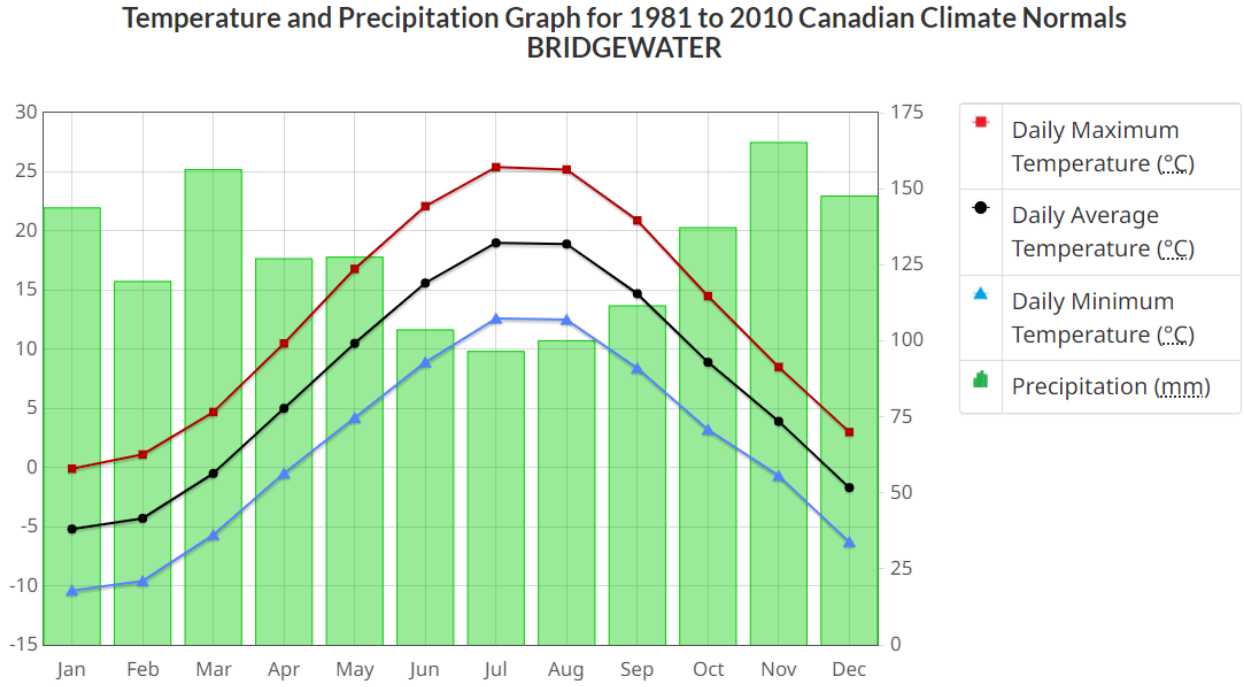


Figure 6. Annual precipitation and temperature cycle, Bridgewater (1981-2010) (Canadian Climate Normals 2022).

4.1.2 TOPOGRAPHY AND GEOLOGY

Landscape

Colpton Quarry and associated study area for the environmental assessment is located inland in the LaHave Drumlins Ecodistrict (740). The LaHave Drumlins ecodistrict is defined by extensive fields of drumlins with a landscape that is gently rolling and slopes slightly southeast toward the Atlantic Ocean. The study site is located in south-central Nova Scotia, approximately 22 kilometers northwest of the Town of Bridgewater, near the northwestern limit of the Ecodistrict. The Quarry is centred on a topographic prominence which reaches a maximum elevation of 120 meters at the south end, with a minimum elevation of approximately 92 meters above sea level, near the northeast end of the study site. The LaHave Drumlins ecodistrict features well-drained soil and with its gently rolling landscape and a mild climate in places nearer the coast are used for cultivation and agriculture (NSDNR 2015). However, the study area features exposed areas of the Meguma Group, Goldenville Formation bedrock over most of the site, forming a barrens where bedrock is close to the surface and often exposed, and soils are shallow and drier creating little potential for agriculture use (Stea et al., 1992). Mature mixed forest forms the predominant cover in the area but most of the southern section of the site has been recently clear cut.

Figure 7. Forest landscape at the Colpton Quarry including clear cut area (right), July 6, 2022.

Bedrock Geology

Bedrock at the quarry belongs to the Goldenville Group, which is composed of Cambro-Ordovician quartzites, meta-greywakces, and lesser amounts of slate. A contact with the Halifax Group is located three to five kilometers southeast of the quarry (Figure 8). The Goldenville and Halifax groups were derived from seafloor sediments that were metamorphosed during the Appalachian-Caledonide orogeny (Waldron et al., 2009). Quartzites of the Goldenville Group are a source of high quality aggregate due to the durability, hardness, and resistance to weathering of the crushed stone (Prime and White, 2009). Rocks in the Goldenville Group are also typically low in pyrite or other sulfides and has low acid-generating potential (White and Goodwin, 2011).

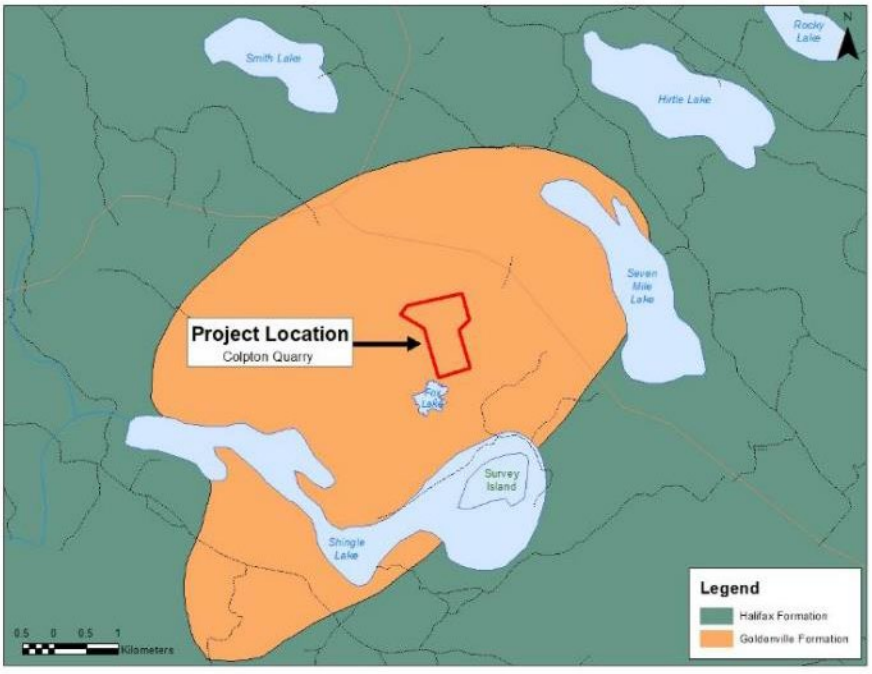


Figure 8. Bedrock formations in the vicinity of the Colpton Quarry (Keppie 2000).

Surficial Geology

Colpton Quarry and the surrounding, immediate area is located in a broad expanse of largely exposed bedrock with shallow soils, centered around Fox Lake (Figure 9). Surrounding areas are overlain with a shallow layer of basal till derived largely from local bedrock and northwest-southeast oriented drumlins. This combination of flat to very shallowly sloping geography and relatively recently deposited glacial sediments has resulted in a poorly organized drainage system with abundant wetlands, leading to peat deposits in a few locations. This combination of nutrient-poor, stony soil and poor drainage results in land that had limited use for either agriculture or construction (Stea et al. 1992).

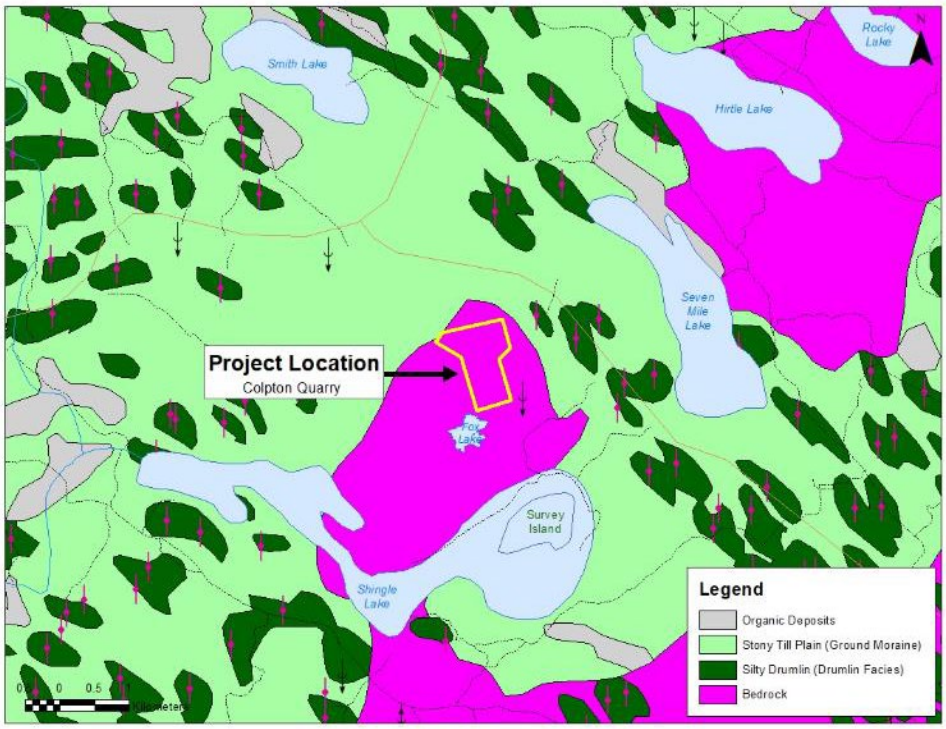


Figure 9. Surficial geology of the study area. From Stea et al. (1992) and digital version (2006).

4.1.3 AIR QUALITY, NOISE & LIGHT

The Colpton area experiences low levels of artificial light, ambient noise, and high air quality. No large urban centres occur in the area which could be a source of artificial light; ambient noise levels at the quarry reflect traffic noise along Highway 325, as well as noise from traffic and operations of the quarry; and air quality is expected to be good due to the remote rural location and predominantly natural setting.

Light coming from vehicle activity on nearby Highway 325 is expected to be low to non-existent at the quarry due to the low population density and traffic of the area, distance from the highway and the length and winding direction of the quarry access road. If lighting was used at the quarry for nighttime operations, 'skyshine' from operations when low clouds occur, might be seen from adjacent communities of Colpton or West Clifford.

The vicinity of the Quarry is expected to have relatively high natural baseline air quality typical of areas with a high proportion of natural landscapes such as neighbouring forested wilderness areas, open water such as Fox Lake, natural wetland areas around Barren Meadow Brook and the largely undeveloped surrounding area. Low levels of human activity, including vehicle traffic along Highway 325, as well as that associated with quarry activities, have little impact on overall air quality at the site. Periodic dust and vehicle exhaust emissions from quarry activities as well as regular residential vehicle traffic are the main contributors to particulates and exhaust emissions, which are expected to be at low levels.

The quarry and associated movement of trucks and equipment would continue to provide a minor and periodic source of noise in the area. Operations at the quarry are periodic in response to demand for product and are likely one of the main noise sources in the area. Operational noise would not be heard in the closest communities to the site—Colpton and West Clifford. Blasting occurs typically one to two times per year during years in which the quarry is active; operation of a portable crusher and heavy equipment may take place periodically and temporarily add to noise levels when the quarry is in operation; a portable asphalt plant may operate at the site periodically; and trucks are used to transport product and move the portable equipment as required. Typical noise includes blasting and sounds from the crusher and other heavy equipment operations (e.g. motors, generators, back-up signals etc.). The scope of operations for the quarry, including annual production, is not expected to change as the result of expansion, and ambient noise levels in general are expected to be localized. All trucks leaving the site are required to follow Municipal's best operational practices, as well as those established by Truckers Association of Nova Scotia (TANS) and the Nova Scotia Road Builders Association (NSRBA), to minimize emissions. Noise levels arising from the quarry in the future will continue to meet the limits established in the Nova Scotia Pit and Quarry Guidelines and are expected to be consistent with those produced by the existing quarry operations at the site.

4.1.4 HYDROLOGY

The Colpton Quarry is located in the upper headwaters near the east side of the Medway River (1EE-2) secondary watershed that drains a large area of central Nova Scotia via the Medway River into the Atlantic Ocean. Uplands have shallow to non-existent overburden and occasional bedrock exposures, leading to rapid runoff after precipitation events over land, through intermittent flowages, into wetlands, or existing watercourses. The study area is on a gradual downslope from the south and surface flows eventually meet different wetlands along the northern boundary of the study site that surround tributaries to Barren Meadow Brook. One unnamed watercourse which is a tributary of Barren Meadow Brook, flows south to north within the study area east of the active quarry (Unnamed Tributary 1, Figure 10), from headwaters southeast of the property. The watercourse flows through a large riparian swamp that was flooded by beaver activity, and is now a modified beaver pond / meadow that borders northern and eastern areas of the current quarry study area (Figure 10). A second unnamed tributary to Barren Meadow Brook and associated wetland occurs at the northwest end of the study area, flowing west to join the main branch of Barren Meadow Brook (Unnamed Tributary 2). The cutover area south of the active quarry pit features various surface water pools, vernal pools and infilled abandoned mine shafts with standing water (Pulsifer 2022; CRM 2022).

Barren Meadow Brook flows westward into Shingle Lake, which discharges at its west end through Eel Weir Stillwater, into Pleasant River, which flows south through the community of Pleasant River immediately west of Colpton. Pleasant River eventually discharges into Molega Lake, one of several large lakes in southwestern Nova Scotia. Molega Lake discharges west into Wildcat River at a point within the Wildcat First Nation, and

the latter joins the Medway River southeast of South Brookfield. The Medway then flows into Ponhook Lake, and then leaves it to flow southeastward to discharge into the Atlantic Ocean at Port Medway.

A sump on the eastern side of the active quarry area, adjacent to the highwall, has been constructed to collect surface water within the active quarry excavation (R. Thompson, Municipal Enterprises, personal communication, 2023). Surface water overflow from the sump drains through a culvert which leads north into the vegetated swamp wetland northeast of the quarry.

Flows in watercourses in the vicinity of the site are expected to follow a seasonal pattern, with highest flows in the fall (October-November) and winter, peaking after snow melt in spring (April) and dropping to low, or non-existent levels in summer (July-September). Much of the Medway River watershed is forested and flows are expected to be moderate in response to precipitation events, compared to the exposed surfaces of the quarry. Although increased flashiness of flows leaving the quarry may be expected, the Colpton Quarry study area (77 ha) occupies only 0.05% of the 1EE-2 secondary watershed (151,914 ha) and therefore is not expected to impact flows to a significant degree. A parallel Water Balance Assessment for the proposed quarry expansion estimated that prior to the quarry reaching mid-development conditions, most of the area will have a negligible increase in runoff; and one catchment area will have an increase in runoff relative to existing conditions of approximately 10%.

Figure 10. Unnamed tributary to Barren Meadow Brook flowing southeast to north west (*left*) and associated wetland (*right*) east of the study area, July 6, 2022.

4.1.5 HYDROGEOLOGY

The site is underlain predominantly by meta-sedimentary bedrock of the Goldenville formation with negligible soil cover, and groundwater develops predominantly subsurface in cracks and fractures, and on horizontal surfaces between strata in bedrock. The water table at the site is below the floor of the quarry based on current drainage characteristics at the site. The actual depth of the bedrock water table at the quarry site is not known, but it has not been encountered during previous quarry operations, and it is not anticipated that the quarry expansion will reach the bedrock water table.

Surficial and shallow groundwater flow is anticipated to mirror the topographic slope, which although disorganized, flows largely north over the northernmost third of the study area; and east, west and south off the sides of a topographic high which occupies the southern two-thirds of the study area.

Precipitation reaching the quarry floor infiltrates the floor or leaves via ditches and outflows into a sump which drains into a nearby wetland; while some is expected to enter groundwater as seepage through cracks and fractures. Some areas of the site have small surface accumulations of water retained above bedrock in local depressions: however, this is retained surface water and not an expression of the groundwater table.

4.1.6 SOILS

Much of the site is dominated by a bedrock surface at or near ground level, with little or no soil and which is rocky and poorly drained (Cann and Hilchey 1958). Soils are shallow lithosols derived directly from the bedrock which is usually quartzite and greywacke. Larger depressions and watercourse valleys at lower elevations frequently form swamps which have developed peat deposits, but bogs and associated peat deposits are not a feature of this environment. The land surface is usually quite stony and quartzite boulders frequently occur on the surface.

4.2 BIOLOGICAL RESOURCES AND HABITAT

4.2.1 TERRESTRIAL ENVIRONMENT

The site is in the LaHave Drumlins Ecodistrict (740) and vegetation reflects characteristics found throughout the ecodistrict, including predominance of shade-tolerant softwood forest cover dominated by Red Spruce, White Pine and Eastern Hemlock on well drained, shallow and sandy loams soils (NSNRR 2015). Mixed woods, which also occur at the site, include Red Maple, Red Spruce, Black Spruce, White Pine, and Balsam Fir. Parts of this ecodistrict and particularly at higher elevations, such as at the Colpton Quarry site, occur over bedrock formations which retained only a thin cover of glacial till and have developed shallow soils and exposed barrens, although still containing many of the major forest species typical of the ecodistrict.

The study area is largely a cutover or modified mixed forest with additional areas that are in a natural state. Areas southeast of the active quarry support natural stands of predominantly shade-tolerant mixed wood forest and has been recently cutover or modified. Natural stands of mixed wood forest also occur within the study area surrounding the existing quarry footprint predominantly to the west as well as a small area near the southern boundary of the property (Map A-3). All plant species identified within the study area were non-invasive (i.e. introduced species with potential to harm the environment or known to interfere with the ecological balance), and consisted of both native species with secure populations in Nova Scotia, as well as exotic species in some locations. Plant species found at the site during June 18-19 and October 17-18, 2022 (late spring/early summer and fall) botany surveys, are presented in the survey report (Appendix B).

Around the margins of the active quarry, where forest cover has been removed and drainage has been affected by quarry activities, a disturbed vegetated community occurs. These modified areas either drop abruptly in elevation or are level to gently sloping down to where they transition into the surrounding woodland; they are usually mesic or moderately dry. These open disturbed areas feature scattered patches of generally weedy, mostly non-native vegetation (Figure 11). Native and non-native, herbaceous, vascular plant species occurring within the quarry pit area include Dwarf Snapdragon (*Chaenorhinum minus*), Rabbit's-

foot clover (*Trifolium arvense*), White Clover (*Trifolium repens*), Common Plantain (*Plantago major*), Canada Bluegrass (*Poa compressa*), Rough Fleabane (*Erigeron strigosus*), several hawkweeds (*Hieracium* spp.), an evening primrose (*Oenothera* sp.), Common St. John's-wort (*Hypericum perforatum*), Ox-eye Daisy (*Leucanthemum vulgare*), Dandelion (*Taraxacum officinale*), Pearly Everlasting (*Anaphalis margaritacea*), Queen Anne's Lace (*Daucus carota*), Calico Aster (*Symphyotrichum lateriflorum*) and Variegated Horsetail (*Equisetum variegatum*).

Vascular plant species present in the large, recently cutover area southeast of the open quarry pit include Bracken Fern (*Pteridium aquilinum*), Wild Raspberry (*Rubus idaeus ssp. strigosus*), Bristly Aralia (*Aralia hispida*), Wild Sarsaparilla (*Aralia nudicaulis*), Velvet-leaved Blueberry (*Vaccinium myrtilloides*), Northern Bush Honeysuckle (*Diervilla lonicera*), Sheep Laurel (*Kalmia angustifolia*), Black Cherry (*Prunus serotina*), Starflower (*Lysimachia borealis*), Northern Red Oak (*Quercus rubra*), Trembling Aspen (*Populus tremuloides*), Red Maple (*Acer rubrum*), Balsam Fir (*Abies balsamea*), White Pine (*Pinus strobus*), Eastern Hemlock (*Tsuga canadensis*), Red Raspberry (*Rubus* idaeus ssp. *strigosus*), Christmas Fern (*Polystichum acrostichoides*), Lady Fern (*Athyrium filix-femina*) and Whorled Wood Aster (*Oclemena acuminata*) (Figure 12).

Figure 11. Open disturbed areas of the quarry's edge vegetated primarily with both native and non-native, and generally weedy species. Photos by R. Newell, June 2022 botany survey (*left*); July 6 , 2022 (*right*).

Figure 12. Cutover area southeast of the existing quarry area. Photos by R. Newell, June 2022 botany survey (*left*) and October 2022 (*right*).

Mixed woodland including some that has been cutover within the last 10-20 years, occurs throughout much of the property (Figure 13). Tree and shrub species observed include Balsam Fir (*Abies balsamea*), White Pine (*Pinus strobus*), Red Spruce (*Picea rubens*), Red Maple (*Acer rubrum*), Large-toothed Aspen (*Populus grandidentata*), Red Oak (*Quercus rubra*), White Ash (*Fraxinus americana),* White Birch (*Betula papyrifera*) and Northern Bush Honeysuckle (*Diervilla lonicera*). Herbaceous plants present within the mixed woodland include Bracken Fern (*Pteridium aquilinum*), Wild Sarsaparilla (*Aralia nudicaulis*), Wild Lily-of-the-valley (*Maianthemum canadense*), Starflower (*Lysimachia borealis*), Twinflower (*Linnaea borealis*), Whorled wood Aster (*Oclemena acuminata*), Common Lady Fern (*Athyrium filix-femina*), Eastern Teaberry (*Gaultheria procumbens*).

Figure 13. Mixed woodland throughout the study area, R. Newell, June 2022 botany survey

Immediately west of the quarry is a somewhat open, rocky area dominated by low shrubs with areas of relatively young tree growth (Figure 14). Tree species present within this barren habitat include Red Maple (*Acer rubrum*), Red Oak (*Quercus rubra*), White Pine (*Pinus strobus*), Red Spruce (*Picea rubens*), Wire Birch (*Betula populifolia*), White Spruce (*Picea glauca*) and White Birch (*Betula papyrifera*). Bracken Fern (*Pteridium aquilinum*) is predominant in the herbaceous layer. Other commonly occurring herbaceous species present include Eastern Teaberry (*Gaultheria procumbens*), Cinnamon Fern (*Osmundastrum cinnamomeum*) and Wild Lily-of-the Valley (*Maianthemum canadense*). Commonly occurring shrub species present include Sheep laurel (*Kalmia angustifolia*), Velvet-leaved Blueberry (*Vaccinium myrtilloides*), Sweet Fern (*Comptonia peregrina*), Witch Hazel (*Hamaemelis virginiana*), Black Huckleberry (*Gaylussacia baccata*), Witherod (*Viburnum nudum* var. *cassinoides*), Northern Bayberry (*Morella pensylvanica*), Rhodora

(*Rhododendron canadense*) and Bristly Dewberry (*Rubus hispidus*). The substrate within the barren habitat is relatively rocky and it is not known if this is a fire barren or an area that was clearcut or cutover.

Figure 14. Semi-open shrub barren located west of the open quarry. Photo by R. Newell, June 2022 botany survey.

Several wetlands also occur within the study area, predominantly occurring near the north and northeast boundary of the study area and are associated with unnamed tributaries to Barren Meadow Brook. Wetlands include two shrub bog/fen complexes, a riparian marsh, treed swamps, and an alder swamp. Additionally, a seasonal pond occurs west of the existing quarry pit and a vernal pool was observed within the recently cutover area south of the active quarry. Refer to Section 4.2.4 Wetlands for detailed descriptions of wetlands within the Colpton Quarry study area.

4.2.2 AQUATIC ENVIRONMENT

The Colpton Quarry is located in the eastern part of the Medway River (1EE-2) secondary watershed which borders the LaHave River watershed to the east. Watercourses surrounding the quarry eventually drain into the Medway River to the west and southwest of the study site. The existing quarry is situated near the base of a gradual slope toward the lowlands of Barren Meadow Brook, west of the study area, and is bordered by two, first order, unnamed tributaries to Barren Meadow Brook and their associated wetlands east and northwest of the study site.

The unnamed tributary east of the study site (Unnamed Tributary 1) originates southeast of the quarry property and flows northwest along the eastern boundary of the study area. The stream eventually crosses through the quarry property at the northeast corner, passing through a culvert under the quarry access road (Figure 15). The watercourse then transitions to flow west where it becomes a second order stream and eventually meets the main branch of Barren Meadow Brook. Where Unnamed Tributary 1 flows through the study area, it has a predominantly sandy substrate with gravel and occasional cobble and boulder. Upstream of the access road, the stream flowed through a large riparian swamp, which was flooded recently by beaver activity. Vegetation died off before the beaver dam was either broken or removed, leading to the site being drained (Pulsifer 2022) and leaving dead trees. Flowages through these sections are braided with areas that appeared more shallow and featured instream grasses and woody debris.

The second unnamed tributary to Barren Meadow Brook (Unnamed Tributary 2) originates near the northwest corner of the study area and flows west approximately 250 meters before connecting to the main branch of Barren Meadow Brook.

Figure 15. Unnamed tributary 1 of Barren Meadow Brook along the east boundary of the study site, looking upstream of the quarry access road culvert towards the beaver-flooded wetland, July 6, 2022.

The existing quarry has an artificial sump to collect surface water and runoff originating within the quarry. Substrate is boulder-cobble with gravel and also fines present (Figure 16). A culvert located on the north side of the sump directs overflow into a wetland north of the existing quarry. The sump supports vegetation and some animal life seasonally, and tadpoles were observed at the time of the July survey, indicating breeding of an unidentified frog species. Within the recently cutover area south of the existing quarry, small areas of pooling surface water, vernal pools and mine shafts[1] infilled with water were observed (Pulsifer 2022; CRM 2022).

[1] The area was the focus of largely unsuccessful gold mining activity in the 1800s.

Figure 16. Quarry Sump, July 6, 2022.

4.2.3 WATER QUALITY

Surface water quality measurements were made during the July 6 and 7, 2022 field survey at several locations. Water quality overall was moderate to high, which is expected for a small quarry in a natural environmental setting[2] (Table 1; Figure 25). Conductivities indicating levels of dissolved substances in water, are low to moderate, and total suspended solids were low. Dissolved oxygen levels were above guideline ranges for the protection of freshwater aquatic life at Site P1 (CCME 1999) (Table 2); Site WS1 had dissolved oxygen levels were slightly below guideline levels, thought to be influenced by standing water draining the sump coming from the culvert; low oxygen levels in the wetland of Unnamed Tributary 2 (WS2), were typical of standing waters with no observable flow, and not related to activities at the quarry. Water quality at Site C1 fell below guideline levels for the protection of aquatic life for dissolved oxygen and pH. This may be attributed to the recent flooding and then draining of the upstream wetland associated with beaver activity (Pulsifer 2022).

Table 1. Water quality measurements in surface waters at the Colpton Quarry. Locations are shown in Figure 17.
Bolded values exceeded the Freshwater Aquatic Life Guidelines.

Site Location & Date	July 6, 2022				**Freshwater Aquatic Life Guidelines**
	Colpton Quarry				
	C1	**WS1**	**WS2**	**P1**	
Site Description	Unnamed Tributary 1	Treed Swamp (wetland)	Shrub Bog/fen Complex (wetland)	Quarry Sump	
Temperature °C	16.5	14.7	15.8	19.1	<20[1]
Dissolved Oxygen (mg/L)	**4.72**	**5.04**	**3.17**	7.38	6.5 to 9.5[2]

2 Water quality measurements were made during the July 6, 2022 field survey day at several locations, including: unnamed tributary to Barren Meadow Brook east of the existing quarry (Unnamed Tributary 1) (C1); Alder swamp wetland north east of the existing quarry footprint (WS1);Wetland associated with the unnamed tributary to Barren Meadow Brook northwest of the study area (Unnamed Tributary 2)(WS2); and the man-made quarry sump located within the active quarry footprint (P1) (Figure 17).

Dissolved Oxygen (% saturation)	48.5	50.5	32.8	70.7	--
Conductivity (µS/cm)	39.7	149.8	42.0	237.1	--
Specific Conductivity (25°) (µS/cm)	47.4	187.8	50.9	266.7	--
pH	**6.2**	7.0	6.5	8.1	7.0-8.7[4]
TSS (mg/L)	8.0	10.0	--[3]	2.0	--

Note: TSS = Total Suspended Solids.
1. Thresholds of 20° C are used as indicators of stress to aquatic species, particularly salmonids (DFO 2012).
2. CCME, Canadian Council of Ministers of the Environment. 1999. Suitable levels are >9.5 mg/L for early life stages and >6.5 mg/L for late stages.
3. The sample had high levels of organic material which were not suitable for testing.
4. The pH of marine and estuarine waters should fall within the range of 7.0 – 8.7 units unless it can be demonstrated that such a pH is a result of natural processes.

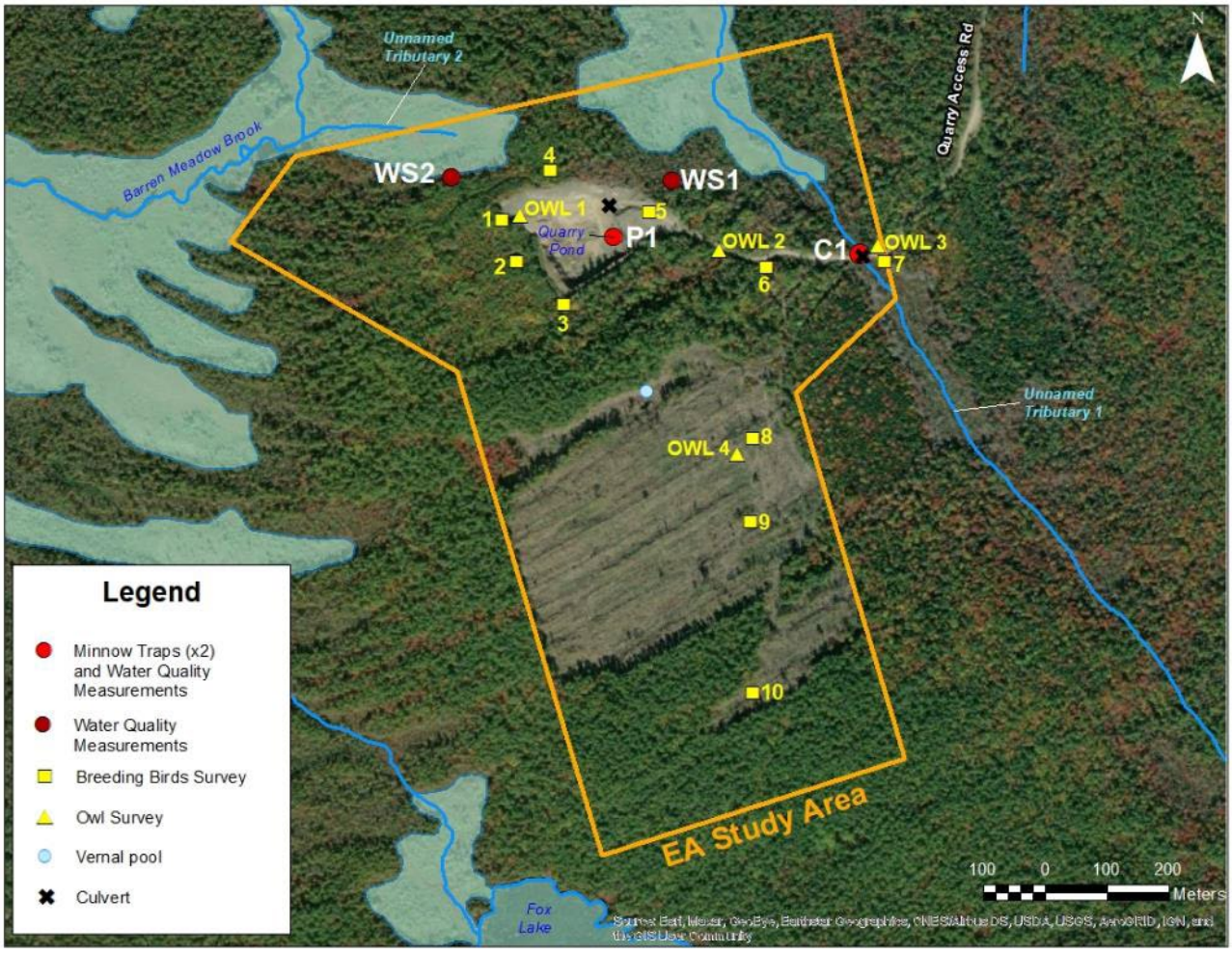


Figure 17. Field survey locations for water quality, fish (minnow traps), and breeding birds and owl surveys.

4.2.4 WETLANDS

Wetlands are areas of land that are periodically or permanently flooded, have characteristic soils, and support particular types of vegetation which are adapted to life in such environments. The quarry property and study area are moderately-sloped and moderately well-drained; however parts are poorly drained and support wetlands. Wetlands at the site include: two shrub bog/fen complexes, two treed swamps, an alder swamp, a riparian marsh, a seasonal pond,and a vernal pool (Figure 24; Table 2).

Two large shrub bog/fen complexes occur along the northern boundary of the study area (W1 and W2)(Figure 18). The fen habitat is along the unnamed tributaries of Barren Meadow Brook near the northeast (Unnamed Tributary 1) and northwest (Unnamed Tributary 2) corners of the property, with areas of bog habitat scattered near the edges of both wetlands (Figure 18 and Figure 19). The fen habitat surrounding Unnamed Tributary 2 supports vascular plants including Tussock Sedge (*Carex stricta*), Eastern Marsh Fern (*Thelypteris palustris* var. *pubescens*), Meadowsweet (*Spiraea alba* var. *latifolia*), Pitcher Plant (*Sarracenia purpurea*), Speckled Alder (*Alnus incana* ssp. *rugosa*), Royal Fern (*Osmunda regalis*), Sheep Laurel (*Kalmia angustifolia*), Cinnamon Fern (*Osmundastrum cinnamomeum*), Larch (*Larix laricina*), Black Spruce (*Picea mariana*), Sweet Gale (*Myrica gale*), Shining Rose (*Rosa nitida*), Bog Rosemary (*Andromeda polifolia*), Spiked Muhly Grass (*Muhlenbergia glomerata* var. *cinnoides*) and Tall Meadow-rue (Thalictrum pubescens). Fen habitat near the northeast corner of the study area along Unnamed Tributary 1 had similar species including sedges (*Carex* spp.), Spiked Muhly Grass (*Muhlenbergia glomerata* var. *cinnoides*), Canada Rush (*Juncus canadensis*), New York Aster (*Symphyotrichum novi-belgii*), White Meadowsweet (*Spiraea alba* var. *latifolia*), Shining Rosa (*Rosa nitida*), a pondweed (*Potamogeton* sp.), Bog Aster (*Oclemena nemoralis*), New York Aster (*Symphyotrichum novi-belgii*), Labrador Tea (*Rhododendron groenlandicum*) and Pitcher Plant (*Sarracenia purpurea*). Shrub and tree species observed in the scattered bog areas within the two wetlands include Leatherleaf (*Chamaedaphne calyculata*), Sheep Laurel (*Kalmia angustifolia*), Rhodora (*Rhododendron canadense*), Labrador-tea (*Rhododendron groenlandicum*), Witherod (*Viburnum nudum* var. *cassinoides*), Black Spruce (*Picea mariana*), Larch (*Larix laricina*), Black Huckleberry (*Gaylussacia baccata*), Dwarf Huckleberry (*Gaylussacia bigeloviana*) and White Pine (*Pinus strobus*). Herbaceous species present include Three-seeded Sedge (*Carex trisperma*) and Reindeer Lichens (*Cladonia* spp.).

Figure 18. Fen habitat adjacent to Unnamed Tributary 1 located in the northeast corner of the study area (W1; *left*; October 2022) and adjacent to Unnamed Tributary 2 northwest of the study area (W2; *right*; June 2022). Photos by R. Newell.

Figure 19. Shrub bog habitat within the bog/fen complexes northeast of the active quarry (W1; *left*) and northwest of the active quarry (W2; *right*). Photos by R. Newell, June 2022 botany survey; July 6, 2022.

Treed swamp habitat occurs adjacent to the northeast side of the active quarry pit and extends east to connect to the shrub bog/fen complex in the northeast corner of the study area (W4; Figure 20). A second area of treed swamp habitat occurs along the northern boundary of the study area, also adjacent to the northeastern shrub bog/fen complex (W5). Vascular plant species occurring within these areas include

Figure 20. Treed swamp habitat occurring adjacent to the northeast side of the active quarry area (W4). July 6, 2022.

Cinnamon Fern (*Osmundastrum cinnamomeum*), Speckled Alder (*Alnus incana* ssp. *rugosa*), Black Spruce (*Picea mariana*), Blue Flag (*Iris versicolor*), Meadow-rue (*Thalictrum pubescens*), Larch (*Larix laricina*), Red Maple (*Acer rubrum*), Sensitive Fern (*Onoclea sensibilis*), Lady-fern (*Athyrium filix-femina*), Blue Joint Grass

(*Calamagrostis canadensis*), Common Winterberry (*Ilex verticillata*), Labrador-tea (*Rhododendron groenlandicum*), Three-seeded Sedge (*Carex trisperma*), Mountain Holly (*Ilex mucronata*), Goldthread (*Coptis trifolia*), Turtlehead (*Chelone glabra*), Dwarf Red Raspberry (*Rubus pubescens*), Low Rough Aster (*Eurybia radula*), Eastern Marsh Fern (*Thelypteris palustris*), Tall Meadow-rue (*Thalictrum pubescens*), Bugleweed (*Lycopus uniflorus*), Velvet-leaved Blueberry (*Vaccinium myrtilloides*), American Witch-Hazel (*Hamamelis virginiana*), Black Huckleberry (*Gaylussacia baccata*), American Hog-peanut (*Amphicarpaea bracteata*) and Sheep Laurel (Kalmia angustifolia).

An open riparian marsh habitat also occurs along Unnamed Tributary 1, predominantly south of the quarry access road (W3; Figure 21). The wetland plants associated with the stream and marsh in the vicinity of the access road are diverse and include Fowl Manna Grass (*Glyceria striata*), Meadowsweet (*Spiraea alba* var. *latifolia*), Steeplebush (*S. tomentosa*), Blue Flag (*Iris versicolor*), Sensitive Fern (*Onoclea sensibilis*), Black-girdled Bulrush (*Scirpus atrocinctus*), Star Sedge (*Carex echinata*), Broom Sedge (*Carex scoparia*), Marsh Fern (*Thelypteris palustris* var. *pubescens*), Cyperus-like Sedge (*Carex pseudo-cyperus*), Swamp Yellow Loosestrife (*Lysimachia terrestris*), Marsh Bedstraw (*Galium palustre*), Red Maple (*Acer rubrum*), and Speckled Alder (*Alnus incana*).

Figure 21. Riparian marsh habitat south of the quarry access road adjacent to Unnamed Tributary 1 (W3). Photos by R. Newell, June 2022 botany survey; July 7, 2022.

North of the quarry access road, along Unnamed Tributary 1, a small area of alder swamp occurs adjacent to the shrub bog/fen complex in the northeast corner of the study area (W6; Figure 22). Vascular plants there included Meadowsweet (*Spiraea latifolia* ssp. *alba*), Common Winterberry (*Ilex verticillata*), Dewberry (*Rubus* pubescens), sedges (Carex spp.), Blue Joint Grass (Calamagrostis canadensis), Speckled Alder (Alnus *incana* ssp. *rugosa*), Tall White Aster (*Doellingeria umbellata*), Cinnamon Fern (*Osmundastrum cinnamomeum*), Meadowrue (*Thalictrum pubescens*), Sensitive Fern (*Onoclea sensibilis*), Rough Goldenrod (*Solidago rugosa*), and Red Maple (*Acer rubrum*).

Figure 22. Alder thickets within the alder swamp (W6) north of the quarry access road and adjacent to the shrub bog/fen complex located in the northeast corner of the study area. Photo by R. Newell, October 2022 botany survey

One seasonal pond was observed west of the active quarry pit (W7; Figure 23). No standing water was present at the time of reconissance or botany surveys. Marsh fern (*Thelypteris pubescens*) was predominant within this depression wetland. Other species present included various mosses, Blue Flag (*Iris versicolor*) and Meadowsweet (*Spiraea alba var. latifolia*). This pond was surrounded by trees including Wire Birch (*Betula populifolia*), White Pine (*Pinus strobus*) and Northern Red Oak (*Quercus rubra*). Bluejoint Grass (*Calamagrostis canadensis*) was also documented within this seasonal pond during the autumn survey. One vernal pool was identified within the cutover area of the property (Figure 18), and is smaller than the 100 m^2 threshold for requiring regulatory approval.

Figure 23. Shallow seasonal pond (W7) observed in the shrub barren located immediately west of the active quarry. Photos by R. Newell, June 2022 botany survey (*left*), July 6, 2022 (*right*).

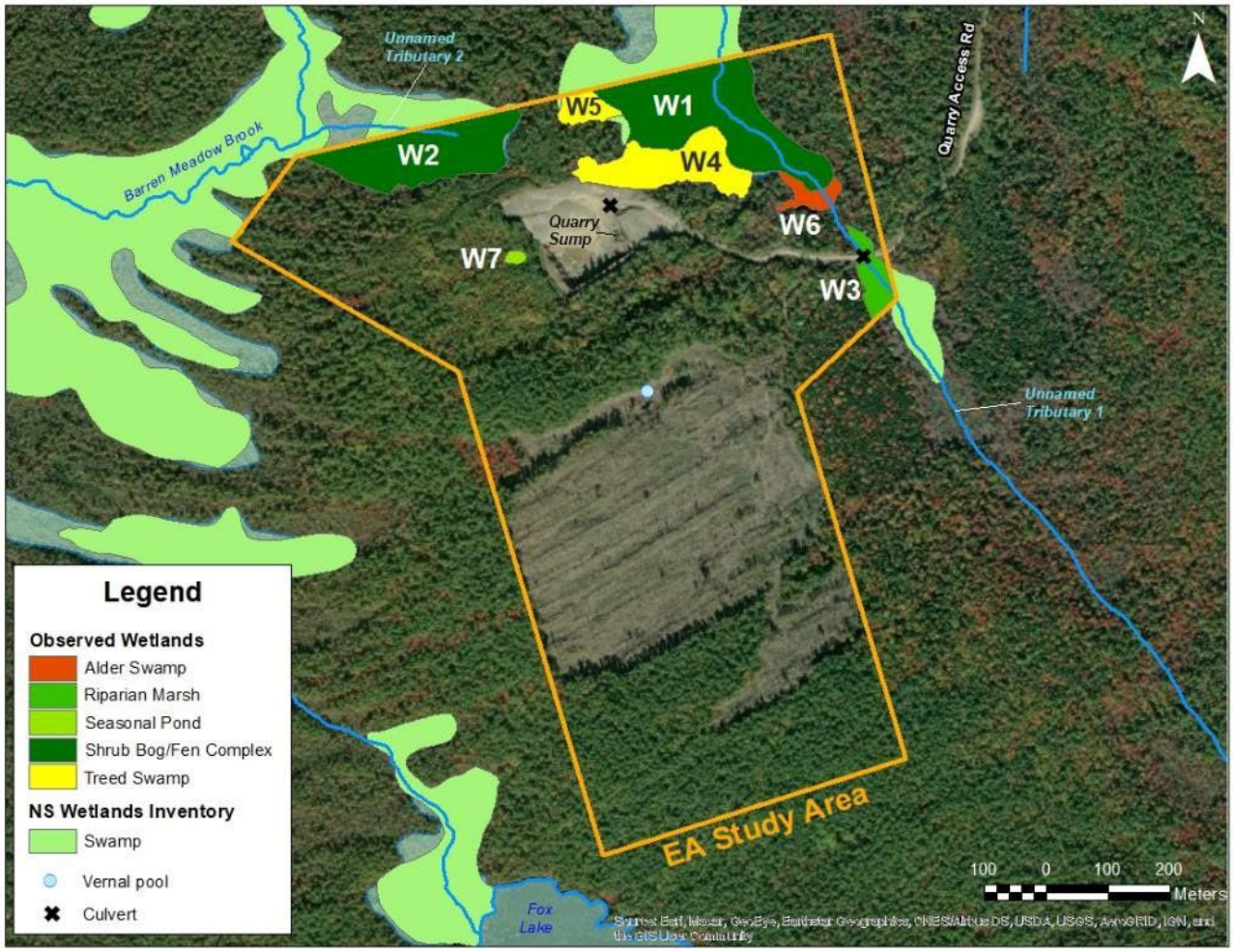


Figure 24. Wetlands at Colpton Quarry.

Table 2. Wetlands, Colpton Quarry Expansion. Locations shown in Figure 18 Areas presented are approximate delineations of wetlands within the study area.

Wetland	Area (ha)	Wetland Type	Wetland of Special Significance	Rationale for WSS Consideration
W1	3.68	Bog/fen complex	✓	Part of wetland is within the designated Pu'tlaqne'Katik Wilderness Area (Table 10 and Figure 30).
W2	2.58	Bog/fen complex	✓	W2 forms part of swamp along Barren Meadow Brook. This area is in Barren Meadow 1,3 and 4 Conservation lands (see Table 10 and Figure 30) and supports critical habitat for Blandings Turtle and Eastern Ribbonsnake (Figure 29).

Table 2. Wetlands, Colpton Quarry Expansion. Locations shown in Figure 18 Areas presented are approximate delineations of wetlands within the study area.

Wetland	Area (ha)	Wetland Type	Wetland of Special Significance	Rationale for WSS Consideration
W3	1.71	Riparian marsh	Potential ✓	Part of wetland within the designated Pu'tlaqne'Katik Wilderness Area (Table 10 and Figure 30).
W4	0.57	Treed swamp	✓	Part of wetland complex connected with W2 and containing habitat for Olive-Sided Flycatcher.
W5	0.38	Treed swamp	✓	Part of wetland complex connected with W2 and containing habitat for Olive-Sided Flycatcher.
W6	0.33	Alder swamp	✓	Part of wetland complex connected with W2 and containing habitat for Olive-Sided Flycatcher.
W7	0.01	Seasonal pond	No	N/A

Most of the wetlands in the study area are Wetlands of Special Significance (WSS) as defined in the Nova Scotia Policy on Conservation of Wetlands 2011 (Revised 2019) (Nova Scotia Environment 2019). This is due to the presence of habitat for an endangered species as designated under the federal Species At Risk Act or the Nova Scotia Endangered Species Act (Figure 29); or as being part of a wetland or wetland complex which is within land that is legally protected by non-government charitable conservation land trusts (Table 2). The remaining wetlands except for W7 would become WSS if a currently designated Wilderness Area (Pu'tlaqne'Katik Wilderness Area) which surrounds the study area (Figure 30), is proclaimed at some point in future.

4.2.5 FISH & FISH HABITAT

Streams or other surface waters which could support fish occur along the east/northeasten boundary and northwestern boundary of the of the EA study area (Table 4). Streams in the area originate from groundwater and precipitation, and because they are first order streams, they can be seasonally intermittent near the headwaters. The unnamed tributary to Barren Meadow Brook that flows through the northeast corner of the study area (Unnamed Tributary 1, Figure 17), supports various fish species including Creek Chub, Nine-spine Stickleback, Common Shiner, and Golden Shiner, which were all observed in Unnamed Tributary 1 during the reconnaissance survey (Figure 25). This stream also likely intermittently supports salmonids such as Brook Trout, due to their presence in the Medway River system, although none were observed during site surveys.

After crossing the access road, Unnamed Tributary 1 flows north through large a wetland complex where it is partly shaded by alders before transitioning back to open wetland. Suitable fish habitat was present along the reach of stream that flows within the quarry property, providing areas of refugia, aquatic plants and

some overhanging vegetation. A similar community of fish is expected in Unnamed Tributary 2[3]. No fish were caught by minnow traps placed in the quarry sump. Tadpoles were abundant in the quarry sump at the time of the survey and it may be utilized by other aquatic organisms (e.g., salamanders).

Barren Meadow Brook and associated tributaries in the area potentially support salmonids, including trout and other freshwater, anadromous and catadromous fish typical of the area. Species potentially occurring include Brook Trout, American Eel, White Sucker, and Smallmouth Bass. Nearby Fox Lake, south of the study area is also known to support smallmouth bass (Fish Brain 2022).

Table 3. Summary of fish observations, Colpton Quarry Expansion. July 6-7, 2022. Locations shown in Figure 17.

Location	Method	Species	Size (cm)	Number of individuals	Total
UNNAMED TRIBUTARY 1					
C1	Minnow trap 1	Creek Chub	5.0-7.5	24	73
		Nine-spine Stickleback	6.5	1	
	Minnow trap 2	Creek Chub	5.0-13.0	45	
		Golden Shiner	9.0	1	
		Common shiner	7.0	1	
		Nine-spine Stickleback	6.0	1	
	Tadpoles throughout area.				
QUARRY SUMP					
P1	Minnow trap 1	No fish observed or caught			
	Minnow trap 2	No fish observed or caught			
	Tadpoles throughout area.				

Figure 25. Creek Chub (*left*) and Nine-spine Stickleback (*right*) captured in minnow traps at the Colpton Quarry, July 7, 2022.

[3] Minnow traps were not set in Unnamed Tributary 2 due to inaccessibility.

4.2.6 BIRDS

Birds are one of many animal groups which occupy natural environments at the Colpton Quarry and which have important ecosystem functions in terrestrial and wetland ecosystems. Occurrence of birds was assessed by means of reviews of available literature; as well as standard point-count surveys for owls and breeding birds conducted in late May, 2022[4]. Forty-five species of birds were observed during the standard point-count survey, summarized in Table 4, which accounted for approximately 52% of 87 species of birds which have been recorded as potentially breeding in the study area (Maritimes Breeding Bird Atlas 2022, Mersey-LaHave Region 19; Table 6). Other species encountered at the site included Common Nighthawk, Black-throated Blue Warbler, Tennessee Warbler, Brown Creeper, Hairy Woodpecker, Golden-Crowned Kinglet, Common Grackle, Chipping Sparrow and Song Sparrow. Moderate numbers overall can be attributed to the sampling date which was early in the migration period, and also to cool temperatures encountered, although most of the species were expected to occur. Total number of species (species richness) at the Colpton Quarry ranged from low to moderate (11 species at Site 10, refer to Figure 17) to moderate (22 and 24 species at Sites 6 and 7 respectively)—and 45 species overall.

Two species of conservation concern—Common Nighthawk and Olive-Sided Flycatcher—occurred at the site (refer to Figure 29). Both are listed under federal Species at Risk Act (SARA) (*Special Concern* status) and Provincial Endangered Species Act (ESA) (*Threatened* status). Two pairs of Common Nighthawk were heard at the quarry from 0430 to 0530 on May 29, 2022 at the commencement of the point-count survey. Eleven Olive-Sided Flycatcher were heard at the site, most at the north end in woods beyond the existing quarry and some in the woods east of the southern section of the study area. Individuals were heard within 50 meters north of Site 1; beyond 100 meters east of Site 2; and more than 100 meters north of Site 5. Two were heard beyond 100 meters east of Site 3; and two were heard at Site 4, one within 50 meters east and one 50-100 meters north; and three along the edge or beyond the clear-cut east of Sites 8 and 9 (refer to Figure 17).

Songbird communities at the site are summarized in Tables 4 and 5. Black-and-White Warbler, Red-Eyed Vireo, American Robin, Hermit Thrush, Blue Jay, Ovenbird, Olive-Sided Flycatcher, Palm Warbler and Blue-headed Vireo were the most common and abundant species, occurring at 7 to 9 sites. Also important as dominants were Black-capped Chickadee, Dark-Eyed Junco, Magnolia Warbler, Common Yellowthroat, Northern Parula, and Northern Flicker which occurred at 5 or 6 of the 10 survey points.

White Pine, Red Maple and Heath woodland west, north and northwest of the existing quarry (Sites 1, 2 and 3, refer to Figure 17) supported a moderate number of species (27) and moderate abundance (26 individuals per 10 minutes) (Table 4). The mixed softwood habitat with Black Spruce, Larch, Balsam Fir and Red Maple at the north end of the study area (Sites 4 and 5, refer to Figure 17) also had a moderate number of species (25) and moderate abundance (27.5 individuals per 10 minutes) occurred at this site (Table 4).

[4] A survey for owls was conducted on May 14, 2022 beginning at 0330 hrs, during which the observers listened for 20 minutes at each of four sites (refer to Figure 17). Playback of calls was not possible due to an equipment malfunction, The breeding bird survey was conducted from 0530 hrs to 0855 hrs on May 29, 2022 under calm conditions and clear sky, at pre-selected sites chosen to represent different forest habitat types and also be close enough together to allow the observers to move between sites within the prescribed early morning period which is optimal. At each site the principal observer listened for 10 minutes and the birds observed, their direction, and approximate distance from the observer were noted.

The forest along the access road consisting of mixed Softwood (Red Spruce and White Pine) and Red maple supported a moderate number of species (22) and a moderate overall abundance (20 individuals per 10 minutes), comparable to other sites. The bird community in mixed softwood forest north of the access road and an extensive beaver meadow to the south, created from a recently flooded and then discharged swamp, supported the highest abundances (38 individuals per 10 minutes) and a moderate diversity (24 species) (Table 4). A Common Loon was heard in the distance west of this site.

The recent clearcut and adjacent forest which occupies the south section of the study area, supported moderate abundance (25 individuals per 10 minutes) and low to moderate diversity (21 species)(Table 4), despite having been recently clear cut over most of the area.

Observation conditions for the May 14, 2022 owl survey were ideal, including a full moon; calm conditions which picked up to light gusts at the end of the survey; and clear sky (air temperature 8°C). Four sites (refer to Figure 17) were surveyed, each for 20 minutes. Due to a tape recorder malfunction, no effort was made to attract owls using calls, and owls detected were those calling normally. Four species of owl were heard at the site: Barred Owl, Great Horned Owl, Long-Eared Owl and Saw-whet Owl. Owls were heard at Sites 1 to 3, but not at Site 4. Saw-whets were heard near Site 1 (25 meters east), at Site 2 (250 meters northeast), and Site 3 (200 meters northeast). The Saw-whet at Site 1 was heard in the distance from both the other sites. A Long-eared Owl was heard 100 meters east northeast of Site 1. A Barred Owl was heard in the distance north of Site 1; and also 75 meters southwest of Site 3. A Great-Horned Owl was heard 400-500 meters northwest of Site 2. With the exception of the owls at Site 1, most were outside both the study area and the proposed expansion area for the quarry.

Most bird species common to the area can be observed from April to August in open, forested, wetland and farmland habitats (Figure 26). A number of significant habitats for migratory birds are located in the general vicinity of the site. Common Loon habitat occurs on three lakes, inlcuiding Lohnes Lake, Hirtle Lake and Rhyno Lake, all occuring within four kilometers of the study site (Kydd, personal communications, 2022). Nesting for other bird species of conservation concern that have been observed within a five kilometer radius of the site, is primarily between May to early-August (Figure 27).

Table 4. Bird species heard or observed during dawn bird surveys conducted May 29, 2022, between 05:30 and 08:55 hrs at the Colpton Quarry study site. For locations of observation points, see Figure 17.

	White Pine, Red Maple, Heath (Sites 1, 2 and 3)		Mixed Black Spruce, Larch, Balsam Fir, Red Maple (Sites 4 and 5)		Mixed Red Spruce, White Pine, Red Maple (Site 6)		Red Maple Swamp, Beaver Meadow (Site 7)		Clear-cut White Pine, Red Maple, Red Oak, Beech (Sites 8, 9, and 10)	
	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins	No. of sites	Average / 10 mins
PASSERIFORMES										
Alder Flycatcher	0	0.00	0	0.00	1	2.00	1	3.00	0	0.00
American Crow	1	0.33	0	0.00	0	0.00	0	0.00	0	0.00
American Goldfinch	1	0.33	0	0.00	1	1.00	1	1.00	1	0.33
American Redstart	1	1.00	2	1.00	0	0.00	1	3.00	1	0.33
American Robin	2	1.33	2	2.00	0	0.00	1	2.00	3	3.33
Bay-Breasted Warbler	1	0.33	0	0.00	0	0.00	0	0.00	0	0.00

Table 4. Bird species heard or observed during dawn bird surveys conducted May 29, 2022, between 05:30 and 08:55 hrs at the Colpton Quarry study site. For locations of observation points, see Figure 17.

	White Pine, Red Maple, Heath (Sites 1, 2 and 3)		Mixed Black Spruce, Larch, Balsam Fir, Red Maple (Sites 4 and 5)		Mixed Red Spruce, White Pine, Red Maple (Site 6)		Red Maple Swamp, Beaver Meadow (Site 7)		Clear-cut White Pine, Red Maple, Red Oak, Beech (Sites 8, 9, and 10)	
	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins	No. of sites	Average / 10 mins
Black and White Warbler	3	2.33	2	2.00	1	2.00	1	4.00	2	1.00
Black-capped Chickadee	2	0.67	1	0.50	1	1.00	0	0.00	2	0.67
Black-Throated Green Warbler	0	0.00	0	0.00	1	1.00	1	2.00	0	0.00
Blue-Headed Vireo	1	0.33	2	1.50	1	1.00	1	1.00	2	0.67
Blue Jay	3	3.33	1	1.00	0	0.00	1	2.00	2	2.00
Chestnut-Sided Warbler	0	0.00	0	0.00	1	1.00	0	0.00	0	0.00
Common Raven	0	0.00	1	0.50	0	0.00	0	0.00	1	0.33
Common Yellowthroat	1	0.33	1	1.00	0	0.00	1	1.00	1	0.33
Dark-Eyed Junco	1	1.00	1	0.5	0	0.00	1	2.00	3	5.00
Gray Jay	1	0.67	0	0.00	0	0.00	0	0.00	0	0.00
Hermit Thrush	3	4.00	2	3.00	0	0.00	0	0.00	2	1.00
Least Flycatcher	1	0.33	2	1.50	0	0.00	1	2.00	0	0.00
Lincoln's Sparrow	0	0.00	0	0.00	0	0.00	0	0.00	2	1.33
Magnolia Warbler	1	0.33	2	2.50	1	4.00	0	0.00	1	0.33
Mourning Dove	2	1.33	0	0.00	0	0.00	0	0.00	2	0.67
Nashville Warbler	0	0.00	1	0.50	0	0.00	0	0.00	0	0.00
Northern Parula	1	0.33	2	1.00	1	2.00	1	2.00	0	0.00
Northern Raven	1	0.33	0	0.00	0	0.00	0	0.00	0	0.00
Northern Waterthrush	0	0.00	0	0.00	1	1.00	0	0.00	0	0.00
Olive-Sided Flycatcher	3	1.33	2	1.50	1	1.00	0	0.00	2	1.00
Ovenbird	3	2.33	2	2.00	1	3.00	1	3.00	1	0.33
Palm Warbler	1	0.33	2	1.50	1	1.00	0	0.00	3	1.67
Purple Finch	0	0.00	1	0.50	0	0.00	0	0.00	0	0.00
Red-Breasted Nuthatch	0	0.00	0	0.00	1	1.00	1	1.00	0	0.00
Red-eyed Vireo	2	1.33	1	1.50	1	3.00	1	4.00	3	2.33
Ruby-Crowned Kinglet	0	0.00	1	0.50	0	0.00	1	1.00	0	0.00
Ruby-Throated Hummingbird	0	0.00	0	0.00	1	1.00	0	0.00	0	0.00
Swamp Sparrow	0	0.00	0	0.00	0	0.00	1	1.00	0	0.00
Veery	1	0.33	1	0.50	1	3.00	1	2.00	0	0.00
White-Throated Sparrow	0	0.00	0	0.00	1	1.00	0	0.00	2	1.33
Yellow-Bellied Flycatcher	0	0.00	1	0.50	1	1.00	1	1.00	0	0.00
Yellow-Rumped Warbler	0	0.00	1	1.00	1	2.00	1	2.00	0	0.00
GALLIFORMES										
Ruffed Grouse	0	0.00	0	0.00	1	2.00	1	2.00	0	0.00
GAVIIFORMES										
Common Loon	0	0.00	0	0.00	0	0.00	1	1.00	0	0.00
PICIFORMES										