



**Gold Bond Gypsum Mine
Expansion Project**

EA Registration Document

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Prepared for:

Gold Bond Canada Ltd.
PO Box 57
Milford Station NS B0N 1Y0

Prepared by:

Stantec Consulting Ltd.
40 Highfield Park Dr. #102
Dartmouth, NS B3A 0A3

File: 121417382

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Abbreviations

μg^3	microgram(s) per cubic gram
AC CDC	Atlantic Canada Conservation Data Centre
ARIA	archaeological resource impact assessment
ARIA Guidelines	<i>Archaeological Resource Impact Assessment (Category C) Guidelines</i> (Nova Scotia Communities, Culture, Tourism and Heritage 2012)
BP	before present
CCME	Canadian Council of Ministers of the Environment
cm	centimetre(s)
CO	carbon monoxide
CO ₂	carbon dioxide
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CRHP	Canadian Register of Historic Places
CWQG-PAL	<i>Canadian Water Quality Guidelines for the Protection of Aquatic Life</i>
dBA	A-weighted decibel(s)
EA	environmental assessment
EA Guide	<i>Guide to Preparing an EA Registration Document for Pit and Quarry Documents in Nova Scotia</i> (NSE 2009)
ECCC	Environment and Climate Change Canada
EPA	Environmental Protection Agency
ESA	Ecologically Sensitive Area
GHG	greenhouse gas
ha	hectare(s)
HRP	Heritage Research Permit
IA	Industrial Approval
km	kilometre
ktCO _{2e}	kilotonnes of carbon dioxide equivalent
Leq	equivalent sound level
LiDAR	light detection and ranging
MEKS	Mi'kmaq Ecological Knowledge Study
NAPS	National Air Pollution Surveillance
NO	nitrogen oxide



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NO ₂	nitrogen dioxide
NO _x	nitrogen oxides
NS	Nova Scotia
NSECC	Nova Scotia Environment and Climate Change
NSNRR	Nova Scotia Natural Resources and Renewables
NSESA	Nova Scotia <i>Endangered Species Act</i>
PM _{2.5}	particulate matter less than 2.5 microns in diameter (i.e., fine particulate matter)
Project, the	Gold Bond Gypsum Mine Expansion Project
SAR	species at risk
SARA	<i>Species at Risk Act</i>
SO ₂	Sulphur dioxide
SOCI	species of conservation interest
TSP	total suspended particulate
TSS	total suspended solids
US	United States
VC	valued component



1.0 INTRODUCTION

Gold Bond Canada Ltd. (Gold Bond, the Proponent; formerly National Gypsum Canada Ltd.), has owned and operated a gypsum mine in Milford, Nova Scotia (NS) since 1954 that has produced over 134 million tonnes of gypsum since initial development. The current mine operation is approximately 445 hectares (ha) with a 9-ha ecological buffer located to the east of the mine site. Gold Bond proposes to expand the active mine site to incorporate a small adjacent parcel of land, approximately 14 ha, directly north of the existing mine that continues along the current deposit. The mine currently supplies gypsum rock for several wallboard plants in Canada and the eastern United States (US).

The mine is currently operating under an Industrial Approval (IA) (No. 2015-093939-01) issued in 2015. The Gold Bond Gypsum Mine Expansion Project (the Project) consists of expanding the approved mine site to occupy an additional 14 ha (the “Project Area”). The Project will allow for continued gypsum production (i.e., blasting, crushing, and stockpiling), and the possibility of mining anhydrite rock. Over the life of mine, and depending on market demand, the expansion will advance to the north of the existing mine site. Gold Bond owns the existing mine lands and most of the land in the Project Area. The surrounding lands are mostly residential, agricultural, or undeveloped. Carroll’s Corner is a small community located approximately 2 km east of the Project Area.

Since the Project involves expanding an existing quarry footprint by more than four ha, it will trigger provincial environmental assessment (EA) requirements and must be registered as a Class I Undertaking pursuant to the Environmental Assessment Regulations under the NS *Environment Act*. The Project is not anticipated to trigger federal impact assessment requirements under the *Impact Assessment Act*. This document satisfies requirements for an EA Registration for the Project and has been prepared in accordance with the provincial *Guide to Preparing and EA Registration Document for Pit and Quarry Documents in Nova Scotia* (NSE 2009).



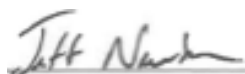
GOLD BOND GYPSUM MINE EXPANSION PROJECT

1.1 PROPONENT INFORMATION

The Project Proponent is Gold Bond Canada Ltd. (Gold Bond), a NS registered firm. Corporate information from the NS Registry of Joint Stocks is provided in Appendix A.

Proponent Contact Information		Company President / EA Contact	
Name:	Gold Bond Canada Ltd.	Name:	Jeff Newton
Mailing Address:	PO Box 57 Milford Station NS B0N 1Y0	Mailing Address:	Same
Telephone Number:	(902) 883-2224 x 227	Telephone Number:	(902) 883-2224 x 227
Fax Number:	(902) 758-3955	Fax Number:	(902) 758-3955
E-Mail Address:	jeffn@goldbondcanada.com		

Contact Person for Purposes of the Environmental Assessment	
Name:	Jeff Newton
Official Title:	Director
Address:	PO Box 57 Milford Station NS B0N 1Y0
Telephone Number:	(902) 883-2224 x 227
Fax Number:	(902) 758-3955
E-Mail Address:	jeffn@goldbondcanada.com



5/31/21

Proponent Signature
Jeff Newton, Director

Date

1.2 PROJECT INFORMATION

Name of the Undertaking: The name of the proposed undertaking is the “Gold Bond Gypsum Mine Expansion Project, Halifax County”, which is referred to in this document as “the Project”.

Location of the Undertaking: Milford Station, Halifax County, NS

1.3 PURPOSE AND NEED FOR THE PROJECT

The purpose of the Project is to allow Gold Bond to expand the mine footprint at its existing gypsum mine near the community of Milford Station, Halifax County, NS. As is the case for other mines and quarries in NS, Gold Bond is an important component of the natural resource sector of the provincial economy. Gold Bond provides direct and indirect employment for its workers and suppliers, as well as potential economic spin-off benefits for related industries and surrounding communities. Gold Bond’s ability to access land with gypsum resources over an extended period is critical for the mine operation to be successful and continue to provide local and regional benefits through employment, the procurement of goods, and tax payments.



1.4 DESCRIPTION OF THE UNDERTAKING

The Project involves the expansion of an existing NS Environment and Climate Change (NSECC) approved gypsum mine in Halifax County from 445 ha to 459 ha. Other than the increased size, the mine will continue to operate as it has been per the existing IA. The Project is located immediately north of the existing open pit, and outside the area included in Gold Bond's existing IA. The new parcel is approximately 14 ha (Figure 1-1) and maintains a 30 m buffer to the adjacent property to the north. Table 1-1 summarizes the spatial extents of the overall mine site and Project Area.

Table 1-1 Descriptions and Size (ha) of Areas Discussed in EARD

Area Descriptions	Approximate Area (ha)
Project Area	14
Overall Mine Site Area	445
Mine Site Area with addition of Project Area	459

The anticipated average production rate for the expanded mine facility will be at the 20-year average of 3.1 million tonnes of product per year, depending on market demand. The current operating schedule is 16 hours / day, five days per week, 52 weeks / year, weather permitting. However, depending on the demand, the plant can operate 24 / 7 to ensure production targets are met. The Project is not anticipated to change the average mine level of operation.

1.5 GEOGRAPHIC LOCATION

The Project is located on Gold Bond owned land (Parcel Identification Number 40829681) on Rock Road, Milford Station, Halifax County, NS, Easting 467573, Northing 4,984736, UTM Zone 20, NAD 83 (Figure 1-2). The mine and Project are located on land zoned for resource uses including extractive facilities requiring the issuance of a development permit (Halifax Regional Municipality 2012). The existing mine and Project are located on Highway 277 and is accessed via a private road that branches off from the main public road.

The municipal zoning in the immediate vicinity of the existing mine and the Project Area is rural residential development. The surrounding lands are mostly residential, agricultural, or undeveloped (Figure 1-3). Carroll's Corner is a small community located approximately 2 km east of the Project Area (Figure 1-2).






The Project Area contains massive strata of gypsum and anhydrite (dehydrated gypsum) (Giles 1982). When anhydrite is exposed to water, it expands and changes into gypsum. When gypsum is above the permanent water table, it can be dissolved by rainwater, creating what is known as karst topography (Moseley 1996; Niven 2015). The karst topography of NS has been flattened by the various phases of glaciations that covered the province (Niven 2015). Habitat and forest ecosystem classification was completed in 2023 at the same time as vegetation and wildlife surveys that investigated the potential for environmentally sensitive features in the Project Area. The Project Area is composed mainly of mixedwood forest (Figure 1-3).

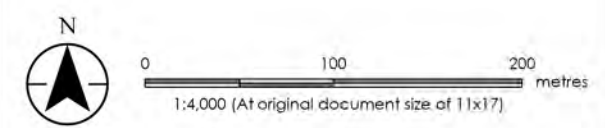
There are no waterbodies in the Project Area, however, there is one watercourse, an unnamed brook, just outside the western boundary of the Project Area (see Section 6.3).



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-  Current Gypsum Mine Footprint
-  Approved Expansion Area
-  Proposed Expansion Area
-  Seasonal Road, Track or Trail
-  Watercourse
-  Remnant Channel
-  Watercourse / Drainage Ditch (Stantec-delineated, 2023)
-  Anthropogenic Waterbody
-  Waterbody (NSHN)
-  Wetland (NSHN)
-  Wetland (Stantec Delineated 2018)
-  Wetland (Stantec-delineated, 2023)
-  Property Boundary



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 20N
 2. Sources: Stantec; Government of Nova Scotia (NTDB Watercourse data modified within Project Area as per Stantec field observations)
 3. Base Map Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Sources: Esri, USGS, NOAA



Project Location 121417382_030
Milford Station,
Nova Scotia, CA

Client/Project
Gold Bond Canada Ltd.
Proposed Gypsum Mine Expansion Project

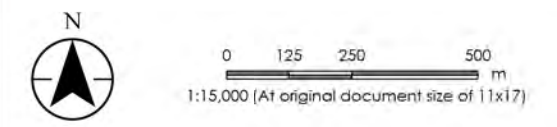
Figure No.
1-1

Title
Proposed Expansion Area

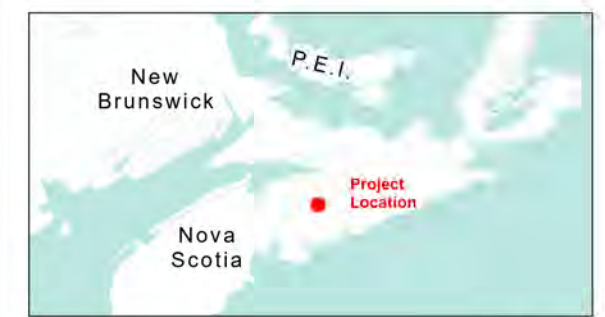
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- ▬ Proposed Expansion Area
- ▬ Current Gypsum Mine Footprint
- ▬ Approved Expansion Area
- Other Features**
- Watercourse
- - - Remnant Channel
- - - Watercourse / Drainage Ditch (Stantec-delineated, 2014)
- - - Watercourse / Drainage Ditch (Stantec-delineated, 2023)
- ▨ Anthropogenic Waterbody
- Waterbody (NSHN)
- ▨ Wetland (NSHN)
- ▨ Wetland (Stantec-delineated, 2018)
- ▨ Wetland (Stantec-delineated, 2023)



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 20N
 2. Sources: Government of Nova Scotia (NTDB Watercourse data modified within Project Area as per Stantec field observations)
 3. Base Map Sources: Esri, USGS, NOAA, Maxar



Project Location 121417382-027
 Milford Station,
 Nova Scotia, CA

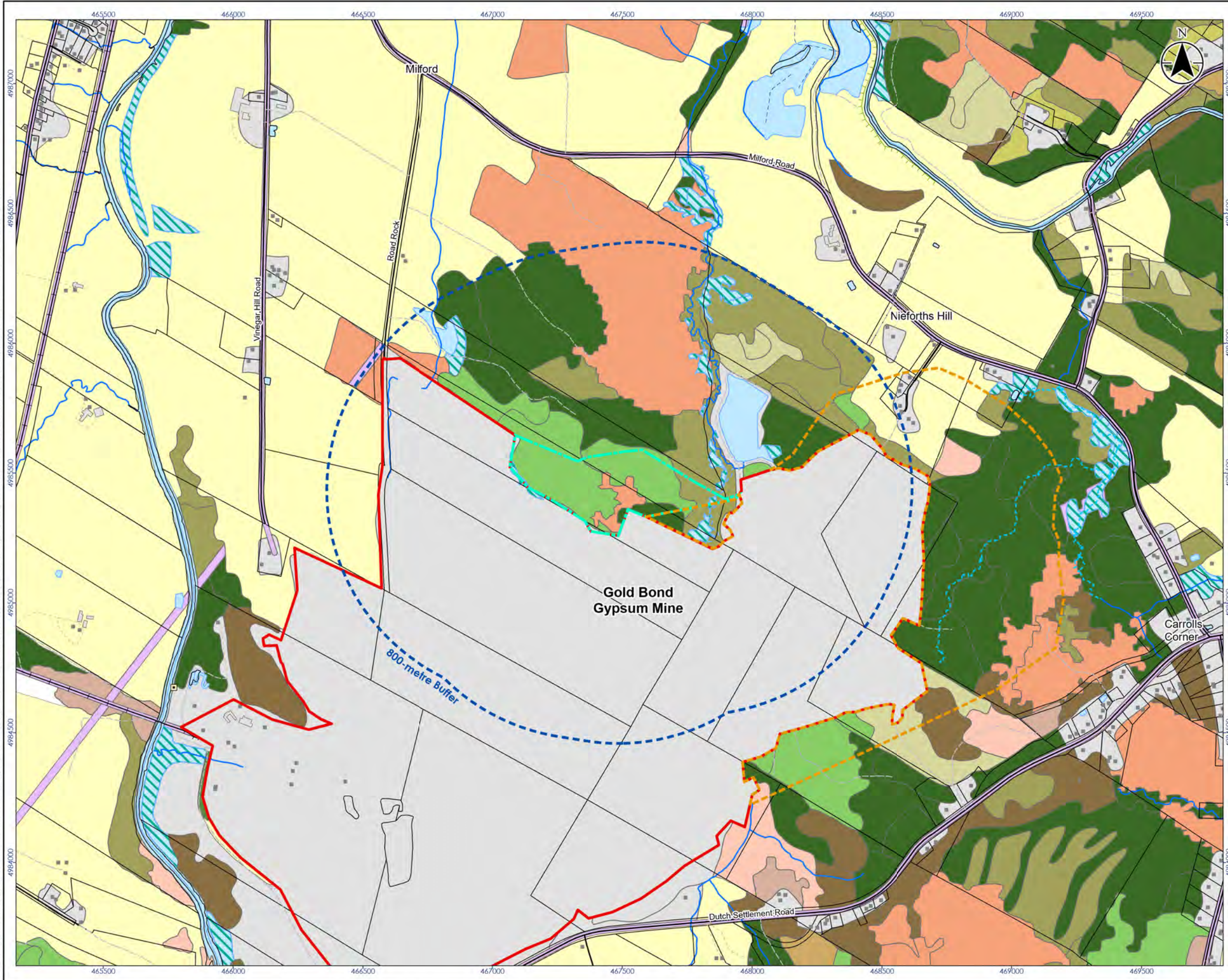
Client/Project
 Gold Bond Canada Ltd.,
 Proposed Gypsum Mine Expansion Project

Figure No.
1-2

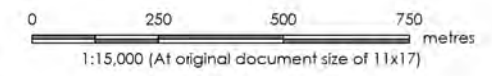
Title

Project Location

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- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Project Components</p> <ul style="list-style-type: none"> ■ Current Gypsum Mine Footprint ■ Approved Expansion Area ■ Proposed Expansion Area ■ Project Area Buffer (800 m) <p>Map Features</p> <ul style="list-style-type: none"> ■ Pumping Station ■ Building / Structure — Road — Private Lane or Restricted Road — Seasonal Road, Track or Trill — Railway — Dyke — Ditch — Watercourse - - - Remnant Channel - - - Watercourse / Drainage - - - Ditch (Stantec Delineated 2014) □ Property Boundary | <p>Forest Cover Types</p> <ul style="list-style-type: none"> ■ Hardwood Mature / Overmature ■ Hardwood Immature / Young ■ Mixedwood Mature / Overmature ■ Mixedwood Unknown ■ Mixedwood Immature / Young ■ Softwood Mature / Overmature ■ Softwood Unknown ■ Softwood Immature / Young <p>Other Cover Types</p> <ul style="list-style-type: none"> ■ Agriculture ■ Corridor ■ Unknown Forest ■ Vegetated With Shrubs ■ Forest Dead / Regrowth, NA ■ Urban / Developed ■ Waterbody ■ Wetland |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 20N
 2. Sources: Government of Nova Scotia (NTDB Watercourse data modified within Project Area as per Stantec field observations)
 3. Base Map Sources: Esri, USGS, NOAA



Project Location 121417382_031
 Milford Station,
 Nova Scotia, CA

Client/Project
 Gold Bond Canada Ltd.,
 Proposed Gypsum Mine Expansion Project

Figure No.
1-3

Title
Habitat Classification and Land Cover

1.6 PROJECT COMPONENTS AND ACTIVITIES

1.6.1 Existing Gypsum Mine

The existing mining operation consists of a working / laydown area for the stationary crushing equipment, screening, rail car load out facility, rail yard, various gypsum rock stockpiles, mine pit, sedimentation ponds, and tailings management areas. Main access to the site is via a private access road located off Highway 277. Site access is also provided via a timber railway bridge which crosses the Shubenacadie River linking Route 2 to the administrative area of the mine. Equipment onsite includes: three 12-yard front-end loaders, eight 70 ton off-highway dump trucks, one D10 bulldozer, three D9 bulldozer, 3 HM-400 articulating trucks, two excavators, one road grader, one water truck (9,000 Litre), one fuel-lube truck, track drill, one yard shunter and one ammonium nitrate / fuel oil truck.

For the existing operation, topsoil, grubbing material, and overburden (mainly glacial till with high clay content) stripped prior to drilling and blasting are stored on-site, and the overburden is backfilled into previously mined out sections of the mine. Topsoil and grubbing materials are stabilized for subsequent use during progressive and final reclamation activities. Storage piles are seeded to reduce potential for erosion and sedimentation and similar practices will continue throughout the development and operation of the Project. Appendix B provides photos of existing site activities.

The existing mine currently operates five, and at times six, days per week and 52 weeks per year, weather permitting. Project development is not anticipated to change the existing operating schedule.

1.6.2 Project Components

The Project would see continued gypsum production (e.g., blasting, crushing, and stockpiling), allowing Gold Bond to maintain current production levels over a longer term, and thereby extending the life of the mine. As the Project is located immediately north of the existing open pit, it can be easily integrated into the existing mine operation, including the use of existing equipment, roads, and infrastructure. The Project will make use of existing rail loading and transport, as well as marine loading facilities in the Bedford Basin. This access to bulk transport is a critical component to the long-term operational success, economic viability, and environmental performance of the gypsum mine at this location, as bulk cargo transport is a more efficient transport method than trucking.

Final details of construction and operation activities of the Project are currently being developed; however, they are anticipated to be the same as those for the existing mine. Project activities include clearing and grubbing of vegetation and overburden; the use of a stationary crusher and / or screener for crushing and screening gypsum; stockpiling of gypsum; trucking of gypsum tailings to market for use in agriculture; and material conveyance to existing mine and rail infrastructure for handling and transport. Gold Bond may incorporate a portable crusher into their operation in future.

Topsoil, grubbing material, and overburden that will be stripped prior to drilling and blasting may be used in progressive reclamation at other sections of the mine or stored on-site for future use. Currently, the overburden is backfilled into previously mined out sections of the mine and graded as outlined in the mine's Reclamation Plan (Stantec 2022). Stockpiles of topsoil and grubbing materials will be stabilized and seeded to reduce potential for erosion and sedimentation prior to use in reclamation efforts.



1.6.3 Operation and Maintenance

Excavation will be carried out using standard and long-established drill and blast techniques. The working / laydown area is located on the mine floor. The rock is processed by stationary crushing equipment that is located largely below ground level which reduces noise and dust in the surrounding area. Stockpiles are currently located at various sites within the mine limits. Material will be conveyed to existing infrastructure for final processing and loading for transport.

Drainage entering the mine from overland runoff will be collected in perimeter drains and ditching associated with the existing mine, treated by allowing it to settle, and conveyed to one of three main sumps. The water is monitored to meet final effluent discharge level limits (i.e., pH, suspended solids, oil and grease, toxicity, and ammonia as nitrogen), as stated in the facility's IA (No. 89-100). Monitoring data from 2016-2023 are provided in Appendix C. The treated water is then pumped to the Shubenacadie River downstream of the mine. Like the current mine, mine drainage and surface runoff collection and controls for the Project will be refined at the IA amendment stage.

There is no planned storage of hazardous materials at the Project site. Gold Bond has practices in place for handling of hazardous materials as well as an established "Contingency Plan and Procedures for Releases of Dangerous Goods and Hazardous Wastes" and an "Emergency Procedures Plan".

1.6.4 Effluents and Emissions

Although the Project is expected to extend to depths of 60 m below mean sea level to extract buried gypsum and underlying anhydrite deposits, mining will be maintained above the groundwater table. As mining extends northward from the existing pit, drainage originating as direct precipitation and runoff will be directed via perimeter drains and ditching to one of the three main sumps. Mitigation measures such as diversion ditches, settling ponds, straw hay mulch and seeding will be used as necessary to control sedimentation. Existing mitigation measures for the control of runoff / overflow and erosion / sedimentation will be implemented to limit runoff and sediments from leaving the mine site.

At the existing mine, collected water is monitored to meet final effluent discharge level limits as stated in the facility's IA, and discharged to the Shubenacadie River. Water is collected from the various mine levels via a series of pumps and ultimately discharged from the Level 3 sump to the Shubenacadie River.

With the addition of the Project to the mine operation, discharged water will continue to be monitored and sampled according to the terms and conditions of the existing IA (and future updates) so total suspended solids (TSS) levels do not exceed the approved final effluent discharge limits. In the unlikely event that overflow associated with a significant rain fall exceeds final effluent discharge limits as determined through monitoring, contingency measures will continue to be in place. A Stormwater Management Plan for the existing mine will be updated for the Project and will be submitted as part of the IA amendment process.



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Mitigation measures to address additional overflow volume will be implemented, as required and in consultation with regulators and appropriate guidance documents such as NSECC's Erosion and Sedimentation Control Handbook for Construction Sites (NSE 1988). Details regarding additional perimeter drains and ditching required for Project operation will be refined during the IA amendment process.

Dust emissions will be controlled by the application of water, obtained from pooled water in the mine pit. To reduce generation of dust, the following mitigation measures are undertaken at the existing mine:

- Water spray in the hopper where trucks dump material into the crusher
- Water spray at the primary crusher
- Water with dust suppression chemical (Zinkin DT10) spray at the tail of Conveyor #3 (this is the conveyor that stockpiles the gypsum)
- Water spray at the head of Conveyor #3 as the gypsum falls off the belt onto the stockpile
- Water spray of the rail cars to limit dust during transport

All sprays are automatic if there is material going through the system. In 2015, Gold Bond installed a water spray system in the car loading area that sprays each loaded car before transport to the dock.

Dust generated by material movement along the access road is controlled by speed control (i.e., maximum of 50 km / hour, and operators adjust their speed based on road conditions), proper truck loading, application of dust suppressants, proper construction of on-site roads, and / or other means recommended or required by NSECC.

Monitoring of airborne particulate emissions (dust) will be conducted at the request of NSECC and at locations established by a qualified person, as outlined in Section 5 of Gold Bond's existing IA, updated in April 2023. If monitoring is required it will be done in compliance with the US Environmental Protection Agency (EPA) standard: EPA/625/R-96/010a (EPA 1999) and should not exceed the following limits at the property boundaries:

- Annual Geometric Mean 70 $\mu\text{g}/\text{m}^3$
- Daily Average (24 hrs) 120 $\mu\text{g}/\text{m}^3$

Combustion emissions will be generated from the operation of vehicles and equipment during Project activities. The volume of emissions will be similar to the current operation. Emissions will be reduced through proper equipment maintenance and inspection practices for efficient operation. Practices to reduce truck and equipment idling will be implemented, where feasible.

Stationary crushing equipment is located below grade, and this greatly reduces noise outside the mine site. Noise from back-up beepers on equipment (a safety requirement) was previously identified as a concern by local residents. Since Gold Bond replaced their existing back-up beepers with directional back-up beepers, noise levels have decreased and no concerns have been raised.



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As per the existing IA, sound levels (A-weighted decibels-dBA) from mine operations should not exceed threshold sound levels (Leq) at the property boundaries:

- Leq 65dBA 0700-1900 hours (Days)
 60dBA 1900-2300 hours (Evenings)
 55dBA 2300-0700 hours (Nights)

Details of monitoring programs required by NSECC (e.g., surface water, noise, dust) will be developed in consultation with NSECC and as outlined in the IA amendment application.

During crushing and screening operations, hazardous materials present on-site are those associated with the normal operation of construction equipment. These materials include gasoline, diesel fuel, lubricants, and antifreeze liquid. Regular maintenance of equipment will be completed by qualified personnel and most equipment maintenance services will be carried out on-site, with oils and tools stored in sufficient quantities to accommodate these activities. A waste oil tank with a storage capacity of 10,000 L is present on-site. In late 2014, three waste oil burners were incorporated at the maintenance shop to burn waste oil and generate heat.

Hazardous wastes will be contained and temporarily stored in a designated area until they are removed from the site by a licensed contractor and recycled or disposed of at an approved facility. Other control measures include implementing Gold Bond's existing established practices for handling of hazardous materials and adherence to established Plans such as Contingency Plan and Procedures for Releases of Dangerous Goods and Hazardous Wastes and Emergency Procedures Plan.

Refueling of equipment will be conducted on-site on a regular basis via existing diesel fuel tanks which are re-filled by a tanker truck. Refueling activities will not be conducted within 100 m of a waterbody or wetland identified in field surveys. Equipment operators will remain with equipment during refueling in accordance with the Petroleum Management Regulations of the NS *Environment Act* and Gold Bond's established practices for handling of hazardous material. At lower benches in the mine, equipment may be refueled next to ponds, and in the unlikely event of a spill, pumping would cease and affected water would be contained and cleaned up per provincial regulations and Gold Bond's Spill Contingency Plan.

Employees and temporary site workers will review the Gold Bond Spill Contingency Plan as part of their site orientation. If an accidental spill of hazardous material occurs, the Gold Bond Spill Contingency Plan will be initiated, which includes immediate reporting of any size spill and implementing spill containment measures immediately. Supervisors will notify proper agencies, put controls in place to prevent further release, and initiate clean up. Requirements for containment, clean-up, site restoration, disposal and reporting are provided in the Spill Contingency Plan. The Plan also contains a list of hazardous materials maintained on site and a list of equipment available for emergency response to a spill. All spills will be reported to the 24-hour environmental emergencies reporting system (1-800-565-1633) in accordance with the NS Emergency Spill Regulations.



1.6.5 Decommissioning and Reclamation

Decommissioning and reclamation activities for the Project will be the same as for the existing mine. The existing mine pit will be left as a flooded pond, and the shoreline slopes will be constructed in accordance with NSNRR general expectations; for example, maximum shoreline slopes of 5H:1V for 2 vertical m below the low water line and 1 vertical m above the high-water mark.

Gold Bond will complete progressive rehabilitation activities at the existing mine and Project site to offset phased stripping / grubbing activity. The timing and specifics of progressive rehabilitation efforts will depend on production volumes and will vary according to the intensity of production-related stripping / grubbing activity. With the phased construction and progressive reclamation process, only the area needed for mine extension in any one year will be grubbed and stripped, and areas affected by mine activities will be eventually rehabilitated. The overburden from the stripped areas will be placed in a mined-out portion of the pit. Subsoil and topsoil will be stockpiled for use in future reclamation.

The final Reclamation Plan outlines both natural and active re-vegetation programs, e.g., contouring, topsoil placement, fertilization, and seeding and / or planting to re-vegetate disturbed areas. Seeding stockpiles, as currently practiced, will also be conducted for Project activities. If it is necessary to seed reclaimed areas where grubbing has not produced sufficient plant biomass to stabilize soils, seed mixtures free of noxious weeds and invasive species will be used. Native plants may be used for site reclamation, or seed mixes containing naturalized species that are well established in NS and free of invasive species and aggressive weeds may be used for reclamation. Photos showing existing site reclamation activities are presented in Appendix B, Photo Long B.2.

As areas are mined out, slopes will be graded to a stable slope, i.e., 3:1 or 1:1, or leveled to allow for future uses. Inactive areas will be covered with overburden and seeded in the absence of laying a root mat. Areas stripped of overburden and worked to the appropriate elevation will form part of the staging area for the stockpiles of newly exposed and blasted rock. Once the operation reaches a stage where the storage area can be reduced, these areas will be rehabilitated per the final Reclamation Plan.

A detailed Reclamation Plan was developed for the mine in 1995 (Porter Dillon 1995) and is updated regularly, most recently in 2022 (Stantec 2022). This Plan will also be updated to include the Project and submitted to NSECC for review. The revised Reclamation Plan will include updated information on proposed final topography, maximum slopes, re-vegetation plans and an outline for progressive reclamation at the Project site.

2.0 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

Since the Project involves the expansion of a quarry footprint beyond four ha, it must be registered as a Class I Undertaking pursuant to the Environmental Assessment Regulations under the NS *Environment Act*. The Project is not anticipated to trigger federal impact assessment requirements under the *Impact Assessment Act*. This EA Registration Document has been prepared in accordance with the provincial *Guide to Preparing and EA Registration Document for Pit and Quarry Documents in Nova Scotia* (NSE 2009) (EA Guide).



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A preliminary Project Information and Scoping Document was submitted to NSECC in January 2022 for discussion. That document provided an overview of the key components and activities associated with the Project, the proposed EA approach and scope of the assessment, and proposed consultation and engagement activities for the purposes of soliciting feedback from NSECC and facilitating an efficient and effective EA process for the Project. Gold Bond and Stantec subsequently met with NSECC on February 9, 2022, to present and discuss the contents of the Project Information and Scoping Document to further focus the scope of the assessment and associated desktop and field studies.

The scope also takes into consideration that the mine is presently operational and subject to an existing IA. The existing IA includes conditions and mitigation measures related to operational sound levels, separation distances, particulate emissions, surface water quality, groundwater management, reclamation, regulatory reporting as well as site-specific conditions. Prior to Project commencement, the existing IA will be amended based on the results of recently completed baseline studies and assessments completed for this EARD, and potential conditions arising from the EA Approval. The amended IA will outline operational requirements of the expanded mine operation. The Project will not change the scope of operations at the mine site and other than the proposed expansion, ongoing activities at the pit will be the same as in the past.

2.1 VALUED COMPONENT IDENTIFICATION

In 2022, Stantec conducted a desktop environmental constraints analysis and regulatory requirement review of the proposed expansion. Based on the constraints analysis and the Valued Components (VCs) assessed in the 2015 EA, this document includes an assessment of the following VCs:

- Atmospheric Environment
- Water Resources
- Vegetation and Wetlands
- Wildlife and Wildlife Habitat
- Archaeological and Heritage Resources
- Land Use
- Indigenous Communities and Activities

The EARD will be based on existing desktop and field data, supplemented by additional field surveys completed in 2023 in the Project Area.

2.2 FIELD STUDIES AND DATA COLLECTION

Field studies were conducted in 2023 by Stantec to investigate the existing conditions and to determine appropriate mitigation measures to manage environmental effects of the Project. The Project footprint is the expansion area of 14 ha also referred to as the Project Area. Existing environmental conditions are described for each VC and are established based on data collected during public, stakeholder, and Indigenous engagement activities and baseline studies (i.e., desktop studies and field studies) conducted in support of the EARD.



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Field studies were completed in spring and summer 2023 by qualified technical personnel and consisted of the following:

- Vegetation and wetland field surveys
- Dedicated avifauna surveys (e.g., breeding bird surveys, bird atlas style search surveys)
- Incidental wildlife observations for avifauna, mammals (including bats), and herptiles completed during the execution of targeted vegetation and wetland field surveys
- Surface water sampling at watercourses, and overland drainage near the Project Area

Several desktop studies were also completed and include:

- Assessment of potential archaeological and heritage resources
- Atmospheric environment (i.e., air quality)
- Groundwater resources
- Land and resource use

Additional information in support of the field and desktop studies was gathered through a review of:

- Aerial and satellite imagery
- NS Significant Species and Habitats Database
- Site mapping
- The Atlantic Canada Conservation Data Centre (AC CDC)
- Statistics Canada
- NS Museum
- NS Department of Natural Resources and Renewables (NSNRR)
- NS Geomatics Centre (NSGC)
- NS Topographic Database (NSTDB)
- NS Groundwater Atlas
- 2022 Constraints Analysis

For this EARD, species at risk (SAR) are defined as those species that meet any of the following criteria:

- Species that are listed under Schedule 1 of the federal *Species at Risk Act* (SARA) as Endangered, Threatened, Vulnerable, or of Special Concern
- Species that are listed under the NS *Endangered Species Act* (NS ESA) as Endangered, Threatened, Vulnerable, or of Special Concern
- Species that are not yet listed under provincial or federal legislation but have been identified by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as being Endangered, Threatened, or of Special Concern

2.3 EFFECTS ANALYSIS METHODS

Table 2-1 indicates where there is potential for interaction between Project activities and the VCs identified for the assessment.



Table 2-1 Potential Project-VC Interaction Matrix

Project Activity	Valued Components						
	Atmospheric Environment	Water Resources	Vegetation and Wetlands	Wildlife and Wildlife Habitat	Archaeological and Heritage Resources	Land Use	Indigenous Communities and Activities
Site preparation, including clearing and grubbing to facilitate expansion of the mine footprint (Project Area) and installation of site management features (e.g., erosion and sediment controls)	✓	✓	✓	✓	✓	✓	✓
Presence and operation of Project vehicles, equipment, and site lighting within the Project Area	✓	✓	✓	✓	✓	✓	✓
Gypsum extraction (i.e., drilling, blasting, and excavation), processing (i.e., crushing and screening), and stockpiling	✓	✓	✓	✓	✓	✓	✓
On-site transportation (hauling / moving and trucking) of gypsum	✓	–	✓	✓	✓	✓	✓
Dismantling (where necessary) and removal of Project equipment, facilities, and infrastructure from the Project Area	–	–	✓	✓	✓	✓	–
Progressive and final reclamation of the Project Area	✓	✓	✓	✓	✓	✓	✓
Closure of the overall mine site	–	–	–	–	–	✓	✓
Notes: ✓ = Potential interaction – = No interaction							

Section 6 presents the existing environment and effects assessment for each VC selected for the Project. The spatial and temporal boundaries for the assessment are presented for each VC and a definition is provided for a significant adverse environmental effect. If there are mitigation measures or requirements for follow-up and monitoring because of the Project, these are also presented in Section 6.

2.4 MITIGATION MEASURES AND BEST MANAGEMENT PRACTICES

Project activities will be consistent with the current mining activities approved by NSECC at the mine site, except that the mine footprint will progressively expand to the north throughout the operation and maintenance phase of the mine. Gold Bond's current IA for ongoing activities at the Gold Bond gypsum mine (IA #2015-093939-01) stipulates requirements related to:

- Separation distances
- Air quality limits
- Noise level limits
- Water quality limits
- Erosion and sediment control



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- Blasting limits
- Reclamation (rehabilitation) planning and associated financial security

Technically feasible mitigation measures are proposed to eliminate, avoid, reduce, or control adverse environmental effects to address public concerns, and / or to optimize beneficial effects. Types of mitigation measures include Project design mitigation measures and standard environmental protection procedures, as well as VC-specific mitigation measures to address the potential effects on a particular VC.

The Environmental Protection Plan (EPP) in place for existing mine operations describes standard environmental mitigation measures and established environmental management practices that are to be implemented as applicable during the site preparation, operation and maintenance, and decommissioning and reclamation phases of the existing quarry. The existing EPP will be applied to the proposed Project and updated, as applicable.

3.0 CONSIDERATION OF ALTERNATIVES

Gold Bond has determined that there are no financially viable alternatives to the Project. The gypsum deposit to be mined occurs north of the existing mining operation and as such, the resource must be mined at the deposit location. Development in the 2015 approved expansion area revealed lower than expected yields in that area. To maintain current production levels, Gold Bond determined that expansion into the Project Area is necessary. Mining this deposit now follows a logical sequence of quarry development that optimizes resource extraction while limiting the potential for future resource sterilization.

Development methods and machinery, processing infrastructure, and shipping methods were developed for the original mine and are demonstrated to be economically and environmentally sound. Transportation of the mined gypsum and means of extraction will not change from the existing operation. The mine's Reclamation Plan will include consideration of various alternatives for final land use of the Project Area following the completion of decommissioning and reclamation activities, based on the long-term objectives for future use of the site.

The Project Area was not owned by Gold Bond at the time of the 2015 EA and was not included in the 2015 EA registration.



4.0 PROJECT SCHEDULE

The Project could start within one year of Project approval. The estimated timing and duration of the various phases of the Project are as follows:

- Site Preparation – Site preparation activities will occur progressively on an as-needed basis over the life of the Project (typically once per year for one to two weeks), with grubbing carried out prior to resource extraction.
- Operation and Maintenance – The extractable reserves in the Project Area are estimated to be fully mined within 10 years at the current average annual rate of production. The proposed operating schedule for the Project is the same as for the existing quarry (i.e., 12 hours / day, five to six days / week for 50 weeks / year). Blasting activities at the existing Gold Bond mine are currently conducted on an as-needed basis.
- Decommissioning and Reclamation – Progressive reclamation activities may overlap temporally with site preparation / construction and operation / maintenance phases at other locations on the mine site. It is anticipated that the final reclamation program (contouring, vegetation, and monitoring) will be completed within a one- to three-year period following the conclusion of the gypsum extraction activities. Additional details on decommissioning and reclamation timelines will be developed as part of the IA amendment process and based on conditions of EA approval.

5.0 ENGAGEMENT

Engagement with the Mi'kmaq community, potentially affected stakeholders, the public, and regulatory agencies is a regular component of EAs in NS.

5.1 MI'KMAQ ENGAGEMENT

Gold Bond completed a Mi'kmaq Ecological Knowledge Study (MEKS) (Membertou 2014) to support the EA for the 2015 expansion project. At that time, engagement activities included an open house and several tours of the mine site. Table 5-1 below is a summary of concerns raised during the 2015 engagement activities. At a January 4, 2023, meeting with NSECC Stantec proposed using information from the 2015 MEKS, as well as information obtained through 2023 or 2024 engagement activities for this Project's EARD. NSECC officials agreed with this approach and indicated that additional information provided through engagement should be used to build on the past MEKS.

Table 5-1 Summary of Mi'kmaq Engagement – 2015 Gypsum Quarry Expansion

Information Request	How Addressed
Location of the Project	The Proponent provided a map showing existing mine and Proposed Extension Area.
Location of the Project relative to other features	The Proponent provided a site map and figure showing land use in the area. An ecological buffer zone was added to mapping to protect large wetland and watercourse at eastern end of Project Area.



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Table 5-1 Summary of Mi'kmaq Engagement – 2015 Gypsum Quarry Expansion

Information Request	How Addressed
Operation schedule and Proposed Mine Development Plan map	Operation schedule discussed in Section 2.5 of 2015 Registration document. Proposed Mine Development Plan in Appendix B of 2015 Registration document.
Recommended that a MEKS be conducted	A MEKS was conducted. Appendix F and summary in 2015 Registration document
Suggested Proponent's archaeologist contact Heather MacLeod-Leslie from the KMK and provide report. Chief Copage identified potential for ancient burial grounds.	The Proponent offered to have a Sipekne'katik representative review mapping and/or accompany the Stantec archaeologist during field surveys. Followed up with calls and communicated that the MEKS was initiated in the spring. Ms. MacLeod-Leslie was contacted by the Proponent's archaeologist to discuss findings, and EARD was shared during the draft and final EARD review process.
Opportunities for employment	The Proponent met with the Human Resources Director at Sipekne'katik First Nation and discussed future hiring needs of the mine and the skills required. The Proponent has a signed MOU with the Native Council of Nova Scotia; The Proponent is willing to provide pre-apprentice training and work experience. Employment opportunities discussed in the 2015 EARD. Continued operation of the mine will result in economic benefits, including ongoing employment and business opportunities.
Benefits program opportunities and encouraged proponent to meet with KMK benefits representative	The Proponent had correspondence with the Benefits Officer for Sipekne'katik First Nation (letter sent to Jennifer MacGillivray in October 2014).
Acknowledged Proponent's outreach to Sipekne'katik First Nation and said to also engage Millbrook First Nation	The Proponent had a telephone conversation on September 11, 2014, with Chief Gloade from the Millbrook First Nation to discuss the Project. An in-person meeting and site tour were offered at the convenience of Chief Gloade and Council.
Ongoing engagement after EA	Ongoing engagement with local Mi'kmaq community representatives will provide feedback on the effectiveness of mitigation measures, effects prediction and potential adaptive management strategies.

To supplement the 2014 MEKS (Membertou 2014), a current Project Information Bulletin was sent to the Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO), Sipekne'katik First Nation, and Millbrook First Nation in early March 2024, and no additional comments have been received to date. The KMKNO, Sipekne'katik First Nation and Millbrook First Nation were invited to the open house on March 27, 2024 (details below). Gold Bond will follow up with appropriate communication and engagement with respect to additional information requests received, including those raised during the open house. It is understood that NSECC will engage with Mi'kmaq communities during the EARD review phase.

Gold Bond will continue to engage with the Mi'kmaq post-EA during permitting and reclamation planning and will communicate the steps to be taken to address concerns. Ongoing engagement with local Mi'kmaq community representatives will provide feedback on the effectiveness of mitigation measures and confirm effects prediction and required adaptive management.



5.2 PUBLIC CONSULTATION AND COMMUNITY INVOLVEMENT

An open house session was held at the Carroll's Corner Community Centre on March 27, 2024, from 2:00 pm to 6:00 pm. Publicity for the event was via open house invitations and Project Information Bulletins (Appendix E) distributed to residents along Vinegar Hill Road and Milford Road, the two roads closest to the proposed expansion. Vinegar Hill Road runs north – south and is located to the northwest of the Project Area, while Milford Road runs northwest – southeast, on the north side of the existing mine, and Project Area. Copies of the open house invitation and Project Information Bulletin were also provided to NSECC, KMKNO, Sipekne'katik First Nation, Millbrook First Nation, and local elected officials to inform them of the Open House.

At the open house, attendees were provided with information on the Project, as well as opportunities to ask questions of Gold Bond and Stantec staff. Attendees were provided feedback forms and were encouraged to submit comments or concerns to Gold Bond. Attendees were also provided with contact information for Gold Bond, in the event they wished to express comments or concerns later. No comments or concerns were raised at the open house, and no comments or concerns have been received by Gold Bond at the time of submission of this EARD.

Gold Bond has a long-standing history in the region and is proud of its ongoing community involvement and financial support to several organizations in the area, e.g., Lions Club, Carroll's Corner Community Association, Mission to Seafarers, Milford-Lantz United Church, East Hants Chamber of Commerce, East Hants Family Resource Centre, Corridor Community Options for Adults, and the Corridor Horse & Pony Society (CHAPS). The Proponent has also provided land for a walking trail and provides scholarship funds to area schools.

5.3 REGULATORY CONSULTATION

Gold Bond communicated with NSECC on November 22, 2022, to advise that an expansion was proposed. A virtual meeting was held on January 4, 2023, and included representatives from Gold Bond, Stantec, and NSECC EA Branch. The purpose of the meeting was to provide information about the Project; identify and discuss issues and concerns to inform the scope of the EA; discuss the proposed Project schedule and regulatory approvals process; and discuss the approach to Mi'kmaq and public engagement.



6.0 EXISTING ENVIRONMENT AND EFFECTS ASSESSMENT

The selection of the seven VCs considered for this Project was based on a desktop environmental constraints analysis and the VCs assessed in the 2015 Registration document.

6.1 OVERVIEW OF CONSTRAINTS ANALYSIS

Information from various sources was reviewed to identify the potential for the presence of environmentally sensitive features and Species at Risk (SAR) in the Project Area: the 2015 EA for the eastern expansion of the mine; a hydraulic assessment of Big Pond Brook related to mine reclamation planning; incidental observations of plant and bird SAR; and ongoing wetland monitoring conducted by Stantec. This information was supplemented by available desktop information regarding historical SAR and species of conservation interest (SOI) observations from the AC CDC. Specifics of the constraints analysis are presented under the applicable VC description below.

6.2 ATMOSPHERIC ENVIRONMENT

The Atmospheric Environment VC includes climate, air quality, greenhouse gas (GHG) emissions, and noise emissions. This VC was selected for consideration in the assessment of Project-related environmental effects due to the following:

- The importance of air quality to the health and wellbeing of human and non-human biota
- The importance of the atmospheric environment as a pathway for the potential transport of Project-related air contaminants (including dust) to surrounding terrestrial, freshwater, and human environments
- The potential for Project-related noise to cause sensory disturbance affecting human health and wellbeing, land and resource use, and wildlife and wildlife habitat
- The potential for noise from Project blasting activities to cause auditory injury to humans or wildlife in proximity to the source

GHGs are the subject of local, national, and international reduction targets due to their association with climate change; therefore, potential Project-related emissions of GHGs are an issue of scientific and regulatory concern.

The assessment of Project-related effects on the atmospheric environment considers associated potential human health impacts as applicable. However, potential effects on other components of the biophysical / ecological environment, socio-economic environment, or cultural / heritage environment that may be associated with Project-related changes in air quality and noise are assessed separately in the context of the relevant VC(s).

Spatial boundaries for the assessment of air quality and noise includes the airshed within which sensitive receptors (e.g., residences), could potentially experience a measurable change in regulated air quality parameters (e.g., airborne particulates). For the mine site, five km is considered a sufficient spatial boundary for assessment of this VC. The temporal boundary for the Project is continuous through the Project life, including decommissioning and reclamation activities.



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A significant adverse environmental effect relative to air quality is defined as one that would reduce air quality at the Project site boundary, such that the level of total suspended particulate matter frequently exceeds $120 \mu\text{g} / \text{m}^3$ over a 24-hour averaging period or $70 \mu\text{g}/\text{m}^3$ over an annual averaging period.

A significant adverse environmental effect relative to the acoustic environment is defined as one that increases existing sound levels such that they continuously exceed 65 dBA during the day (7:00 to 19:00), 60 dBA during the evening (19:00 – 23:00) or 55 dBA during the night (23:00 – 7:00), over a two-hour period.

6.2.1 Existing Environment

6.2.1.1 Climate

A review of historic meteorological data collected at the Halifax Stanfield International Airport Climate Station (ID 8202250; Coordinates: $44^{\circ}52'48.060''$ N, $63^{\circ}30'00.050''$ W; Elevation: 145.4 m) operated by Environment and Climate Change Canada (ECCC) was completed. The Airport Station is located approximately 28 km southwest of the Project Area. Climate normals from 1981 to 2010, the most recently published, are summarized in Table 6-1 (ECCC 2023a). The climate normals for the Airport Station indicate that the daily average temperature ranges from -5.9°C in January to 18.8°C in August. Precipitation was lowest during the summer (June to August) and highest during the fall / winter (October-January).



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Table 6-1 Summarized Climate Normals for Halifax Stanfield International Airport (1981-2010)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Year
Temperature °C													
Daily average	-5.9	-5.2	-1.3	4.4	10.0	15.1	18.8	18.7	14.6	8.7	3.5	-2.4	6.6
Standard Deviation	2.2	2.0	1.6	1.2	1.3	1.1	1.1	1.0	1.3	1.3	1.3	2.2	0.8
Daily maximum	-1.3	-0.6	3.1	9.1	15.3	20.4	23.8	23.6	19.4	13.1	7.3	1.7	11.3
Daily minimum	-10.4	-9.7	-5.7	-0.3	4.6	9.7	13.7	13.7	9.7	4.2	-0.4	-6.4	1.9
Record high	14.8	17.5	25.6	29.5	32.8	33.4	33.9	35.0	34.2	25.8	19.4	16.3	
Record low	-28.5	-27.3	-22.4	-12.8	-4.4	0.6	6.1	4.4	-0.8	-6.7	-13.1	-23.3	
Average Precipitation (mm) / Snow (cm) / Rainfall (mm)													
Precipitation	134.3	105.8	120.1	114.5	111.9	96.2	95.5	93.5	102.0	124.9	154.2	143.3	1396.2
Snowfall	58.5	45.4	37.1	15.9	2.0	0.0	0.0	0.0	0.0	0.4	16.6	45.4	221.2
Rainfall	83.5	65.0	86.9	98.2	109.8	96.2	95.5	93.5	102.0	124.6	139.1	101.8	1196.1
Precipitation days (>0.2 mm)	18.7	15.2	15.1	14.8	13.7	12.9	11.3	11.0	10.2	12.1	15.1	17.4	167.4
Snowy days (>0.2 cm)	14.6	12.0	9.6	5.2	0.61	0.0	0.0	0.0	0.0	0.14	3.9	11.7	57.7
<p>Note: While more recent climate normal are available from some ECCC sties, these data represent the most recent climate normals for the Halifax Stanfield International Airport, the site closest to the Project Area.</p>													



6.2.1.2 Air Quality

Ambient air quality is monitored in NS through seven monitoring stations operated by NSECC in accordance with the National Air Pollution Surveillance (NAPS) program (ECCC 1969). Ambient air stations can monitor fine particulate matter (i.e., particulate matter less than 2.5 microns in diameter [PM_{2.5}]), carbon monoxide (CO), sulphur dioxide (SO₂), total reduced sulphur, and nitrogen oxides (NO_x).

Current mine operation activities such as blasting, processing / crushing, and trucking have the potential to contribute to increased ground-level suspended particulates.

The closest monitoring sites to the Project Area are on Granville Street, Halifax and in Cherry Brook, Dartmouth. Minimum and maximum average hourly values and monthly average values for 2021 for the Dartmouth and Halifax Stations are shown in Table 6-2.

NS does not have ambient air criteria in place for fine particulate matter, however, the Canadian Ambient Air Quality Standards (CCME 2012) sets the maximum permissible ground-level concentration of PM_{2.5} at 27 µg/m³ for a 24-hour averaging period and 8.8 µg/m³ for an annual averaging period.

Table 6-2 2021 Summarized Air Quality Data for Nearby NAPS Stations

	PM _{2.5} (µg/m ³)	NO (ppb)	NO ₂ (ppb)	NO _x (ppb)
Applicable Standards				
<i>NS Air Quality Regulations</i> (1-hour average)	—	—	212	—
Canadian Ambient Air Quality Standards (24-hour average)	27	—	—	—
Dartmouth (Cherry Brook) Measurements				
Minimum	0	0	0	0
Maximum	33	23	19	42
Average (1-hour)	4	0	1	1
Halifax (Granville Street) Measurements				
Minimum	0	0	0	0
Maximum	71	100	37	132
Average (1-hour)	5	2	4	5
Note: “—” = Indicates no available criteria NO – Nitrogen oxide. NO ₂ – Nitrogen dioxide, ppb- parts per billion				

The NS Air Quality Regulations maximum permissible ground level concentration for NO₂ is set at 400 µg/m³ or 212 ppb for a 1-hour averaging period. The concentration of NO₂ recorded at the Dartmouth and Halifax Stations did not exceed this criterion for January 2016 to December 2021 (GNS 2020). The concentration of PM_{2.5} exceeded the NS Air Quality Regulations maximum permissible ground level concentration on one occasion for both Stations and is shown as the maximum PM_{2.5} concentration from January 2016 to December 2021.



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The data presented from both Stations may be influenced by the urban setting which includes increased industry and population, and therefore air quality in the rural setting of the Project Area may be better.

The Air Quality Health Index (AQHI) is a scale designed by ECCC to help understand the impact of air quality on human health. The AQHI measures the current levels of outdoor air pollution and related human health risks using a scale of 1 to 10, representing low to very high-risk levels. Three air pollutants are measured to calculate the AQHI, including ozone (O₃) PM_{2.5} and NO₂ (GNS 2013). The closest community to the Project Area that has this program implemented is Halifax and the current air quality levels in this area can be viewed online at ECCC's website (ECCC 2023b).

The existing mine is in a rural setting with little industrial development nearby. Gold Bond conducted ambient air monitoring events in 2000, 2002, and 2004 to determine dust levels at the facility's site boundaries. Dust levels at the facility's site boundaries were below the NS Air Quality Regulations for total suspended particulate (TSP) on all occasions except for the one occasion during the summer of 2004 when the measured 24-hour TSP value exceeded the regulatory limit of 120 µg/m³. No evidence at the mine or in the immediate vicinity of the sampler was available at the time to explain the exceedance. Gold Bond continues to place a high priority on the control of dust generation at the site.

6.2.1.3 Acoustic Environment

Noise is defined as unwanted sound and is measured as a sound pressure level (SPL) in decibels. Noise emissions have the potential to disturb nearby receptors (i.e., residences and wildlife). Provincial noise level guidelines have been published under the *Guidelines for Environmental Noise Measurement and Assessment* (NSECC 2023) and the *Pit and Quarry Guidelines* (NSEL 2003). Both guideline documents prescribe noise criteria for daytime hours (7:00–19:00) at 65 dBA, evening hours (19:00–23:00) at 60 dBA, and nighttime hours (23:00–7:00) at 55 dBA. For the data to be considered representative, the measurement duration is to be a minimum of two continuous hours of data in each period and is to be measured on the property boundary of sensitive receptors (e.g., the nearest permanent residence).

The EARD completed in 2015 noted that there are approximately 102 buildings / structures located within 800 m of the existing mine site. The addition of the Project to the existing mine does not change the number of receptors considered in the 2015 assessment. Given the Project is an expansion of an existing mining operation, baseline noise levels in the Project Area are characterized by heavy equipment use, blasting, and natural background sounds (e.g., wind).

Typical noise levels at 15 m from heavy construction equipment are provided in Table 6-3 (USDOT 2018). A general rule of thumb is that noise levels decrease by approximately 6 dBA as the distance doubles from the point source.



Table 6-3 Typical Noise Levels from Construction Equipment at 15 m

Type of Equipment	Noise Level Range (dBA)
Backhoes	74 - 92
Front Loaders	75 - 94
Trucks (e.g., pickup, dump truck, flat-bed truck)	55 - 84
Excavators	85

The Proponent conducted noise monitoring events in 1999, 2000, 2002 and 2003 to determine noise levels at the facility’s site boundaries. The measured 1-hour Leq values were below the NSECC Noise Guidelines (NSECC 2023). The proponent has also reported two non-conformances related to air concussions from blasting in the past 12 months.

6.2.1.4 GHG Emissions

According to the most recently published data from Canada’s GHG Emissions Reporting Program, the quantity of GHG emissions released to the atmosphere in Canada in 2021 was 285,472 kilotonnes of carbon dioxide (CO₂) equivalent (ktCO_{2e}), of which 6,720 ktCO_{2e} were released in NS (ECCC 2021), representing approximately 2% of Canada’s emissions.

NS’s Greenhouse Gas Emissions Regulations (GNS 2013) apply to any facility that emits greater than 10 ktCO_{2e} GHGs in one calendar year. Under these regulations, Gold Bond is not required to report Project-related GHG emissions. GHG emissions for the Project will be limited to earthworks and associated heavy equipment during construction. No substantial change in GHG emissions is expected during the Project operation phase compared to the current mine operation.

6.2.2 Effects Assessment

Air Quality

Mining activities can generate dust (i.e., particulate emissions) which has the potential to be transported off-site. The primary sources of airborne particulates include:

- Exhaust gas emissions due to incomplete combustion from diesel compression engine
- Road dust
- Wind erosion on storage piles
- Removal of overburden
- Blasting activities
- Crushing operations
- Material handling and transport
- Truck loading / truck unloading
- Rail car loading / unloading.



GOLD BOND GYPSUM MINE EXPANSION PROJECT

Results from ambient air monitoring events in 2000, 2002 and 2003 indicated dust levels at the facility's site boundaries were below the NS Air Quality Regulations for TSP on all occasions except for the one occasion during the summer of 2004 when the measured 24-hour TSP value exceeded the regulatory limit of 120 µg/m³. No evidence at the mine or in the immediate vicinity of the sampler was available at the time to explain the exceedance. Gold Bond continues to place a high priority on the control of dust generation at the site. The remainder of the datasets showed no adverse effects from the mining operations.

Gold Bond will continue to comply with air quality limits as indicated in the amended IA. Monitoring of airborne particulate emissions (dust) will be conducted as required by NSECC and in accordance with the NS Air Quality Regulations and the mine's IA.

Acoustic Environment

Project activities will generate noise from equipment operation and blasting. Project-related blasting will be conducted in accordance with current operations at the mine as permitted by NSECC (i.e., per IA, similar frequency as past operations, daytime hours).

The current IA and standard provincial guidelines require that sound levels from mine operation at the property boundaries be maintained at:

- Leq 65 dBA 0700-1900 hours (Days);
 60 dBA 1900-2300 hours (Evenings); and
 55 dBA 2300-0700 hours (Nights).

Results from noise monitoring events conducted in 1999, 2000 and 2003 to determine noise levels at the facility's site boundaries indicated that the measured 1-hour Leq values were below the NSECC Noise Guidelines.

Mitigation Measures and Determination of Significance of Residual Effects

Overall, the Project is an expansion of a currently operating quarry in an area historically influenced by industrial operation. Activities within the Project Area are anticipated to be similar to the current operations, and annual air and noise emissions will not measurably change because of the Project. Gold Bond is not aware of any unmitigated issues, concerns, or complaints raised by the public, Indigenous groups, or stakeholders in relation to ongoing operations at the existing gypsum quarry.

Gold Bond will comply with requirements in their IA related to the atmospheric environment and relevant conditions of EA Approval. Adverse air quality and noise emissions specific to the Project can be managed with standard mitigation measures already in place for the existing mine. The primary mitigation measure to limit the generation of dust at the mine site is the use of water sprays, including during crushing at the subgrade stationary crusher unit, and other dust producing activities. In addition to the primary mitigation measures of water application for dust suppression, dust generated by truck movement in the Project Area will be managed by maintaining appropriate speed limits, proper truck loading, proper construction of on-site roads, and / or other means as determined necessary or required by NSECC.



GOLD BOND GYPSUM MINE EXPANSION PROJECT

Project related blasting activities will be the same as for existing mining operations and will be carried out by a licensed blaster and in accordance with standard operating procedure for normal blasting operations.

As with the existing mine, exhaust emissions from equipment and vehicles will be managed by maintaining vehicles in good working order and implementing a no-idling policy, where feasible.

Mitigation measures to reduce noise emissions from mining equipment include the use of mufflers on engines and vehicles, adherence to established maintenance policies and the scheduling of noisy activities during daytime hours.

Residual effects, those remaining after mitigation measures are applied, are predicted to be largely indistinguishable from existing operations, to occur sporadically over the life of the Project, and to be reversible following reclamation. With the implementation of proposed mitigation measures, Project-related residual effects on the atmospheric and acoustic environment are predicted to be not significant.

With respect to GHG emissions, no substantial change in the level of emissions is expected during the Project operation phase compared to the current mine operation as emissions would be within the current operational range.

6.3 WATER RESOURCES

The water resources VC is divided into surface water and groundwater, and describes the existing surface water and groundwater resources, identifies the spatial boundaries in which the Project may interact and affect the VC, proposes mitigation measures, and determines whether residual effects may occur.

Spatial boundaries for the assessment of groundwater resources extend to a 500 m radius surrounding the Project Area. The area of influence or capture area of a typical domestic well is usually less than 100 m. Vibration damage to a well is generally a function of distance between the energy source and the well and the seismic properties of the aquifer materials. Risk from blasting is expected to be minimal beyond about 200 m in soft rock terrain (Stantec 2015), and the working face of the mine is required to remain 800 m from structures unless allowed by the property owner as per the Pit and Quarry Guidelines (NSEL 2003). Vibration monitoring is conducted at four residential properties adjacent to the existing quarry. Monitoring is reviewed after each blasting event to check that vibration guidelines are not exceeded. In the past 12 months, there were no exceedances.

The spatial boundaries for surface water are dominantly controlled by the topography of the Project Area. The extent of Project related influences encompasses catchment areas (watershed) of nearby watercourses and waterbodies located down gradient of Project infrastructure. The greatest pathway of effect is from ground disturbance and the exposure of fine sediments to precipitation and surface water runoff. These sediments can be carried downstream and affect waterbodies outside the Project Area. The spatial extent of the assessment will therefore consider downgradient water courses and the watershed in which the Project Area is located.

Temporal boundaries for water resources are continuous throughout the life of Project operations including decommissioning and reclamation activities.



GOLD BOND GYPSUM MINE EXPANSION PROJECT

A significant adverse environmental effect on groundwater resources is defined as one in which the Project causes one or more of the following:

- yield from an otherwise adequate well supply decreases to the point where it is inadequate for intended use
- quality of groundwater from an otherwise adequate well supply that meets applicable guidelines deteriorates to the point where it becomes non-potable or cannot meet the Guidelines for Canadian Drinking Water Quality (Health Canada 2022) for a consecutive period exceeding 30 days
- the aquifer is physically or chemically altered to the extent that interaction with local surface water results in stream flow or chemistry changes that adversely affect aquatic life or surface water supply

A significant adverse environmental effect on surface water resources is defined as one in which the Project contravenes a watershed management target including:

- degrading water quality that causes acute or chronic toxicity to aquatic life
- an uncompensated loss in fish habitat
- changes to flow that increase sedimentation and erosion above regulatory guidance in waterbodies receiving surface water runoff
- changes to flows that cause flooding downstream of the Project beyond existing conditions
- changes to pond and lake levels outside the Project Area to the point that it affects their ability to support existing ecological functions
- exceeds an implemented water quality guideline such as Canadian Water Quality Guidelines for the Protection of Aquatic Life (CWQG-PAL) or a site-specific water quality guideline for the protection of aquatic life
- exceeds the generally accepted TSS monitoring guideline (CWQG-PAL) applied for Project activities

6.3.1 Existing Environment

6.3.1.1 Groundwater

The Project will see gypsum extraction occur above the groundwater table. The NSECC did not previously require a field program to document potential high groundwater table conditions within the Project Area, and a desktop review, including consultation of the ground water atlas (NSNRR 2024a), to identify groundwater users in the area was completed for this EARD.

The desktop review indicates no changes in potable water users since 2015 within 500 m of the Project boundary. Four new wells are listed in the NS Well Log Database between 2015 and 2023; however all four are beyond 500 m of the Project Area. This conclusion is based on a review of publicly available data sources (i.e., available water well records from NSNRR 2024b). The identification of properties that are likely to derive their potable water supply from groundwater were assessed based on a review of the most recent available aerial photography of the Project Area (Stantec 2015).



6.3.1.2 Surface Water

For surface water resources, adequate public data was not available to characterize the surface water conditions in the general area of the Project, so a field-based water sampling program was completed on August 23, 2023. The Project Area was traversed by Stantec staff to identify watercourses and collect water quality data in the area. In-situ water quality parameters such as dissolved oxygen, conductivity, temperature, and pH were measured with a YSI multi-meter at watercourses and drainage areas in proximity to the Project. Samples were also taken at the remnant channel of Big Pond Brook (Table 6-4). Results from this work aided the characterization of surface water considered in this EARD and supported the development of mitigation measures to maintain water quality downstream. Sample locations can be seen in Figure 6-1.

The Project is situated on the boundary of two secondary watersheds of the Shubenacadie River, the McLennan Brook and the Big Pond Brook watersheds. Prior to the mid-1990s, Big Pond Brook flowed through the mine property (south to north) east of the active pit area (Stantec 2015). In its original arrangement, the brook conveyed surface runoff collected from south (upstream) of the Gold Bond Mine to the Shubenacadie River. In the mid-1990s, Gold Bond redirected a portion of Big Pond Brook to the east (under permit from NSECC) to prevent flow from entering the pit and a remnant of the Big Pond Brook remains on the east side of the Project Area (Figure 6-1). This channel maintains the size and shape of the of Big Pond Brook prior to its alteration in the 1990s; however, it no longer has the same drainage area nor are there continuous flows within the channel. Due to intermittent flows, and unpredictable water levels, the remnant channel was deemed not suitable for fish, and thus does not provide fish habitat. Discussions with NSECC (Brander 2023, pers. comm.) have resulted in this not being considered a watercourse, and it is not considered further in this EARD.



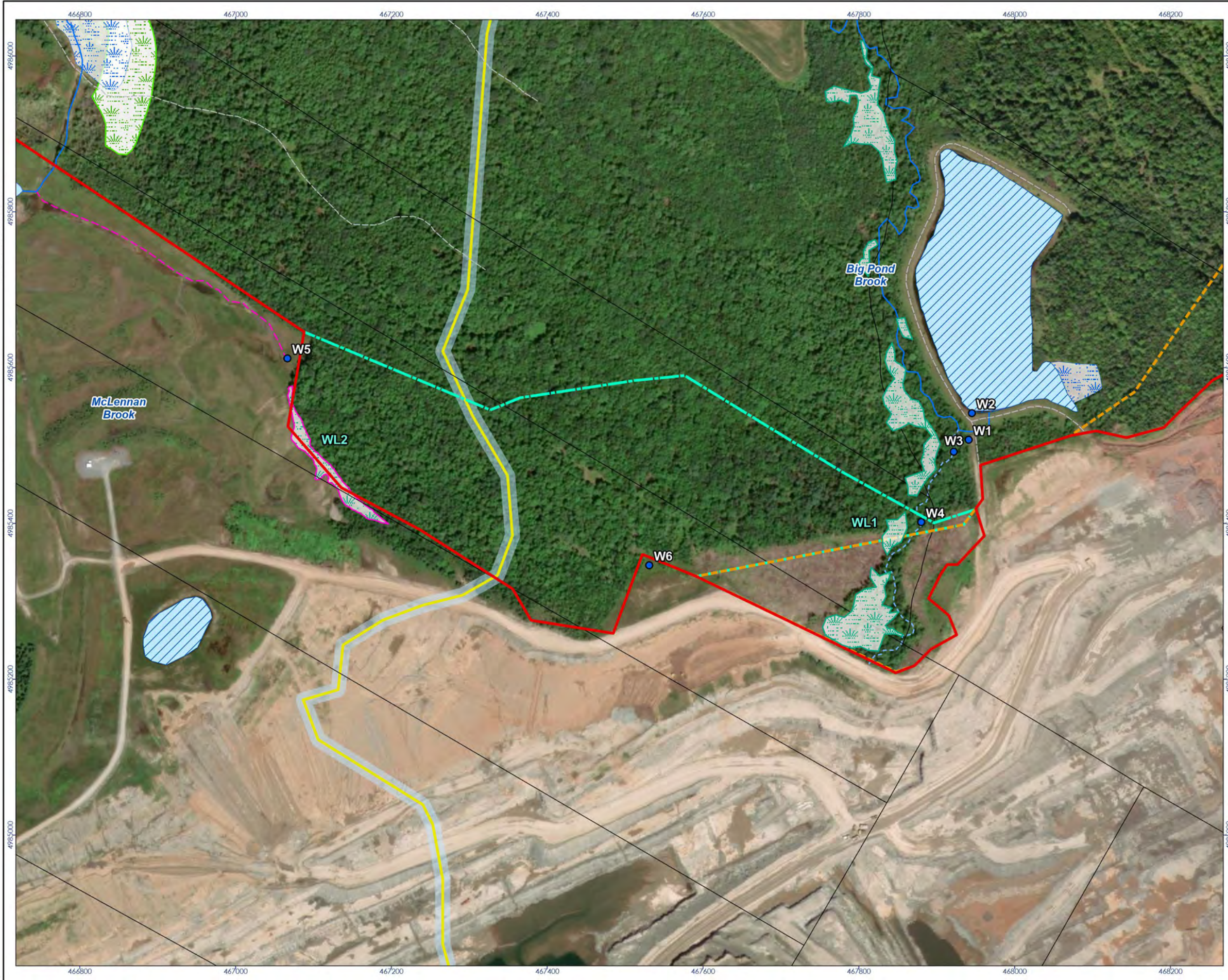
GOLD BOND GYPSUM MINE EXPANSION PROJECT

Table 6-4 YSI water quality readings on August 8, 2023

Site	Location	Temp (°C)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Specific Conductivity (µS/cm)	Conductivity (µS/cm)	Total Dissolved Solids (mg/L)	Salinity (ppt)	pH
W 1	Remnant channel of Big Pond Brook	21.7	76.8	6.9	148.2	138.8	96.2	0.1	6.33
W 2	Big Pond	22.7	76.5	6.6	140.6	134.4	91.4	0.1	6.68
W 3	Remnant channel of Big Pond Brook	16.1	51.2	5.0	608.0	503.0	393.9	0.3	6.53
W 4	Remnant channel of Big Pond Brook	17.8	11.5	1.0	662.0	572.0	430.0	0.3	6.66
W 5	Unnamed Brook	17.5	87.7	8.5	1844.0	1581.0	1198.0	0.9	8.21
W 6	Standing water; Overland drainage	24.7	100.8	8.3	139.9	138.9	91.1	0.1	7.54



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Stantec

- Water Quality Sampling Locations
- ▭ Current Gypsum Mine Footprint
- ▭ Approved Expansion Area
- ▭ Proposed Expansion Area

Other Features

- Seasonal Road, Track or Trail
- Watercourse
- - - Remnant Channel
- - - Watercourse / Drainage Ditch (Stantec-delineated, 2023)
- ▨ Anthropogenic Waterbody
- ▨ Waterbody (NSHN)
- ▨ Wetland (NSHN)
- ▨ Wetland (NSDNR)
- ▨ Wetland (Stantec, 2018)
- ▨ Wetland (Stantec-delineated, 2023)
- ▨ Watershed Boundary (NSECC)
- ▭ Property Boundary

N

0 100 200 metres
1:5,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 20N
2. Sources: Stantec; Government of Nova Scotia (NTDB Watercourse data modified within Project Area as per Stantec field observations)
3. Base Map Sources: Esri, USGS, NOAA, Maxar



Project Location 121417382_032
Milford Station, Nova Scotia, CA

Client/Project
Gold Bond Canada Ltd.
Proposed Gypsum Mine Expansion Project

Figure No.
6-1

Water Quality Sampling Locations and Wetlands

GOLD BOND GYPSUM MINE EXPANSION PROJECT

An unnamed watercourse (unnamed brook; Photo 6-1) is located within the existing boundaries for the approved quarry, and outside the Project Area, to the west. It is considered in this report due to its proximity to the Project Area and the potential for Project-related environmental effects on the watercourse. The unnamed brook is a small, unmapped, first order watercourse that appears to provide overland drainage, with a drainage area of approximately 3 ha. The unnamed brook flows northeastward down a series of steep cascades, providing drainage for WL2 and the surrounding topography. Based on aerial imagery, the channel appears to join McLennan Brook approximately 0.5 km from the western boundary of the Project Area. The bed and banks are not well defined, and the channel appears intermittent within the area surveyed. The channel gradient is steep, approximately 5 to 10%, and riprap can be found throughout the channel. Based on aerial imagery, the downstream reaches appear to have connectivity with McLennan Brook suggesting the potential for fish habitat in the downstream reach. However, upstream towards the Project Area the watercourse would be considered ephemeral overland drainage thus not suitable for fish.





Photo 6-1 The unnamed brook looking upstream on August 8, 2023

6.3.2 Effects Assessment

6.3.2.1 Groundwater

There is potential for Project-related effects to local groundwater quality because of the Project. Quality effects may include contamination of groundwater from accidental spills of fuel, lubricants, or blasting chemicals (see section 7 for additional information on accidents), or temporary increases in turbidity in nearby potable wells because of blasting vibrations. Project-related contamination (e.g., accidental petroleum hydrocarbon spills from machinery or blasting chemicals [fuel oil and nitrate]) could theoretically affect the groundwater at the mine and potentially affect well water quality downgradient of the Project.

The Project Area represents an additional area of 14 ha of development, all above the groundwater table. A search of the NS Well Log Database (NSECC 2024; NSNRR 2024b) does not indicate the construction of new potable wells within 1 km since the mine site underwent an environmental assessment review in 2015. Based on the comprehensive assessment completed in 2015 and the nature of this Project (i.e., above the groundwater table), the potential for adverse effects to potable well users is low.



GOLD BOND GYPSUM MINE EXPANSION PROJECT

Bedrock underlying the Project Area consists of massive gypsum. Gypsum is not an acid rock drainage (ARD) risk due to its high buffering capacity. No evidence of ARD has been found in the 60 plus years the mine has been in operation.

The water quality of the effluent entering the Shubenacadie River through the existing infrastructure at the mine is expected to meet parameters as stated in the facility's IA and future amendments.

Mitigation Measures and Determination of Significance of Residual Effects

Significant Project-related effects on groundwater quality are not likely to occur. The results of the groundwater resources assessment suggest a limited risk of adverse Project-related effects due to works being completed above the ground water table. Risks can be further mitigated by continued adherence to the Pit and Quarry Guidelines, continued implementation of Gold Bond's existing standard mitigation measures, and continued monitoring.

6.3.2.2 Surface Water

The unnamed brook on the west side of the Project is not within the Project Area and is within the currently approved quarry boundaries. The upper reaches of this watercourse are not expected to be suitable fish habitat as it is overland drainage and ephemeral, with no defined bed or banks.

The portion of the Project Area that overlaps with the unnamed brook watershed is small, and therefore unlikely to contribute to surface water quantity effects downstream of the unnamed brook. The removal of vegetation can reduce infiltration rates and increase peak discharge, which can cause flooding and erosion downstream; however, due to the relatively small contributing area it is not anticipated the Project will have a substantive effect on peak discharge. As well, the unnamed brook channel has existing rip rap protection downstream of the Project Area, further mitigating effects on peak discharge.

A pathway of effects exists where runoff during precipitation events or spring snow melt generate overland flow that can mobilize exposed sediments in the Project Area and increase TSS in the remnant channel. As well, the exposure of sediments to air and water can result on changes in the chemical composition of surface water runoff. To mitigate for changes in physical and chemical parameters of surface water, surface water will be collected in existing sedimentation ponds in accordance with NSECC's Erosion and Sedimentation Control Handbook for Construction Sites (NSE 1988). These existing sedimentation ponds will allow water quality to improve prior to release to the downstream environment. Collected water will be monitored to meet final effluent discharge level limits i.e., pH, TSS, suspended solids, oil and grease, toxicity and ammonia as nitrogen, as stated in the facility's IA. Data collected on August 8, 2023 (Table 6-4) provides characterization of existing water quality and provides baseline data for comparison. This mitigation strategy will be incorporated into the mine's existing Stormwater Management Plan and will be submitted as part of the IA amendment process.



Mitigation Measures and Determination of Significance of Residual Effects

Potential adverse effects on surface water resources specific to the Project will be managed by extending standard, effective, mitigation measures already in place for the existing mine to the Project Area. Discharge water from the Project Area will flow into the main pit where existing, permitted procedures and quality standards (e.g., for TSS) will be applied prior to ultimate discharge. Project-related residual effects on surface water resources are predicted to be not significant.

6.4 VEGETATION AND WETLANDS

The vegetation and wetlands VC includes baseline descriptions characterising the dominant vegetation and wetland types in the Project Area. Spatial boundaries for the assessment of rare and sensitive flora includes those flora species and associated habitat that occur within or immediately adjacent to the Project Area such that their habitat could be affected by Project activities. Temporal boundaries are continuous throughout the life of Project operations including decommissioning and reclamation activities.

A significant adverse environmental effect on rare and sensitive flora occurs when the population of a species is sufficiently affected to cause a decline in abundance and / or change in distribution beyond which natural recruitment would not return the population to its former level within several growing seasons.

6.4.1 Existing Environment

6.4.1.1 Vegetation

Vegetation within the Project Area was evaluated using available desktop information and field surveys. The following information sources were reviewed prior to conducting field surveys: existing AC CDC data, aerial and satellite imagery (including light detection and ranging [LiDAR]), provincial forestry data and wetland mapping, the provincial Significant Species and Habitats Database and Boreal Felt Lichen Habitat Modelling (NSDNR 2018).

A two-day field survey was carried out on July 27 and July 28, 2023, to better understand the rare and / or sensitive vascular plant species present in the Project Area, and to establish the boundaries of any previously unmapped wetlands.

Vegetation field surveys focused on documenting the distribution and abundance of SAR and SOCI, describing the dominant vegetative communities, and obtaining information on other important features (e.g., rare, or unique habitats, concentrations of invasive plants). A total of 134 species were observed during the field program. Of these, no SAR or SOCI were recorded. Table 6-5 presents a list of species observed, as well as their status under federal and provincial legislation, and their rarity rank per AC CDC in the province of NS.



GOLD BOND GYPSUM MINE EXPANSION PROJECT

Table 6-5 Species Observed during Field Surveys, Summer 2023

Date	Common Name	Scientific Name	COSEWIC	NS ESA	S-Rank	SARA
27-Jul	a Lettuce	<i>Lactuca sp.</i>	-	-	-	-
27-Jul	a Panic Grass	<i>Panicum sp.</i>	-	-	-	-
27-Jul	a Rush	<i>Juncus sp.</i>	-	-	-	-
27-Jul	a Serviceberry	<i>Amelanchier sp.</i>	-	-	-	-
27-Jul	Alsike Clover	<i>Trifolium hybridum</i>	-	-	SNA	-
27-Jul	Alternate-leaved Dogwood	<i>Cornus alternifolia</i>	-	-	S5	-
27-Jul	American Beech	<i>Fagus grandifolia</i>	-	-	S3S4	-
27-Jul	American Witch-Hazel	<i>Hamamelis virginiana</i>	-	-	S5	-
27-Jul	Awl-fruited Sedge	<i>Carex stipata</i>	-	-	S5	-
27-Jul	Balsam Fir	<i>Abies balsamea</i>	-	-	S5	-
27-Jul	Beaked Hazel	<i>Corylus cornuta</i>	-	-	S5	-
27-Jul	Bearded Shorthusk	<i>Brachyelytrum erectum</i>	-	-	SNA	-
27-Jul	Bebb's Willow	<i>Salix bebbiana</i>	-	-	S5	-
27-Jul	Bittersweet Nightshade	<i>Solanum dulcamara</i>	-	-	SNA	-
28-Jul	Black Cherry	<i>Prunus serotina</i>	-	-	S5	-
27-Jul	Black Knapweed	<i>Centaurea nigra</i>	-	-	SNA	-
27-Jul	Black Sedge	<i>Carex arctata</i>	-	-	S5	-
27-Jul	Black-girdled Bulrush	<i>Scirpus atrocinctus</i>	-	-	S5	-
27-Jul	Bladder Sedge	<i>Carex intumescens</i>	-	-	S5	-
27-Jul	Bracken Fern	<i>Pteridium aquilinum</i>	-	-	S5	-
27-Jul	Broad-leaved Cattail	<i>Typha latifolia</i>	-	-	S5	-
27-Jul	Broom Sedge	<i>Carex scoparia</i>	-	-	S5	-
27-Jul	Bull Thistle	<i>Cirsium vulgare</i>	-	-	SNA	-
27-Jul	Calico Aster	<i>Symphyotrichum lateriflorum</i>	-	-	S5	-
27-Jul	Canada Blue Grass	<i>Poa compressa</i>	-	-	SNA	-
27-Jul	Canada Fly Honeysuckle	<i>Lonicera canadensis</i>	-	-	S5	-
27-Jul	Canada Goldenrod	<i>Solidago canadensis</i>	-	-	S4S5	-
27-Jul	Canada Manna Grass	<i>Glyceria canadensis</i>	-	-	S5	-
27-Jul	Canada Yew	<i>Taxus canadensis</i>	-	-	S4S5	-
27-Jul	Christmas Fern	<i>Polystichum acrostichoides</i>	-	-	S5	-
27-Jul	Coltsfoot	<i>Tussilago farfara</i>	-	-	SNA	-
27-Jul	Common Buttercup	<i>Ranunculus acris</i>	-	-	SNA	-
27-Jul	Common Lady Fern	<i>Athyrium filix-femina</i>	-	-	S5	-
27-Jul	Common Marsh Bedstraw	<i>Galium palustre</i>	-	-	S5	-
27-Jul	Common Oak Fern	<i>Gymnocarpium dryopteris</i>	-	-	S5	-
27-Jul	Common Plantain	<i>Plantago major</i>	-	-	SNA	-
27-Jul	Common Self-heal	<i>Prunella vulgaris</i>	-	-	S5	-



GOLD BOND GYPSUM MINE EXPANSION PROJECT

Table 6-5 Species Observed during Field Surveys, Summer 2023

Date	Common Name	Scientific Name	COSEWIC	NS ESA	S-Rank	SARA
27-Jul	Common Speedwell	<i>Veronica officinalis</i>	-	-	SNA	-
27-Jul	Common Valerian	<i>Valeriana officinalis</i>	-	-	SNA	-
27-Jul	Common Wood Sorrel	<i>Oxalis montana</i>	-	-	S5	-
27-Jul	Common Woolly Bulrush	<i>Scirpus cyperinus</i>	-	-	S5	-
27-Jul	Convulsion-Root	<i>Monotropa uniflora</i>	-	-	S5	-
27-Jul	Cottony Willow	<i>Salix eriocephala</i>	-	-	S5	-
27-Jul	Creeping Bent Grass	<i>Agrostis stolonifera</i>	-	-	S5	-
27-Jul	Creeping Buttercup	<i>Ranunculus repens</i>	-	-	SNA	-
27-Jul	Crested Wood Fern	<i>Dryopteris cristata</i>	-	-	S5	-
27-Jul	Cucumber Root	<i>Medeola virginiana</i>	-	-	S5	-
27-Jul	Dwarf Red Raspberry	<i>Rubus pubescens</i>	-	-	S5	-
27-Jul	Early Goldenrod	<i>Solidago juncea</i>	-	-	S5	-
27-Jul	Eastern Hemlock	<i>Tsuga canadensis</i>	-	-	S4	-
27-Jul	Eastern White Pine	<i>Pinus strobus</i>	-	-	S5	-
27-Jul	Evergreen Wood Fern	<i>Dryopteris intermedia</i>	-	-	S5	-
27-Jul	Fibrous-Root Sedge	<i>Carex communis</i>	-	-	S5	-
27-Jul	Field Horsetail	<i>Equisetum arvense</i>	-	-	S5	-
27-Jul	Field Sow Thistle	<i>Sonchus arvensis</i>	-	-	SNA	-
27-Jul	Flattened Oat Grass	<i>Danthonia compressa</i>	-	-	S5	-
27-Jul	Fowl Blue Grass	<i>Poa palustris</i>	-	-	S5	-
27-Jul	Fowl Mannagrass	<i>Glyceria striata var. striata</i>	-	-	S5	-
27-Jul	Fringed Sedge	<i>Carex crinita</i>	-	-	S5	-
27-Jul	Fringed Yellow Loosestrife	<i>Lysimachia ciliata</i>	-	-	S4	-
27-Jul	Giant Goldenrod	<i>Solidago gigantea</i>	-	-	S5	-
27-Jul	Graceful Sedge	<i>Carex gracillima</i>	-	-	S5	-
27-Jul	Grass-leaved Goldenrod	<i>Euthamia graminifolia</i>	-	-	S5	-
27-Jul	Gray Birch	<i>Betula populifolia</i>	-	-	S5	-
27-Jul	Hairy Evening Primrose	<i>Oenothera villosa</i>	-	-	SU	-
27-Jul	Hairy Flat-top White Aster	<i>Doellingeria umbellata</i>	-	-	S5	-
27-Jul	Hairy Willowherb	<i>Epilobium hirsutum</i>	-	-	SNA	-
27-Jul	Hairy Woodrush	<i>Luzula acuminata</i>	-	-	S5	-
27-Jul	Helleborine	<i>Epipactis helleborine</i>	-	-	SNA	-
27-Jul	Interrupted Fern	<i>Claytosmunda claytoniana</i>	-	-	S5	-
27-Jul	Ironwood	<i>Ostrya virginiana</i>	-	-	S4S5	-
27-Jul	Large-leaved Aster	<i>Eurybia macrophylla</i>	-	-	S5	-
27-Jul	Large-toothed Aspen	<i>Populus grandidentata</i>	-	-	S5	-
27-Jul	Meadow Fescue	<i>Lolium pratense</i>	-	-	SNA	-



GOLD BOND GYPSUM MINE EXPANSION PROJECT

Table 6-5 Species Observed during Field Surveys, Summer 2023

Date	Common Name	Scientific Name	COSEWIC	NS ESA	S-Rank	SARA
27-Jul	Meadow Hawkweed	<i>Pilosella caespitosa</i>	-	-	SNA	-
27-Jul	Mosquito Bulrush	<i>Scirpus hattorianus</i>	-	-	S5	-
27-Jul	Naked Bishop's-Cap	<i>Mitella nuda</i>	-	-	S4S5	-
27-Jul	Narrow-Leaved Cattail	<i>Typha angustifolia</i>	-	-	SNA	-
27-Jul	Necklace Sedge	<i>Carex projecta</i>	-	-	S5	-
27-Jul	New England Sedge	<i>Carex novae-angliae</i>	-	-	S5	-
27-Jul	New York Fern	<i>Amauropelta noveboracensis</i>	-	-	S5	-
27-Jul	Nodding Sedge	<i>Carex gynandra</i>	-	-	S5	-
27-Jul	Northern Beech Fern	<i>Phegopteris connectilis</i>	-	-	S5	-
27-Jul	Northern Bush Honeysuckle	<i>Diervilla lonicera</i>	-	-	S5	-
27-Jul	Northern Red Oak	<i>Quercus rubra</i>	-	-	S5	-
27-Jul	Northern Starflower	<i>Lysimachia borealis</i>	-	-	S5	-
27-Jul	Northern Sweet Coltsfoot	<i>Petasites frigidus</i>	-	-	S4	-
27-Jul	Northern Water Horehound	<i>Lycopus uniflorus</i>	-	-	S5	-
27-Jul	Northern Willowherb	<i>Epilobium ciliatum</i>	-	-	S5	-
27-Jul	Partridgeberry	<i>Mitchella repens</i>	-	-	S5	-
27-Jul	Pussy Willow	<i>Salix discolor</i>	-	-	S5	-
27-Jul	Queen Anne's Lace	<i>Daucus carota</i>	-	-	SNA	-
27-Jul	Red Maple	<i>Acer rubrum</i>	-	-	S5	-
27-Jul	Red Osier Dogwood	<i>Cornus sericea</i>	-	-	S5	-
27-Jul	Red Raspberry	<i>Rubus idaeus</i>	-	-	S5	-
27-Jul	Red Spruce	<i>Picea rubens</i>	-	-	S5	-
27-Jul	Reed Canary Grass	<i>Phalaris arundinacea</i>	-	-	S5	-
27-Jul	Retorse Sedge	<i>Carex retrorsa</i>	-	-	S4	-
27-Jul	Rough Bent Grass	<i>Agrostis scabra</i>	-	-	S5	-
27-Jul	Sallow Sedge	<i>Carex lurida</i>	-	-	S5	-
27-Jul	Sensitive Fern	<i>Onoclea sensibilis</i>	-	-	S5	-
27-Jul	Shining Rose	<i>Rosa nitida</i>	-	-	S4S5	-
27-Jul	Shining Willow	<i>Salix lucida</i>	-	-	S5	-
27-Jul	Slender Manna Grass	<i>Glyceria melicaria</i>	-	-	S4	-
27-Jul	Slender Rush	<i>Juncus tenuis</i>	-	-	S5	-
27-Jul	Small-fruited Bulrush	<i>Scirpus microcarpus</i>	-	-	S5	-
27-Jul	Soft Rush	<i>Juncus effusus</i>	-	-	S5	-
27-Jul	Speckled Alder	<i>Alnus incana</i>	-	-	S5	-
27-Jul	Spinulose Wood Fern	<i>Dryopteris carthusiana</i>	-	-	S5	-
27-Jul	Spotted Coralroot	<i>Corallorhiza maculata var. occidentalis</i>	-	-	SNR	-



GOLD BOND GYPSUM MINE EXPANSION PROJECT

Table 6-5 Species Observed during Field Surveys, Summer 2023

Date	Common Name	Scientific Name	COSEWIC	NS ESA	S-Rank	SARA
27-Jul	Stiff Clubmoss	<i>Spinulum annotinum</i>	-	-	S5	-
27-Jul	Striped Maple	<i>Acer pensylvanicum</i>	-	-	S5	-
27-Jul	Sugar Maple	<i>Acer saccharum</i>	-	-	S4S5	-
27-Jul	Tall Northern Green Orchid	<i>Platanthera aquilonis</i>	-	-	S4	-
27-Jul	Three-seeded Sedge	<i>Carex trisperma</i>	-	-	S5	-
27-Jul	Trembling Aspen	<i>Populus tremuloides</i>	-	-	S5	-
27-Jul	Tufted Vetch	<i>Vicia cracca</i>	-	-	SNA	-
27-Jul	Umbellate Hawkweed	<i>Hieracium umbellatum</i>	-	-	S5	-
27-Jul	Variegated Horsetail	<i>Equisetum Variegatum</i>	-	-	S4	-
27-Jul	White Ash	<i>Fraxinus americana</i>	-	-	S4	-
27-Jul	White Clover	<i>Trifolium repens</i>	-	-	SNA	-
27-Jul	White Spruce	<i>Picea glauca</i>	-	-	S5	-
27-Jul	Whorled Wood Aster	<i>Oclemena acuminata</i>	-	-	S5	-
27-Jul	Wild Lily-of-The-Valley	<i>Maianthemum canadense</i>	-	-	S5	-
27-Jul	Wild Sarsaparilla	<i>Aralia nudicaulis</i>	-	-	S5	-
27-Jul	Wild Strawberry	<i>Fragaria virginiana</i>	-	-	S5	-
27-Jul	Woodland Horsetail	<i>Equisetum sylvaticum</i>	-	-	S5	-
27-Jul	Yellow Birch	<i>Betula alleghaniensis</i>	-	-	S5	-
27-Jul	Yellow Bluebead Lily	<i>Clintonia borealis</i>	-	-	S5	-
27-Jul	Zigzag Goldenrod	<i>Solidago flexicaulis</i>	-	-	S5	-
27-Jul	Common Dandelion	<i>Taraxacum officinale</i>	-	-	SNA	-

Notes:
 No SAR / SOCI identified
 S-Rank definitions (AC CDC 2023):
 S1 = Critically Imperiled: Critically imperiled in the province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
 S2 = Imperiled: Imperiled in the province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
 S3 = Vulnerable: Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
 S4 = Apparently Secure: Uncommon but not rare; some cause for long-term concern due to declines or other factors.
 S5 = Secure: Common, widespread, and abundant in the province.
 SNR = Unranked: Nation or state/province conservation status not yet assessed.
 SU = Unrankable: Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
 SNA = Not Applicable: A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
 S#S# = Range Rank: A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
 Not Provided: Species not known to occur in the province



GOLD BOND GYPSUM MINE EXPANSION PROJECT

AC CDC data within a 5 km radius of the area were obtained in May 2022. Based on the AC CDC report (AC CDC 2022), black ash is known to be present within 5 km of the Project Area. The NSNRR considers black ash (*Fraxinus nigra*) to be “location sensitive” in NS, and thus individual locations of black ash trees are not readily available. Vegetation surveys revealed no black ash in the Project Area, nor are any black ash known to occur in wetlands along Big Pond Brook or its remnant channel. Black ash was found previously in a wetland to the northeast of the mine, in an area that will not be disturbed as part of the Project.

6.4.1.2 Wetlands

No provincially mapped wetlands were present in the Project Area, including no wetlands of special significance (WSS). Field surveys identified two unmapped wetlands in the Project Area (Figure 6-1). Wetland One (WL1) was located partially within the eastern end of the Project Area, near the remnant channel of Big Pond Brook, however Gold Bond received approval from the Province of Nova Scotia to alter this wetland (Wetland Approval 2022-3323493-00) and started that work in August of 2023. The wetland is classified as a mixedwood treed slope swamp with a total area of 0.06 ha. The wetland tree stratum is dominated by red maple (*Acer rubrum*), white ash (*Fraxinus americana*) and balsam fir (*Abies balsamea*). The shrub stratum was mainly composed of balsam fir with a minor component of red maple and white pine (*Pinus strobus*). A well-developed herbaceous layer was noted with multiple hydrophytic plants including two sedges, *Carex gynandra* and *Carex stipata*, and swamp aster (*Symphotrichum puniceum*). No SOCI or SAR were observed within the wetland at the time of survey. Hydrology was observed within the wetland, High Water Table (A2) and Saturation (A3) were both present near or at the top of the soil column.

Wetland Two (WL2) is located at the western end of the Project Area. The wetland is classified as a graminoid dominated slope marsh with a total area of 0.27 ha. The wetland borders a mixedwood forest to the northeast and a gravel hillslope to the southwest. The wetland tree and shrub stratum were nearly absent with a densely developed hydrophytic herbaceous layer comprised mainly of cattails (*Typha latifolia*) with a minor component of *Scirpus macrocarpa*, *Equisetum variegatum*, *Agrostis stolonifera* and *Solidago canadensis*. Hydrology features were present within the wetland; Surface Water (A1), High Water Table (A2) and Saturation (A3) were all observed near or at the top of the soil column. No SOCI or SAR were observed within the wetland at the time of survey.

Functional assessments (FA) for WL1 and WL2 were not completed but will be completed prior to application for required permits (i.e., Wetland Alteration Permit) as FAs are required to be conducted within one year of permitting.

6.4.2 Effects Assessment

6.4.2.1 Vegetation

Environmental effects of the Project will include the direct loss of vegetation. Direct effects are anticipated resulting from site preparation (i.e., clearing, grubbing), and will persist through the life of the Project. No SOCI or SAR were found in the Project Area. Unnecessary vegetation loss will be avoided by clearing the smallest area required for the safe operation and maintenance of the Project.



GOLD BOND GYPSUM MINE EXPANSION PROJECT

Mitigation Measures and Determination of Significance of Residual Effects

Given the size of the Project Area, the lack of documented SOCI / SAR, and the amount of similar vegetation and terrestrial habitat in surrounding areas, the effects to the overall vegetation communities in the area will be not significant.

6.4.2.2 Wetlands

Environmental effects of the Project will include the complete direct loss of wetlands and wetland habitat identified in the Project Area, as the Project Area shares a boundary with the existing approved quarry. Direct effects are anticipated resulting from site preparation (i.e., clearing, grubbing), and would persist through the life of the Project. Indirect effect could occur from changes to hydrology associated with nearby quarry excavation. No SOCI or SAR were found in the delineated wetlands in the Project Area. Alteration of wetlands require approval under the Activities Designation Regulations along with submission of wetland compensation plans. Functional assessments will also be completed within a year of permit application.

Mitigation Measures and Determination of Significance of Residual Effects

The potential for indirect effects, to wetlands and vegetation outside the Project Area will be mitigated by application of a 30 m vegetated buffer, where applicable. Wetland habitat lost because of the Project will be compensated through contract with a Wetland Compensation Consultant, as per the Wetland Compensation guidance document (NSE 2023).

In consideration the lack of SOCI / SAR and compensation plans for loss of wetland, the residual effects to wetlands as a result of the Project will be not significant.

6.5 WILDLIFE AND WILDLIFE HABITAT, INCLUDING SAR AND SOCI

The wildlife and wildlife habitat VC includes baseline descriptions characterising the wildlife and dominant habitats in the Project Area. Special attention is afforded to SAR and SOCI in the Project Area. Spatial boundaries for the assessment of wildlife include wildlife and their habitat occurring within or immediately adjacent to the Project Area that they could be disturbed by noise or other stimuli. Temporal boundaries are continuous throughout the life of Project operations including decommissioning and reclamation activities.

A significant adverse environmental effect on wildlife occurs when the population of a species is sufficiently affected to cause a decline in abundance and / or change in distribution beyond which natural recruitment (reproduction and immigration from unaffected areas) would not return the population to its former level within several generations.



6.5.1 Existing Environment

Information regarding use of the Project Area by wildlife was obtained from field surveys and a review of existing data, including records of wildlife SAR / SOCI from the AC CDC data search conducted as part of the 2022 constraints analysis. Areas of known or potential importance for wildlife (e.g., wildlife management areas, ecological reserves, other important wildlife habitat) were identified through a review of AC CDC data (AC CDC 2022), publicly available aerial and satellite imagery, and the provincial Significant Species and Habitats Database (NSNRR 2024c). Field surveys included dedicated bird surveys and incidental observations of other wildlife. The population status of species recorded during field surveys were determined by reviewing provincial and federal designations, including those provided by the AC CDC, the NS ESA, and the federal SARA.

No areas of importance for wildlife were identified in the Project Area. One Ecologically Significant Area (ESA) was identified by AC CDC on the west side of Highway 102 (Veterans Memorial Highway) approximately 4.5 km from the Project Area. The Project is not expected to affect this ESA.

A breeding bird survey within the Project Area was conducted on June 9, 2023, using point counts targeting breeding songbirds. Point count locations were distributed within land cover classes to characterize the species composition of those units. Survey locations can be seen in Figure 6-2. A summary of breeding bird survey results is shown in Table 6-6, and a complete list of observations can be found in Appendix F. The only SAR observed was the Eastern Wood-Pewee, which was observed at point count locations number one and three.

Table 6-6 Summary of Observations from Breeding Bird Surveys, June 2023

Common Name	Scientific Name	COSEWIC	NS ESA	S-Rank	SARA	Locations Observed
American Crow	<i>Corvus brachyrhynchos</i>	-	-	S5	-	1, 2, 3
American Robin	<i>Turdus migratorius</i>	-	-	S5B, S3N	-	1, 2
Black-and-White Warbler	<i>Mniotilta varia</i>	-	-	S5B		1, 2, 3
Blackburnian Warbler	<i>Setophaga fusca</i>	-	-	S4B, S5M		2
Black-capped Chickadee	<i>Poecile atricapillus</i>	-	-	S5		3
Blue Jay	<i>Cyanocitta cristata</i>	-	-	S5		3
Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	-	-	S5B		3
Eastern Wood Pewee	<i>Contopus virens</i>	SC	VU	S3S4B	SC	1, 3
Golden Crowned Kinglet	<i>Regulus satrapa</i>	-	-	S5		3
Hairy Woodpecker	<i>Dryobates villosus</i>	-	-	S5		3
Hermit Thrush	<i>Catharus guttatus</i>	-	-	S5B		1, 3
Northern Parula	<i>Setophaga americana</i>	-	-	S5B		2
Ovenbird	<i>Seiurus aurocapilla</i>	-	-	S5B		1, 2, 3



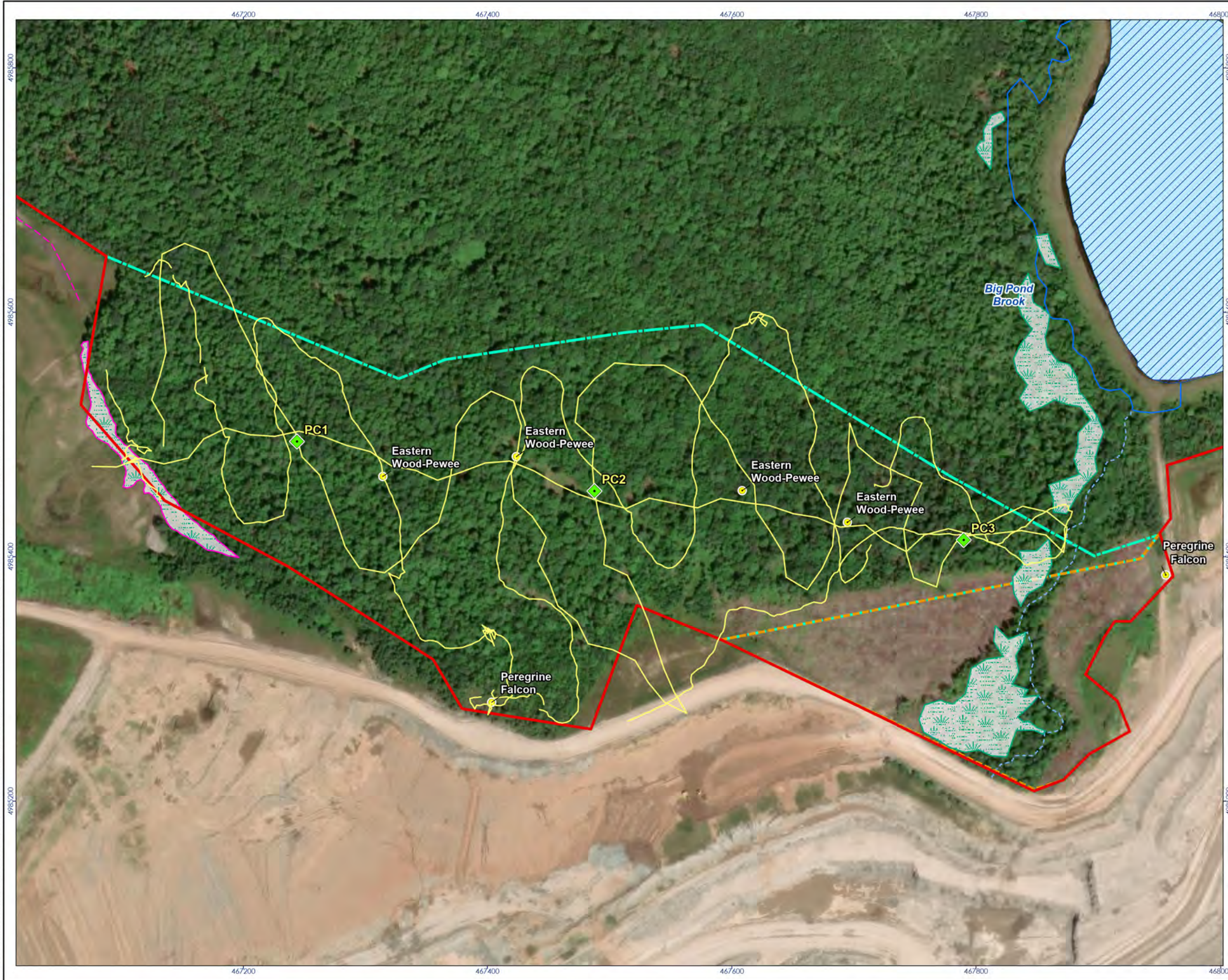
GOLD BOND GYPSUM MINE EXPANSION PROJECT

Table 6-6 Summary of Observations from Breeding Bird Surveys, June 2023

Common Name	Scientific Name	COSEWIC	NS ESA	S-Rank	SARA	Locations Observed
Red-Eyed Vireo	<i>Vireo olivaceus</i>	-	-	S5B		1, 2, 3
Song Sparrow	<i>Melospiza melodia</i>	-	-	S5B		3
Winter Wren	<i>Troglodytes hiemalis</i>	-	-	S5B		1, 2
<p>Notes:</p> <p>All data collected on June 9, 2023</p> <p>Bold indicates SAR</p> <p>SAR / SOCI codes used:</p> <p> SC = Special Concern</p> <p> VU = Vulnerable</p> <p>S-Rank definitions (AC CDC 2023):</p> <p>S1 = Critically Imperiled: Critically imperiled in the province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.</p> <p>S2 = Imperiled: Imperiled in the province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.</p> <p>S3 = Vulnerable: Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.</p> <p>S4 = Apparently Secure: Uncommon but not rare; some cause for long-term concern due to declines or other factors.</p> <p>S5 = Secure: Common, widespread, and abundant in the province.</p> <p>SNR = Unranked: Nation or state/province conservation status not yet assessed.</p> <p>SU = Unrankable: Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.</p> <p>SNA = Not Applicable: A conservation status rank is not applicable because the species is not a suitable target for conservation activities.</p> <p>S#S# = Range Rank: A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).</p> <p>Not Provided: Species not known to occur in the province</p>						



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Stantec

- ◆ Bird Point Count Locations
- Species of Conservation Concern (Stantec Incidental Observation)
- Atlas Breeding Bird Survey Tracks

Project Features

- Current Gypsum Mine Footprint
- Approved Expansion Area
- Proposed Expansion Area

Other Features

- Watercourse
- Remnant Channel
- Watercourse / Drainage Ditch (Stantec-delineated, 2023)
- Anthropogenic Waterbody
- Waterbody (NSHN)
- Wetland (Stantec, 2018)
- Wetland (Stantec-delineated, 2023)

N

0 50 100 metres
1:3,187 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 20N
2. Sources: Stantec; Government of Nova Scotia; Atlantic Canada Conservation Data Centre (NTDB Watercourse data modified within Project Area as per Stantec field observations)
3. Base Map Sources: Esri, USGS, NOAA, Maxar

Project Location 121417382_032
Milford Station, Nova Scotia, CA

Client/Project
Gold Bond Canada Ltd.
Proposed Gypsum Mine Expansion Project

Figure No.
6-2

Title
Bird Species and Habitat

GOLD BOND GYPSUM MINE EXPANSION PROJECT

An atlas style habitat search of the Project Area was also conducted on June 9, 2023, and targeted birds by searching a variety of habitats more actively than point counts presented above (Figure 6-2). Evidence of breeding activity was gathered for birds observed and a summary of results is presented in Table 6-7. A complete list of observations can be found in Appendix F. The only SAR or SOCI observed during atlas style searches were the Eastern Wood-Pewee and the Peregrine Falcon.

Table 6-7 Summary of Observations from Habitat Search Surveys

Common Name	Scientific Name	COSEWIC	NS ESA	S-Rank	SARA	Number Observed	Highest Breeding Evidence
American Goldfinch	<i>Spinus tristis</i>			S5		2	X
American Robin	<i>Turdus migratorius</i>			S5B, S3N		3	S
Black-and-White Warbler	<i>Mniotilta varia</i>			S5B		5	AE
Black-capped Chickadee	<i>Poecile atricapillus</i>			S5		4	S
Black-throated Blue Warbler	<i>Setophaga caerulescens</i>			S5B		1	S
Black-throated Green Warbler	<i>Setophaga virens</i>			S5B		3	S
Blue Jay	<i>Cyanocitta cristata</i>			S5		4	X
Blue-headed Vireo	<i>Vireo solitarius</i>			S5B		2	S
Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>			S5B		1	S
Common Yellowthroat	<i>Geothlypis trichas</i>			S5B		1	S
Dark-eyed Junco	<i>Junco hyemalis</i>			S4S5		1	X
Eastern Wood-Pewee	<i>Contopus virens</i>	SC	VU	S3S4B	SC	2	S
Golden-crowned Kinglet	<i>Regulus satrapa</i>			S5		2	S
Hairy Woodpecker	<i>Dryobates villosus</i>			S5		1	X
Hermit Thrush	<i>Catharus guttatus</i>			S5B		5	NE
Least Flycatcher	<i>Empidonax minimus</i>			S4S5B, S5M		1	S
Mourning Dove	<i>Zenaidura macroura</i>			S5		1	S
Northern Parula	<i>Setophaga americana</i>			S5B		3	S
Ovenbird	<i>Seiurus aurocapilla</i>			S5B		12	A
Peregrine Falcon	<i>Falco peregrinus</i>	NAR	VU	S1B, SUM		2	A



GOLD BOND GYPSUM MINE EXPANSION PROJECT

Table 6-7 Summary of Observations from Habitat Search Surveys

Common Name	Scientific Name	COSEWIC	NS ESA	S-Rank	SARA	Number Observed	Highest Breeding Evidence
Red-breasted Nuthatch	<i>Sitta canadensis</i>			S4S5		1	X
Red-eyed Vireo	<i>Vireo olivaceus</i>			S5B		8	S
Ruby-throated Hummingbird	<i>Archilochus colubris</i>			S5B		1	X
Ruffed Grouse	<i>Bonasa umbellus</i>			S5		1	S
Song Sparrow	<i>Melospiza melodia</i>			S5B		6	A
Winter Wren	<i>Troglodytes hiemalis</i>			S5B		3	S

Notes:
 All data collected on June 9, 2023
Bold indicates SAR
 SAR / SOCI codes used:
 NAR = Not at Risk
 SC = Special Concern
 VU = Vulnerable
 Breeding codes used:
 X = Species observed, no breeding evidence
 S = Singing male(s) present in suitable habitat
 A = Agitated behaviour observed
 AE = Adult on or around nest indicating occupied nest
 NE = Nest with eggs
 S-Rank definitions (AC CDC 2023):
 S1 = Critically Imperiled: Critically imperiled in the province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
 S2 = Imperiled: Imperiled in the province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
 S3 = Vulnerable: Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
 S4 = Apparently Secure: Uncommon but not rare; some cause for long-term concern due to declines or other factors.
 S5 = Secure: Common, widespread, and abundant in the province.
 SNR = Unranked: Nation or state/province conservation status not yet assessed.
 SU = Unrankable: Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
 SNA = Not Applicable: A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
 S#S# = Range Rank: A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
 Not Provided: Species not known to occur in the province
 Breeding codes available at <https://www.mba-aom.ca/jsp/codes.jsp?lang=en&pg=breeding>

An additional four incidental observations of birds were made during vegetation and wetland surveys, three of which were SAR (Table 6-8).



Table 6-8 Incidental Observations of Birds

Date	Common Name	Scientific Name	COSEWIC	NS ESA	S-Rank	SARA	Individuals Observed	Breeding Evidence
27-Jul	Peregrine Falcon	<i>Falco peregrinus</i>	NAR	VU	S1B, SUM		2	P
27-Jul	Eastern Wood-Pewee	<i>Contopus virens</i>	SC	VU	S3S4B	SC	1	S
27-Jul	Eastern Wood-Pewee	<i>Contopus virens</i>	SC	VU	S3S4B	SC	1	S
28-Jul	Red-tailed Hawk	<i>Buteo jamaicensis</i>	NAR		S5		1	X

Notes:
Bold indicates SAR
 SAR / SOCI codes used:
 NAR = Not at Risk
 SC = Special Concern
 VU = Vulnerable
 Breeding codes used:
 X = Species observed, no breeding evidence
 S = Singing male(s) present in suitable habitat
 P = Pair observed in suitable nesting habitat
 S-Rank definitions (AC CDC 2023):
 S1 = Critically Imperiled: Critically imperiled in the province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
 S2 = Imperiled: Imperiled in the province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
 S3 = Vulnerable: Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
 S4 = Apparently Secure: Uncommon but not rare; some cause for long-term concern due to declines or other factors.
 S5 = Secure: Common, widespread, and abundant in the province.
 SNR = Unranked: Nation or state/province conservation status not yet assessed.
 SU = Unrankable: Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
 SNA = Not Applicable: A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
 S#S# = Range Rank: A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
 Not Provided: Species not known to occur in the province
 Breeding codes available at <https://www.mba-aom.ca/jsp/codes.jsp?lang=en&pg=breeding>

Surveys for nocturnal owls, crepuscular birds, or other specific bird SAR / SOCI were not included in the work scope, as it was determined that the habitat was not suitable for such species. Nor were surveys for overwintering birds completed.

In response to consultation with NSECC, dedicated field surveys for mainland moose (moose) were determined to not be required. Complete moose surveys were done in support of the 2015 expansion (Stantec 2015) and no signs of moose were identified at that time. Existing habitat in the Project Area is not ideal for moose; however, moose are known to move through the area periodically. Mitigation measures for mainland moose have been included in the wildlife effects assessment (Section 6.1.4.2).

Incidental wildlife observations were recorded during field surveys and yielded five total observations (Table 6-9), none of which represent SAR or SOCI.



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Table 6-9 Incidental Observations of Other Wildlife

Common Name	Scientific Name	COSEWIC	NS ESA	S-Rank	SARA
Mammals					
White-tailed Deer	<i>Odocoileus virginianus</i>	-	-	S5	-
Northern Raccoon	<i>Procyon lotor</i>	-	-	S5	-
North American Porcupine	<i>Erethizon dorsata</i>	-	-	S5	-
Herptiles					
Pickereel Frog	<i>Lithobates palustris</i>	NAR	-	S5	-
Green Frog	<i>Lithobates clamitans</i>	-	-	S5	-
Notes: SAR / SOCI codes used: NAR = Not at Risk Breeding codes available at https://www.mba-aom.ca/jsp/codes.jsp?lang=en&pg=breeding					

SAR and SOCI

The AC CDC (AC CDC 2022) identified 21 wildlife species with a SAR designation known to occur within 5 km of the project. Of these, five aquatic species were identified (four fish species and one freshwater mussel) and are not further discussed here as there are no water bodies identified within the Project Area. The remaining 16 terrestrial wildlife species consist of 10 bird species, two turtle species, one insect, and a group of three bats (Table 6-10). The AC CDC report also identified the possibility of bat hibernaculum within 5 km of the Project Area.

Table 6-10 SAR / SOCI Known to Occur within 5 km of the Project per AC CDC

Common Name	Scientific Name	COSEWIC	NS ESA	S-Rank	SARA
Bank Swallow	<i>Riparia riparia</i>	TH	EN	S2B	TH
Chimney Swift	<i>Chaetura pelagica</i>	TH	EN	S2S3B, S1M	TH
Bobolink	<i>Dolichonyx oryzivorus</i>	TH	VU	S3B	TH
Rusty Blackbird	<i>Euphagus carolinus</i>	SC	EN	S2B	SC
Barn Swallow	<i>Hirundo rustica</i>	SC	EN	S3B	TH
Canada Warbler	<i>Cardellina canadensis</i>	SC	EN	S3B	TH
Common Nighthawk	<i>Chordeiles minor</i>	SC	TH	S3B	TH
Olive-sided Flycatcher	<i>Contopus cooperi</i>	SC	TH	S3B	TH
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	SC	VU	S3B, S3N, S3M	SC
Eastern Wood-Pewee	<i>Contopus virens</i>	SC	VU	S3S4B	SC
Snapping Turtle	<i>Chelydra serpentina</i>	SC	VU	S3	SC
Wood Turtle	<i>Glyptemys insculpta</i>	N/A	TH	N/A	TH



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Common Name	Scientific Name	COSEWIC	NS ESA	S-Rank	SARA
Monarch	<i>Danaus plexippus</i>	EN	EN	S2?B, S3M	SC
Myotis & Perimyotis Bats	-	N/A	EN	N/A	EN

Notes:
SAR / SOCI codes used:
SC = Special Concern
EN = Endangered
VU = Vulnerable
TH = Threatened
N/A = Not Applicable, not provided by AC CDC for location sensitive species

S-Rank definitions (AC CDC 2023):
S1 = Critically Imperiled: Critically imperiled in the province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
S2 = Imperiled: Imperiled in the province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
S3 = Vulnerable: Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
S4 = Apparently Secure: Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5 = Secure: Common, widespread, and abundant in the province.
SNR = Unranked: Nation or state/province conservation status not yet assessed.
SU = Unrankable: Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
SNA = Not Applicable: A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
S#S# = Range Rank: A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
? = Inexact or Uncertain: Denotes inexact or uncertain numeric rank. The “?” qualifies the character immediately preceding it in the S-rank.
Not Provided: Species not known to occur in the province
Breeding codes available at <https://www.mba-aom.ca/jsp/codes.jsp?lang=en&pg=breeding>

Of the species noted in Table 6.10, two were identified during the field season, Eastern Wood-Pewee and Peregrine Falcon. Eastern Wood-Pewee was identified during breeding bird surveys, the atlas style search survey and incidentally. Peregrine Falcon was identified during the atlas search and incidentally.

Eastern Wood-Pewee is listed as Special Concern under the federal SARA and Vulnerable under the provincial NS ESA. This species is a small migratory forest bird that winters in northern South America and breeds from southeastern Saskatchewan to the Maritime provinces, south to southeastern Texas and east to the US Atlantic coast. In Canada, the eastern wood-pewee is mostly associated with the mid-canopy layer of forest clearings and edges of deciduous and mixed forests. It is most abundant in forest stands of intermediate age and in mature stands with little understory vegetation.

Peregrin Falcon is listed as Not at Risk under the federal SARA but is listed as Vulnerable under the provincial NS ESA. This crow-sized raptor is blueish-grey with darker back parts and a more pale underbody. Peregrine Falcons are commonly found in areas that have cliffs suitable for nesting, and open areas for foraging.

Three species of bats are also known to occur in the area year-round: little brown myotis (*Myotis lucifugus*); northern myotis (*Myotis septentrionalis*); tri-colored bat (*Perimyotis subflavus*). All three species are listed as Endangered under the federal SARA and the provincial NS ESA. These species over-winter in NS in underground sites, including caves and mines. Prior to development of the Gold Bond open pit in the 1950s, there was a large bat hibernaculum in a nearby cave system. This



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hibernaculum was abandoned after the open pit became operational. The Project Area overlaps with an identified critical habitat polygon for these species, as described in the species recovery strategy (ECCC 2018); therefore, sites within the Project Area that contain the following biophysical attributes are considered critical habitat:

- Subterranean features, such as caves, abandoned mines, hand-dug wells, cellars, tunnels, rock crevices, or tree root hollows where light and noise levels are low.
- Typically containing sections that have relatively stable temperatures (2-10 °C) and stable, high humidity levels.

Although the Project Area overlaps with identified critical habitat polygon for these species it is not expected that the Project Area contains the required biophysical attributes to qualify as critical habitat. No subterranean features were documented during studies and there were no indications of karst topography. The proximity of the Project Area to the active mining operations, and the frequency of blasts from the adjacent mine, likely precludes the area from having the required low noise levels.

Both little brown myotis and northern myotis establish maternity colonies in relatively large trees and snags (ECCC 2018). Little brown myotis will also establish maternity colonies in anthropogenic structures. Given the existing habitat, there is some potential for maternity roosts in the Project Area, however disturbance from the adjacent mine limits this potential.

6.5.2 Effects Assessment

Both direct and indirect environmental effects on wildlife and their habitats are expected through the life of the Project. Direct effects, including direct mortality and habitat loss, are expected to be greatest during site preparation, clearing and construction. Indirect effects, including noise, light, and ground vibrations, are expected to be greatest during the operation phase of the Project, particularly during active blasting activities. An existing mitigating factor to these potential effects is the presence of suitable habitat in surrounding areas that is similar to habitat within the Project Area that will be lost.

The Project will lead to a direct loss of vegetation communities and associated terrestrial habitat due to site preparation activities, including vegetation clearing and grubbing. Fragmentation of natural habitats in the Project Area may impede movement for small mammals due to the lack of cover and increased predation, and some small mammals may experience direct mortality because of clearing, or increased vehicle traffic. Forest interior birds may become vulnerable to the negative impacts of direct habitat loss and adverse edge effects but will likely compensate by relocating to adjacent / nearby suitable habitat.

Indirect effects, such as noise, visual, olfactory, and other sensory stimuli (e.g., dust, vibration) emitted from the operation of Project vehicles, equipment, site lighting, personnel, and activities (e.g., blasting) could potentially impact wildlife behavior. However, since the operation of the quarry has been ongoing at the existing site for many years, the Project does not introduce an additional source of disturbance and past and ongoing operations at the mine have discouraged animals from residing in the active quarry site.



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Mitigation Measures and Determination of Significance of Residual Effects

The following mitigation measures applicable to wildlife and wildlife habitat have been identified for the Project.

- Clearing and grubbing activities will be scheduled, when feasible, outside the breeding season to prevent inadvertent harm to most bird species and to comply with both the *Migratory Birds Convention Act* and provincial *Wildlife Act*
- If scheduling clearing and grubbing outside the bird breeding season is impossible, Gold Bond will assess established mitigation measures under the *Migratory Birds Convention Act*. If full avoidance during the timeframes is not practical, qualified biologists will conduct thorough searches, and avoidance setbacks will be established around active nests as a minimum precaution.
- If there is a delay between clearing and operational activities during the bird breeding season, qualified professionals will conduct bird presence assessments. If a nest is found, a setback will be established, restricting human activity until young birds fledge or the nest naturally fails.
- Domestic waste will be stored in secure receptacles to prevent attracting birds and other wildlife to the Project Area
- Project vehicles will adhere to posted speed limits on both the access road and internal site roads, aligning with provincial regulation and industry standards
- Staff will report wildlife incidents to their supervisor, which will be reported to NSNRR and / or CWS, when appropriate
- Personnel will not feed, harass, or hunt wildlife while working on the Project

The Project is expected to result in the incremental direct alteration or loss of approximately 14 ha of vegetation communities and associated terrestrial wildlife habitat. The surrounding area, while containing substantial swathes of undisturbed habitat, is currently fragmented by human activity, including clearcuts and roads. It is therefore unlikely that the incremental increase in alteration or loss of habitat caused by the quarry expansion will have irreversible adverse effects on wildlife populations including wildlife SAR or SOCI in the area. The operation of the existing quarry also makes it unlikely that wildlife species intolerant of human activity are currently inhabiting the Project Area, and likely that animals present in the Project Area have habituated to the sensory disturbance. Therefore, avoidance behavior and associated wildlife displacement effects are expected to be limited and highly localized.

The residual change in mortality risk for avifauna will be greatest during sensitive time periods (e.g., during the bird breeding period) and for eggs of unfledged birds. Risk will be reduced through the application of timing windows for site preparation activities that involve the removal of vegetation (e.g., clearing and grubbing). If vegetation removal is required within the primary nesting period, avian use and nest search surveys will be completed prior to the initiation of Project activities to mitigate the risk to avifauna by identifying and avoiding active nests.

During the Project's decommissioning and reclamation phase, the expanded quarry footprint's terrestrial habitat will undergo progressive restoration activities such as grading, contouring, capping of soil, revegetation, and natural processes over time. Although approximately 14 ha of existing wildlife habitat will be directly impacted, it is expected that suitable habitat for wildlife, including SAR and SOCI, can be



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restored through reclamation efforts. The predicted residual habitat loss and fragmentation effects are considered reversible upon the Projects' completion.

Residual effects related to habitat loss and fragmentation, wildlife behavior and risk of injury or mortality will occur within the Project Area. Residual indirect effects may extend beyond the Project Area into the surrounding area. Project-related residual effects on wildlife and wildlife habitat are generally predicted to be continuous in frequency (although residual injury and mortality effects are not anticipated to occur frequently), medium-term in duration (i.e., the residual effects are predicted to extend throughout the life of the Project), and reversible following decommissioning and reclamation. The predicted magnitude of Project related residual adverse effects on wildlife and wildlife habitat is characterized as "moderate" (i.e., measurable changes from existing / baseline conditions that may exceed natural variability but do not exceed guidelines, standards, or regulatory limits, nor do they pose a risk to the long-term viability of SAR or SOCI in the surrounding area).

Based on the above and considering the area of the Project, the availability of surrounding habitats like those within the Project Area, and assuming application of the recommended mitigation measures described above, Project-related residual effects on wildlife and wildlife habitat, including SAR and SOCI, are predicted to be not significant.

6.6 LAND USE

The land use VC includes a baseline description of the current land use in the Project Area, including any designations afforded to the land that would restrict or inhibit the Project from proceeding. Spatial boundaries for the assessment of the Land Use VC include lands within 1-2 km of the Project Area boundaries with a focus on those land uses that could be directly affected by noise or other stimulus (e.g., views). In general, the focus is on the community of Carroll's Corner.

Temporal boundaries are continuous throughout the life of Project operations including decommissioning and reclamation activities. Other temporal boundaries include those periods of increased land use activity (e.g., summer).

A significant adverse residual environmental effect is one where the proposed use of land for the Project is not compatible with adjacent or historical land use activities as designated through a regulatory land use process, and / or the proposed use of the land will create a change or disruption that widely restricts or degrades present land uses to a point where the activities cannot continue at current levels and for which the environmental effects are not mitigated or compensated.

6.6.1 Existing Environment

The NS Environment Pit and Quarry Guidelines (NSEL 2003) under the *Environment Act* require a minimum setback of 800 m from the foundation or base of a structure located off site. As described in the Pit and Quarry Guidelines, the definition of a *structure* includes residential buildings, schools, churches, commercial buildings, municipal or provincial facilities, hospitals, or other industrial buildings. The distance is measured from the working face and point of blast to the foundation or base of the structure, and can be reduced with written consent from all individuals owning structures within 800 m.



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There are no provincial parks or known sensitive heritage or cultural attractions near the Project Area nor are there any designated public recreational trails or public recreational lands present in the vicinity of the Project Area.

While the lands surrounding the Project that are not included in the existing mine are largely undeveloped, there are a few houses to the northeast of the Project Area, along Milford Road. One of these houses may fall within the 800 m setback (Figure 1-3), however, as the maximum extent of the working face of the expanded pit is not known exactly at this time, this cannot be confirmed. The working face will not come within 800 m of the structure without written consent of the structure owner.

6.6.2 Effects Assessment

The proposed Project is an extension to a currently operating mine in an area historically influenced by mining and forestry operations. The mine is located on land that is zoned for resource uses such as extractive facilities with the issuance of a development permit (HRM 2012). The Project activities are consistent with current uses in the area and are intended to extend the life of the existing mine site. Land and resource use near the Project Area will be affected over a minimum 30 year period by the advancing mine activities, and continued operation of the mine will result in economic benefits, including ongoing employment and business opportunities.

Mitigation Measures and Determination of Significance of Residual Effects

Potential “nuisance” effects associated with dust and noise on surrounding land uses, including mitigation are addressed in 6.2.2. Residual Project effects on land use are anticipated to be not significant as the Project is anticipated to have limited adverse effects on the use of the lands when compared to existing baseline conditions and land use zoning. The Project Area covers undeveloped land that will be restored after the life of the mine and is immediately adjacent to existing industrial activity.

6.7 ARCHAEOLOGICAL AND HERITAGE RESOURCES

The archaeological and heritage resources VC provides context for the historical use of the Project Area and presents information related to the baseline and potential archaeological conditions of the Project Area. A brief description of paleontological resources is also provided. Spatial boundaries for the assessment of archaeological and heritage resources include the area within or immediately adjacent to the Project Area.

Temporal boundaries are continuous throughout the life of Project operations including decommissioning and reclamation activities.



6.7.1 Existing Environment

An Archaeological Resource Impact Assessment (ARIA) for the Project was completed in compliance with NS's Archaeological Resource Impact Assessment (Category C) Guidelines (2014) as well as the *Special Places Protection Act*. As required in NS, the ARIA was completed by permitted professional archaeologists under a Heritage Research Permit (HRP). The fieldwork for the walkover component of the ARIA was conducted by qualified archaeologists on September 21, 2023.

Desktop historical background research was conducted for the Project using digital and archival information available from various government and non-government sources. The scope of work for this work included reviewing the following sources of information, in consideration of the knowledge and experience of the Stantec archaeology team, to gather an understanding of the general and specific history of the general area, as well as the specific location of the Project, for both the Pre-Contact and Historic Periods:

- Relevant Maritime Archaeological Resource Inventory forms for information relating to recorded archaeological sites within a 1 km radius of the Project
- Previous archaeological work and studies conducted near the Project
- Historic aerial photographs, maps, and historical and archival records of the Project Area and adjoining properties to gain information on historical land use
- Regulatory consultation, with the Special Places Coordinator from NSCCH
- The Canadian Register of Historic Places (CRHP)
- LiDAR and base mapping of the Project Area to identify environmental and physiographic features such as topography and historic water margins that would influence human settlement and resource exploitation patterns

Engagement with the Kwiłmu'kw Maw-klusuaqn Negotiation Office's Archaeological Research Division (KMKNO's ARD) was undertaken to gather information pertaining to traditional or historical use of the Project Area.

The scope of the field assessment consisted of a field reconnaissance (archaeological survey or "walkover") of the Project Area, to identify, visually inspect, and document potential areas of archaeological sensitivity, or areas of elevated archaeological potential identified during the historical background study, and areas of modern disturbance within the Project Area.

Site reconnaissance involved an archaeological pedestrian survey of areas, ground conditions, and historically significant features within areas that could be affected by the Project. This survey was documented and assessed through a walkover and by taking into consideration the results of the desktop historical background study, following the Provincial Guidelines (Category C, 2014) as well as the professional judgement of the Stantec Archaeology Team.

The field survey focused on the Project Area where an expansion to the north of the gypsum mine is proposed. The field crew consisted of two archaeologists walking in 10 m transects throughout the subject property to watch for surface heritage resources and to assess ground conditions for archaeological potential.



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The HRP terms included submission of detailed reports, including maps of the Project location, archival photographs and documents, a detailed description of all findings during the historical background research, and site reconnaissance and recommendations for additional mitigation, as warranted.

6.7.2 Description of Existing Conditions

6.7.2.1 The Natural Environment

The Project Area is within the Windsor Lowlands Unit of the Carboniferous Lowlands Region with primarily carboniferous sedimentary rocks, which has allowed deep soils to have developed throughout Lowland NS (Davis & Brown 1996).

The soil within the Project Area originates from the Queens series, primarily occurring in the Musquodoboit Valley and along the Shubenacadie and Gays Rivers (Niven 2015). The soil appearance is reddish – brown clay loam till that is derived from shale and sandstones (MacDougall 1963). The soil along the surface and below the ground are generally a dark reddish – brown sandy clay loam preceding a dark – brown sandy clay loam (Niven 2015).

Archaeological Resources

The Pre-Contact Period

The earliest period of human occupation in NS is Sa'qewe'l L'nu'k (the Ancient People) or “Palaeo-Indian” period (13,000 – 9,000 before present [BP]), which saw the arrival of peoples who harvested caribou, along with a variety of other fauna, following deglaciation of the region (Bonnichsen, Keenlyside and Turnmire 1991). This period is best represented in NS by the Debert-Belmont site complex near Truro, NS.

Sites of the following Mu Awsami Kejihaw'k L'nu'k (the Not so Recent People) or the Archaic Period (9,000-3,000 BP), are characterized in part by distinctive ground stone tool industries. In NS, sites of this period are known mainly from interior locations and mostly date only to the latter half of this period (the Late Archaic). Nevertheless, it is inferred that people were present in the province throughout this period, and that their lifeways included a focus on harvesting the coast's resources and interior waterways. The scarcity of evidence for occupation early in the period and on the coast is seen to reflect the effects of rising sea levels; such sites are now situated in marine environments.

The last phase of the Pre-Contact Period, Kejihawek L'nu'k (the Recent People) or Woodland / Ceramic period (3,000- 500 BP), sees the appearance of ceramic technology in the context of wide-ranging interactions with other peoples of the greater northeast. Coastal archaeological sites are more clearly documented (albeit still threatened by rising sea levels and coastal erosion) and, in some cases, include substantial shell middens, indicating the harvesting of marine shellfish. Nevertheless, both marine and terrestrial resources figured in the seasonal round during this time, with some regional variation (Nash and Miller 1987; Davis 1991).



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There are no recorded archaeological sites within the Project Area. However, there are two interpreted Mi'kmaw archaeological sites within a five km distance of the Project Area: BfCu-05 and BgCu-05. These sites record lithics (KMKNO – ARD 2023). The nearest recorded site is BfCu-05, which is over four km southwest on the banks of the Shubenacadie River. It was recorded by an unfounded source; however, a past 1970 NS Museum archaeological survey failed to produce any evidence of what they suspected to be a Maritime Woodland site (Niven 2015). The area was speculated to have been destroyed by avocational archaeologists (Niven 2015). The Mi'kmaw name for Milford is L'tquamkotek, which means “where two things are piled together” (KMKNO – ARD 2023).

There is one recorded traditional use site used for hunting within a one-km distance of the Project Area (KMKNO-2023 ARD).

The Historic Period

The Historic Period is defined as the period from the arrival of mostly European-derived peoples to North America, about 500 years ago, until the modern era. For Mi'kmaq communities, this period is referred to as Kiskukew'k L'nu'k (Today's People) or Contact Period (500 BP- Present), which saw the growth of European settlement in the region, and with it, a variety of changes for Kiskukew'k L'nu'k associated with trade, conflict, and disease (Whitehead 1991).

The first Euro – Canadian land grants in Carroll's Corner were granted after 1792. The area was named in 1843 after John Carroll, who had a house and small store there (PANS 1967). The 1869 A.F. Church map shows a “J. Carroll” on the west side of the Milford Road, near the intersection with Highway 277, immediately outside of the Project Area. The most detailed map of the Project Area is the 1908 Geological Survey of Canada map. It does not depict any settlements within the Project Area. However, it does show a “Black Rock Gypsum Quarry”, north of Dutch Settlement and west of the Project Area. This indicates that gypsum mining has been ongoing in the wider area since the early twentieth century (Niven 2015).

The Shubenacadie River was a vital transportation route for the Mi'kmaq and it was also an integral part of the Shubenacadie Canal during the nineteenth century. However, it is outside of the Project Area. The most likely historic transportation routes near the Project Area are Highway 277 and Milford Road (Niven 2015).

A review of the CRHP 2024 did not find any registered historic places or heritage sites located within 5 km of the Project Area.

Paleontological Resources

Mastodon remains were found at the existing mine in 1991 (tusk and part of the jawbone of an adult mastodon) and 1993 (left half of the juvenile's jawbone about 400 feet northeast of the first discovery). The six-year-old juvenile is the earliest known juvenile mastodon in Canada, dating back approximately 80,000 years to the Quaternary Period. The mastodon findings indicate the potential for additional paleontological resources to be found when the mine is extended. The existing mine and Proposed Extension Area are not considered a Special Place under the *Special Places Protection Act*.



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When the resources were previously found, work was immediately ceased, and the Nova Scotia Museum was notified.

6.7.3 Effects Assessment

Following the field survey by the Stantec Archaeology Team, no above ground archaeological resources were identified. Based on the results of the ARIA, there does not appear to be heritage related constraints in the Project Area. Due to the presence of wetland, elevated degrees of slope interpreted to be unsuitable for human habitation and the lack of a nearby large named watercourse, the Project Area is assessed as having low archaeological potential.

Mitigation Measures and Determination of Significance of Residual Effects

The Project Area has low potential for identifiable human use in the Pre-Contact Period, and low potential for identifiable human use in the Historic Period. No additional recommendations or archaeological mitigation measures are recommended. It is assumed that no areas beyond the Project Area will be disturbed during the development and operation of the Project. The development and operation of the Project is unlikely to have adverse environmental effects on unknown heritage resources. Based on the results of the desktop study and walkover survey, the potential for archaeological and / or heritage resources is low. No direct or indirect impacts to Cultural and Heritage Resources are expected because of the Project.

If archaeological, heritage or paleontological resources are discovered during development and operation of the Project, work will be immediately stopped, and the find reported to the Curator of Archaeology and / or the paleontological staff at the NS Museum and the Manager of Special Places, Heritage Division Department of Communities, Culture and Heritage. If the resources are thought to belong to Mi'kmaq, the Chief of the nearest Mi'kmaq band (i.e., Sipekne'katik First Nation) will also be contacted. The appropriate authorities will determine if further actions, e.g., avoidance or further assessment, are undertaken.

6.8 INDIGENOUS COMMUNITIES AND ACTIVITIES

The Indigenous communities and activities VC contains information on the Project Area from the perspective of Indigenous communities and individuals. Information related to traditional land use, and Indigenous activities is presented in this VC.

6.8.1 Existing Environment

Use of lands and resources by First Nations are described based on the Mi'kmaq Ecological Knowledge Study (MEKS) conducted for the 2015 gypsum mine expansion (Membertou 2014; available in Stantec 2015, Appendix F). The need for a new MEKS was discussed with NSECC on January 4, 2023, and Gold Bond was advised that a new MEKS was not required. The MEKS outlines traditional use areas in the region surrounding the mine, including areas for hunting, fishing, and gathering. The Project Area does not overlap with any identified traditional use areas.



6.8.2 Effects Assessment

The Project is not anticipated to result in direct change to traditional use reported by the Mi'kmaq in the MEKS prepared for the 2015 mine expansion (Membertou 2014). Indirect effects are possible, which could persist over the life of the Project, however, these effects would be minor. The potential change in traditional Mi'kmaq land and resource use is attributable to direct and indirect disturbance in the Project Area which could cause animals to relocate to areas of traditional use.

Mitigation Measures and Determination of Significance of Residual Effects

With the implementation of proposed mitigation and environmental protection measures, including the recommendation specified in the MEKS report (i.e., consideration of Mi'kmaq interests and traditional use activities throughout the environmental planning process as well as during all Project work and remediation activities), the environmental effect of a change in land use by the Mi'kmaq is predicted to be not significant. Ongoing engagement with local Mi'kmaq community representatives will provide feedback on the effectiveness of this mitigation measure and confirm this effects' prediction.

7.0 ACCIDENTS AND MALFUNCTIONS

Accidents and malfunctions could occur during routine Project activities and could include the accidental release (spill) of petroleum hydrocarbons or other hazardous materials, the failure of mitigation devices (e.g., erosion and sediment controls) to effectively manage site runoff or drainage within the Project Area, and fire.

A hazardous material spill or the failure of mitigation devices to effectively manage site runoff or drainage could adversely affect groundwater quality, surface water quality, riparian habitat, and species, and / or aquatic habitat and species both in, and in proximity to the Project Area. Contaminants from a hazardous material spill could leach into groundwater zones and / or be transported into riparian areas, wetlands, or watercourses (e.g., in surface runoff during very high precipitation events). Similarly, the failure of erosion and sediment controls could result in increased concentrations of TSS and / or other contaminants in groundwater resources, riparian areas, and / or wetlands. Terrestrial habitat and species, potentially including SAR, SOCI, and sensitive vegetation communities, could also be adversely affected by a hazardous material spill or the failure of erosion and sediment controls (i.e., in areas where associated contamination is present and / or sediments are deposited).

A fire could result in the contamination of groundwater resources, as well as associated; alteration or loss of terrestrial habitat; injury or mortality of terrestrial species, potentially including SAR, SOCI, and sensitive vegetation communities; and atmospheric emissions of contaminants that adversely affect air quality. A fire could also adversely affect land and resource use if it results in a restriction or change in access to areas surrounding the Project Area used for recreation, or other purposes.

The risk of an accident or malfunction will be reduced through implementation of standard mitigation measures and best management practices currently used by Gold Bond, including those pertaining to hazardous materials / wastes and dangerous goods; erosion and sediment control, management of



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runoff, and water quality; and blasting. A Spill Contingency Plan and an Emergency Response Plan have been developed for current operations at the Gold Bond mine site and will be implemented, as applicable, in the event of a spill, fire, or other emergency. The Emergency Response Plan prescribes actions to mitigate potential risks to the safety of employees and the public, as well as communication and reporting requirements. In the unlikely event of an accident or malfunction, it is anticipated that implementation of appropriate contingency and emergency response measures will reduce the magnitude, geographic extent, and duration of potential residual adverse effects on the environment. Contingency and emergency response equipment and materials will be maintained in good working order on-site, including spill containment and clean-up equipment, fire prevention and suppression equipment, and contingency erosion and sediment control materials. The drainage and conveyance features that are in place to manage seepage and runoff within the quarry footprint during routine Project activities will further reduce the risk of spill or fire-related contaminants entering riparian areas, wetlands, and other areas where sensitive species, vegetation communities, and / or habitats may be located.

8.0 OTHER UNDERTAKINGS IN THE AREA

Under section 12 of the NS Environmental Assessment Regulations, the Minister must consider other undertakings around a proposed project registered as a Class 1 Undertaking. Environmental effects associated with other nearby undertaking may potentially act in combination with the environmental effects of the Project. Potential environmental effects and a discussion of the potential for other undertakings to act in combination with environmental effects of the Project are noted below.

Generic potential environmental effects from quarry operations include:

- Dust, noise, and light emissions from quarrying and associated traffic
- Loss / alteration of riparian and wetland areas including erosion, sedimentation, increased water temperature, elevated nutrient levels, decreased dissolved oxygen, and / or changes to hydrological patterns
- Loss and / or change in terrestrial habitat including a direct effect on SAR and / or SOCI in the area through direct disturbance or by causing indirect changes to their habitat resulting in a loss of individuals or change in species abundance or distribution
- Change in recreational and / or traditional land and resource use (e.g., loss or impeded access, effects on harvested species)

Gallant Aggregates Ltd. owns a quarry (Elmsdale Quarry) located approximately 10 km southeast of the Gold Bond mine that is approximately 30 ha. Approximately 3.7 km from the Gold Bond mine, there is a lead / zinc mine in Gays River, although this mine is not currently in operation. There are other aggregate pits located within 2 km of the existing Gold Bond mine. The Gold Bond mine and other pits and quarries in the area have been operating in relative proximity for years. The existing Gold Bond operation is currently functioning without any major issues with respect to dust, emissions, traffic, water, etc. If concerns are reported, Gold Bond will address them immediately. It is assumed that quarries and mining operations in the region are obligated to abide by standard permit conditions to manage noise, dust and other emissions that could potentially overlap with mining operations at the Gold Bond site. Since the



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Project does not include an overall increase in production, and assuming the effective application of mitigative measures at the Project site, and for other projects operating under provincial approval, significant adverse cumulative type effects resulting from the Project and other undertakings in the area are not likely to occur. No changes are predicted with respect to cumulative noise or dust to local communities given that Project operations will not increase in intensity or expand closer to residential properties. While the Project can result in adverse environmental effects, these effects will be managed through the implementation of mitigation measures identified in this assessment, thereby reducing the Project's contribution to potential cumulative effects with other undertakings. The Project is not predicted to affect the existing undertakings described above. Since the Project is not expected to result in an increase in operational activity or traffic, residual adverse effects from the Project are not predicted to contribute to existing adverse effects from other undertakings, beyond a cumulative loss of habitat. In addition, the Project will involve progressive reclamation of habitat and effects on habitat are expected to be reversible in the long term. It is anticipated that other future undertakings will be required to implement similar mitigation measures and standards, further reducing potential for other undertakings to contribute additional adverse effects.

9.0 EFFECTS OF THE ENVIRONMENT ON THE UNDERTAKING

For mining projects, effects of the environment on the Project include a change to the Project caused by the environment, usually related to climate and meteorological conditions.

Normal temperature and precipitation conditions are not expected to have substantive effects on the Project. Heavy precipitation events (i.e., heavy rain or snow melt), could result in substantive adverse effects on the Project due to erosion and flooding.

NSECC's *Guide to Considering Climate Change in Project Development in Nova Scotia* (NSE 2011), notes it is important to understand the effects associated with climate change to reduce Project risks by complying with existing and future GHG reduction targets and legislation in Canada by considering their 'carbon footprint'.

Potential climate change events may affect Project operation in several ways, ranging from positive to negative, and from negligible to extreme effects. Events that could result in adverse residual environmental effects include increased frequency of extreme storms accompanied by strong winds, increased incidence of flooding and erosion, and increased frequency of heavy precipitation events. Each of these events, if not designed for, could result in infrastructure damages that are not feasible to fix, or failure of mitigation measures, which may in turn result in adverse environmental effects.

Heavy precipitation events can increase the risk of erosion and sedimentation and can temporarily restrict mining activities. Occasional heavy precipitation events are expected, and the construction and operation schedule allow for weather conditions typical for the region. The risk from erosion and sedimentation during extreme weather will be greatly reduced once site soils have been stabilized through revegetation in rehabilitated areas. The Erosion and Sediment Control plan will be updated during the IA amendment stage.



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Heavy precipitation events may cause short-term delays during operation of the Project, however, are not anticipated to result in long-term environmental effects. Heavy precipitation will result in increases in stormwater runoff in the Project Area, resulting in increased loadings to the stormwater collection and treatment system. The existing Stormwater Management Plan outlines plans for monitoring, maintaining, and upgrading flow retention / siltation treatment areas, and will be updated at the IA amendment stage. Design criteria will recognize the increased likelihood of intense precipitation events in coming decades.

There are several planning, design, and construction strategies that can mitigate potential effects of the environment on the Project to lower risk of damage to the Project or interruption of operation. Mitigation measures include, but are not limited to, designing, and installing erosion and sediment control structures to accommodate high levels of precipitation, and considering weather conditions and forecasts when scheduling activities. Discharged water will continue to be monitored and sampled according to the terms and conditions of the valid IA for the Project. Should overflow associated with a significant rainfall exceed final effluent discharge limits (as determined through monitoring), contingency measures will be implemented.

Project activities will be taking place out-of-doors and as such normal and extreme weather events have been considered in Project phases and activities. Heavy snowfalls with significant snow accumulation may influence the mine's ability to remain open. In summary, the effects of the environment on the Project as a result of climate and meteorological conditions, including climate change, will be not significant.

10.0 OTHER APPROVALS

Gold Bond has developed the following plans that were previously submitted to NSECC for review (i.e., as documentation in support of Gold Bond's 2015 application for IA #2015-093939-01) and are currently in place for the operating Gold Bond gypsum mine:

- Erosion and Sediment Control Plan
- Spill Contingency Plan
- Emergency Response Plan
- Environmental Protection Plan
- Stormwater Management Plan
- Reclamation Plan

If Project-specific changes require revisions to these plans or policies, they will be completed in conjunction with the IA amendment process for the Project.

The existing Reclamation Plan will be updated based on the Project activities and submitted to NSECC for review during the IA amendment process and implemented throughout the life of the Project.

Other relevant provincial regulations include the Activities Designation Regulations, which requires an amendment to the existing IA (#2015-093939-01) from NSECC for operation of the Project, potentially wetland alteration approvals, and the General Blasting Regulations made pursuant to the *Nova Scotia Occupational Health and Safety Act* (1996).



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A Wetland Alteration Approval will be sought for wetland directly affected by the Project. A Watercourse Alteration Approval is not anticipated to be required to enable the Project to proceed.

10.1.1 Monitoring and Commitments

Gold Bond also commits to the following for the Project:

- Blasts will be monitored by a qualified blasting professional
- Ongoing engagement with Mi'kmaq communities and organizations, and with the public throughout the life of the Project
- Implementing surface water management practices for the Project that tie into existing surface water management practices at the mine site
- Monitoring of surface water resources and wetlands in proximity to the Project Area
- Monitoring of air and / or noise emissions will be completed at the request of NSECC, and in accordance with IA terms and conditions

11.0 FUNDING

The Project will be 100 percent privately funded.

12.0 SUMMARY AND CONCLUSIONS

This document has been prepared to evaluate the effect of the Project, an approximately 14 ha expansion of the existing gypsum mine operated by Gold Bond in Milford Station, NS, on selected VCs, as presented in Section 6.0, which includes a detailed assessment of existing baseline conditions and predicted impacts to each VC. The Project will benefit the economy as an important part of NS's natural resource sector. The Project will increase the longevity of current employment associated with the current quarry operations, as well as provide a stimulus to other local businesses.

The findings of this EARD indicate that residual environmental effects will be not significant for identified VCs. Monitoring will be completed as required to confirm the predicted effects and determine if additional mitigation measures need to be implemented using an adaptive management approach

A summary of each VC and Project interactions are outlined below.

Atmospheric Environment

The Project will generate dust, however, after mitigation measures are implemented and the IA conditions and Pit and Quarry Guidelines are adhered to, no adverse effects to human health are predicted.

Air quality is expected to return to baseline conditions during periods of site inactivity and post-reclamation. After mitigation measures are implemented, and the Pit and Quarry Guidelines are adhered to, the predicted residual environmental effects for air quality are assessed not to be significant.



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The Project will generate noise and after mitigation measures are implemented and the IA conditions and Pit and Quarry Guidelines are adhered to, no adverse effects to human health are predicted. Noise is expected to return to baseline conditions during periods of site inactivity and post-reclamation. After commitments and mitigation measures are implemented, and the Pit and Quarry Guidelines are adhered to, the predicted residual environmental effects for noise are assessed not to be significant.

The Project will not result in an increase in annual GHG emissions on an annual basis compared with existing operations and Gold Bond is actively pursuing measures to reduce their overall carbon footprint.

Surface Water and Groundwater

Surface water discharged from the quarry site will be monitored as per requirements listed in the IA to meet the Pit and Quarry Guidelines. After mitigation measures have been implemented, the predicted residual environmental effects on surface water are assessed to be not significant.

There is low potential for the Project to adversely affect the quality of local groundwater wells. Gold Bond does not intend to excavate or blast below the water table in the Project Area so no changes to groundwater quantity recharge / discharge functions and groundwater flow paths are predicted.

No significant residual environmental effects to groundwater quality are anticipated.

Vegetation and Wetlands

Direct loss to wetland and upland habitats is expected to occur primarily during the construction phase of the Project (i.e., clearing and grubbing). Wetland loss will be compensated for, in accordance with Wetland Compensation guidance document (NSE 2023).

It is expected that no permanent, unmitigated alteration to habitat that supports rare flora / lichen species distribution will occur because of the Project, and since similar habitat is currently available at the local / regional levels, the predicted residual environmental effects are assessed to be not significant for vegetation and wetlands. No SAR vascular plants or lichen anticipated to be lost because of the Project.

Wildlife and Wildlife Habitat

Project activities have the potential to effect local the fauna through potential mortality, sensory disturbance, and the loss or alteration of habitat and habitat fragmentation. No SAR or SOCI mammal species were observed within the Project Area during the wildlife surveys or incidentally during non-targeted field studies. Two SAR species, Eastern Wood-Pewee and Peregrine Falcon were observed in the Project Area; however, suitable habitat exists for both these species in adjacent areas in proximity to the Project Area.

While changes to wildlife and wildlife habitat are anticipated through clearing and grubbing) the overall availability of similar habitat in surrounding areas, and mitigation measures implemented by the mine is expected to limit these impacts. The predicted residual environmental effects are assessed to be not significant.



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Land Use

The Project is anticipated to have minimal impact upon the use of the lands when compared to existing baseline conditions and once reclamation is completed. The Project is consistent with municipal zoning and will adhere to setbacks outlines in the Pit and Quarry Guidelines. The Project is predicted to not have a significant effect on land use.

Archaeological and Heritage Resources

No significant archaeological features were identified within the Project Area during desktop studies and field reconnaissance. The portions of the Project Area ascribed elevated potential for encountering Mi'kmaq archaeological resources through desktop review are beyond the boundaries of the Project Area. Due to a low potential for archaeological resources, of either Mi'kmaq or European-descended origin within the Project Area, no direct or indirect impacts to Archeological and Heritage Resources are expected because of the Project.

Indigenous Communities and Activities

In consultation with NSECC, the MEKS prepared for the 2015 EA registration (Membertou 2014) was used for this Project. The MEKS outlines traditional use areas in the region surrounding the mine, including areas for hunting, fishing, and gathering. The Project Area does not overlap with any identified traditional use areas. As a result, the Project is not anticipated to result in direct change to traditional use in the region. Indirect effects are possible, which could persist over the life of the Project.

The residual environmental effects of the Project regarding land use by the Mi'kmaq is assessed to be not significant. Regardless, ongoing engagement with local Mi'kmaq community representatives will provide feedback on the effectiveness of mitigation plans and inform required adaptive management.



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13.2 PERSONAL COMMUNICATION

Brander 2023, pers. comm. NSECC. Re: Watercourse Alteration Permit for Remnant Channel of Big Pond Brook. April 17, 2023. Email.

