Fifteen Mile Stream Gold Project

Project Description

Highway 374
Trafalgar, Nova Scotia

Atlantic Mining NS Corp.
Suite 3083, Three Bentall Centre
595 Burrard Street, P.O. Box 49298
Vancouver, British Columbia
Canada V7X 1L3

May 22, 2018

ATLANTICGOLD

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Glossary of Terms and Abbreviations

ACCDC	Atlantic Canada Conservation Data Centre
AMO	Abandoned Mine Opening
ANFO	Ammonium nitrate- fuel oil mixture explosive
AP	Acid Producing Potential
ARD	Acid rock drainage
Argillite	Highly compacted sedimentary or slightly metamorphic rocks consisting primarily of particles of clay or silt
$CaCO_3$	Calcium carbonate (limestone when a rock)
CCME	Canadian Council of Ministers of the Environment
CEAA	Canadian Environmental Assessment Act or Agency
CLC	Community Liaison Committee
CMM	Confederacy of Mainland Mi'kmaq
CO	Carbon monoxide
CO_2	Carbon dioxide
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CRA	Conestoga-Rovers and Associates
CRM	Cultural Resource Management Group
CWS	Canadian Wildlife Service
dBA	Decibel on the A-scale
DDV Gold	DDV Gold Limited (owned by Atlantic Gold)
DFO	Fisheries and Oceans Canada
DO	Dissolved oxygen
doré	A mixture of gold in cast bars, as bullion.
drumlin	An elongated hill or ridge of glacial drift.
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency (United States)
FWAL	Freshwater Aquatic Life
IA	Industrial Approval
ISQG	Interim sediment quality guideline
IR	Indian Reserve
KMKNO	Kwilmu'kw Maw-klusuaqn Negotiation Office
LAA	Local Assessment Area
loam	Rich soils containing a relatively equal mixture of sand and silt and a somewhat smaller proportion of clay.
MBA	Mutual Benefits Agreement
MBCA	Migratory Bird Convention Act (Canada)
MEKS	Mi'kmaq Ecological Knowledge Study
MEL	McCallum Environmental Ltd
MMER	Metal Mining Effluent Regulations
MOU	Memorandum of Understanding
MPA	Maximum Potential Acidity
MSC	Meteorological Service of Canada
MU	Mixed Use

NAAQS	National Ambient Air Quality Standard
NAD83 CSRS	North American Datum 1983 – Canadian Spatial Reference System
NAPS	National Air Pollution Surveillance
NO_x	Nitrogen oxides
NP	Neutralization Potential
NPAG	Non-Potentially Acid Generating
NSDNR	Nova Scotia Department of Natural Resources
NSE	Nova Scotia Environment
NSESA	Nova Scotia Endangered Species Act
NTS	National Topographic System
PA	Project Area
PAG	Potentially Acid Generating
PID	Property Identification Number
pH	Power of the concentration of a hydrogen atom (measure of acidity)
PM	Particulate matter
POL	Petroleum, oil, and lubricants
Ppm	parts per million
PS	Project Scope
RAA	Regional Assessment Area
RCAp-MS	Rapid Chemical Analysis program – Metal Scan
ROM	Run-of-mine
SARA	Species at Risk Act (Canada)
S	Sulphur
SO_2	Sulphur dioxide
tailings	Mining residue
till	Glacial drift composed of an unconsolidated, heterogeneous mixture of clay, sand, pebbles, cobbles, and boulders.
TMF	Tailings Management Facility
tpd	tonnes per day
TSP	Total suspended particulates
TSS	Total suspended solids
USEPA	United States Environmental Protection Agency
WRSF	Waste Rock Storage Facility

Units of Measure

gpt	grams per tonne
ha	Hectare
kg	Kilogram
kl	Kiloliter
kV	Kilovolts
l	Litres
m	Metre
Ma	Million years
masl	metres above sea level
mg	Milligrams

mm	Millimeter
Mm^3	million cubic metres
Mt	Megatonne (1 million tonnes or 10^9 kg)
MW	Megawatt
µm	Micron (1/1,000,000th of a metre)

1. General Information and Contacts

1.1 Nature of the Designated Project

The Fifteen Mile Stream (FMS) Gold Project (the Project) is contemplated to be developed in association with the currently operating Touquoy mine. The Project is planned to be permitted and operated as a separate satellite surface mine operating at a production rate of approximately two million tonnes (Mt) of gold-bearing ore per year. Ore will be crushed and concentrated on site to produce a gold concentrate which will be hauled by on-road highway trucks to the Touquoy mine carbon-in-leach (CIL) processing facility for final processing into gold doré bar, a distance of just over 76 km on existing public roads. This will eliminate the need for a separate CIL cyanide leach circuit. The concentrate will be processed at Touquoy mine in conjunction with ore supply from Touquoy, Beaver Dam and Cochrane Hill surface mines. For further description of these projects see Section 2.6.

The planned start date for construction for the Project is May 2020 with a scheduled start-up for 2021. The mine will operate for six years to 2026 and will employ up to 200 persons including both salaried and hourly personnel. At the cessation of mining activities, the site will be reclaimed.

Changes to the Touquoy mine as a result of the Project are anticipated to be minimal. Only minor changes to the existing processing facility at the Touquoy mine will be required, including the addition of concentrate storage and the addition of a second gravity concentrate leach reactor and a gravity electrowinning cell. With the exception of the concentrate storage, the changes to the gravity circuit represent an expansion of the existing circuit. This can be accommodated within the existing process building footprint. There will be a small increase in the volume of tailings deposition into the existing tailings management facility (TMF) and mined out Touquoy pit as a result of concentrate from the Project. Source terms from FMS tailings supernatant will be used to update the Touquoy water quality model to predict potential changes in water quality in the Touquoy TMF and open pit as a result of the addition of tailings from processing of FMS concentrate at the Touquoy mine. This information will be used in support of an application to amend to the Touquoy Industrial Approval (IA) to allow processing of FMS concentrate and disposal of tailings from FMS concentrate to the Touquoy TMF and open pit. All other aspects of the Touquoy mine will remain the same as previously assessed including the disturbed footprint, tailings management aspects and the size and locations of stockpiles. Operations at the Project will include mining, crushing, ore processing and concentration, and operation of a waste rock storage facility (WRSF), low grade ore stockpiles (LGO) and a TMF. A gold concentrate will be produced at site and transported to the Touquoy processing facility for final processing into gold doré. Tailings will be generated from mill processing at the Project and deposited into an above ground TMF. Infrastructure will include crushing facilities, fine ore stockpile and reclaim, concentrator facilities, maintenance facilities, fuel storage, office infrastructure and site haul roads.

An existing 69kV, north-south hydroelectric transmission line is located west of Highway 374. This line will supply power to the site via a small spur line (approximately 5.3 km) and substation to step the voltage down to 4.16kV. It is anticipated that clearing for powerline corridors will be minimal.

Development of the Project will require the diversion of Seloam Brook to accommodate development of the open pit. A 1.3 km diversion channel will be constructed to divert Seloam Brook to the north of the proposed open pit.

Two processing concentrate streams will be produced at the Project, a gravity concentrate and a float concentrate. Both will be transported from the Project to the Touquoy mine utilizing existing highways in conjunction with the Beaver Dam haul road thus requiring minimal upgrades to existing road infrastructure. To start, gold concentrate will be hauled south

along Highway 374 (31 km) to Highway 7, through Sheet Harbour (27 km) and onto Mooseland Road to the Touquoy mine (35 km). Once Beaver Dam mine is brought online, and the Beaver Dam haul route has been upgraded as part of that project, haul trucks from the Project are expected to take Highway 224 from Sheet Harbour to the Beaver Dam Cross Road (21 km) and the Beaver Dam haul route will be utilized for the remainder of the haul to the Touquoy mine (24 km). As a result of using existing road infrastructure, infrastructure previously upgraded for the Beaver Dam Project, and the very minor increase from FMS haul truck traffic, impacts to plant, animal or Mi'kmaq and /or archaeological resources are not anticipated to result from concentrate transport.

The majority of tailings will be stored in an approved above ground TMF located at the site. The containment dams will be constructed with rock aggregate material sourced from mine waste rock or nearby quarries with upstream impermeable membrane and seepage cut off constructed using local till material.

Final processing of gold concentrate will be undertaken at the Touquoy mine processing facility resulting in a minor quantity of additional tailings being initially deposited into the existing TMF and once the Touquoy pit is exhausted, into the mined out Touquoy open pit. This allows the Touquoy mine footprint to be maintained as currently permitted. The approved reclamation plan for the Touquoy mine calls for the mined-out pit to be allowed to fill with water. At the end of processing at the Touquoy mine, the remaining volume within the open pit would naturally fill with water and the deposited tailings will be stored under a water cap, creating a lake as per the approved plan for the reclaimed Touquoy pit, albeit slightly shallower. "Wet" disposal is accepted internationally as a superior method of permanent tailings management as opposed to "dry" storage. The Project will be reclaimed to a point that is safe, stable, consistent with the natural surroundings and in alignment with general community wishes regarding final land use.

The Project Scope includes the Project, two options for transportation of gold concentrate (an initial route, and a second main route once Beaver Dam becomes operational both on existing public roads) and the necessary components of the Touquoy mine to process the gold concentrate and manage the associated additional tailings. This Project Scope is shown on Figure 1-1.

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FIGURE 1-1

Fifteen Mile Stream Gold Project Scope

Halifax County

Project Scope

- Fifteen Mile Stream PA
- Touquoy Mine Site
- Haul route (once Beaver Dam is built)
- Initial haul route

Coordinate System: NAD 1983 CSRS UTM Zone 20N
Projection: Transverse Mercator
Datum: North American 1983 CSRS
Units: Meter

0 2 4 8 Kilometers

1:175,000 Scale when printed @ 11" x 17"

Drawn By: LP

Date: 2018-05-16

McCallum Environmental Ltd.

1.2 Proponent Information

1.2.1 Name of the Designated Project

The designated project will be known as the "Fifteen Mile Stream Gold Project" (the Project).

1.2.2 Name and Address of the Proponent

Atlantic Mining NS Corp., the Proponent, is a wholly owned subsidiary of Atlantic Gold Corporation ("Atlantic Gold"). Atlantic Gold was formerly Spur Ventures Inc. which had been looking for suitable precious metals investment opportunities focusing on the Americas for approximately two and one-half years. Spur Ventures was made aware of Touquoy mine Project and other assets that were controlled by an Australian listed company called Atlantic Gold NL. Upon completion of satisfactory due diligence, the two companies merged in August 2014 and Spur Ventures subsequently changed its name to Atlantic Gold Corporation. Shortly after completing this merger, Atlantic Gold subsequently acquired Acadian Mining Corp ("Acadian") from LionGold Mining Canada Inc. in September 2014. This acquisition gave Atlantic Gold access to FMS and other properties and holdings in Nova Scotia. Diamond drilling at the Project commenced in November 2016. Environmental data collection began at the Project site in June 2017.

Atlantic Mining NS Corp.

Corporate Office	Local Office
Suite 3083, Three Bentall Centre	6749 Moose River Road,
595 Burrard Street, P.O. Box 49298	Moose River Gold Mines,
Vancouver, British Columbia	RR2 Middle Musquodoboit, Nova Scotia
Canada V7X 1L3	Canada B0N 1X0

Chairman and Chief Executive Officer	President and Chief Operating Officer
Steven Dean	Maryse Belanger
Phone: (604) 689-5564	Phone: (604) 689-5564
Email: sdean@atlanticgoldcorporation.com	Email: mbelanger@atlanticgoldcorporation.com
Toll Free: 1-877-689-5599	Toll Free: 1-877-689-5599

1.2.3 Project Description Contact

The Project Description was produced by McCallum Environmental Ltd. under contract to the Proponent.

McCallum Environmental Ltd.

115, 2 Bluewater Road	Meghan Milloy – Vice President
Bedford, Nova Scotia	Email: meghan@mccallumenvironmental.com
Canada, B4B 1G7	
Phone: (902) 446-8252	

1.3 Applicable Regulatory Framework

The Project will require Environmental Assessment (EA) approval from CEAA and Nova Scotia. The government of Nova Scotia employs a "One Window" process for reviewing, permitting and monitoring mine development projects in the province. This approach formalizes how government departments (including federal authorities) involved with mine development activities act collectively to streamline the review process for both government and industry.

The Project mining infrastructure will require the rerouting of Seloam Brook and will encroach on waters frequented by fish. In the presence of impacts to recognized fish or fish habitat, authorization will be required from Fisheries and Oceans Canada (DFO) under Paragraph 35(2)(b) of the *Fisheries Act*. The Environmental Impact Statement (EIS) will address potential effects of the proposed Project footprint and activities on fish and fish habitat.

Migratory birds will be assessed through Canadian Wildlife Service (CWS) protocols and breeding birds point count methodology during appropriate breeding windows in the Fifteen Mile Stream Gold Project Area (PA). Breeding bird surveys will be performed on migratory birds, as defined in the *Migratory Birds Convention Ac*t, 1994. The EIS will address potential effects of the Project and activities on migratory birds and their habitat.

The potential effects of the construction and operation of the Project on vegetation, aquatic life and wildlife and their habitat will be assessed as they relate to the *Species at a Risk Act*. The Project design has considered minimization of the Project footprint based on the existing knowledge of the site. Avoidance of certain habitats will mitigate the potential effects and protect species to the extent feasible. The Environmental Impact Statement (EIS) will address potential effects of the proposed Project footprint and activities on species at risk and their habitats.

1.3.1 CEAA - Regulations Designating Physical Activities

The Project activity designated in the Schedule to the Regulations Designating Physical Activities (CEAA, 2012a) that may necessitate a federal environmental assessment for this Project is:

16(c) The construction, operation, decommissioning and abandonment of a new rare earth element mine or gold mine, other than a placer mine, with an ore production capacity of 600 t/day or more.

This Project Description provides information on the Project components and potential environmental effects as described in Prescribed Information for a Description of a Designated Project Regulations (CEAA, 2012b). Further, the content of this document conforms to the "Guide to Preparing a Description of a Designated Project under CEAA 2012" (CEAA, March 2015).

1.3.2 List of Permits, Licenses and other Authorizations

Federal and provincial environmental acts and regulations apply to the Proponent regarding the design, site preparation, construction, operation, and rehabilitation of the proposed mine. In addition to the environmental legislation, other acts and regulations relating to labour standards, mining practices, and other phases are applicable to the Project. The Proponent is aware of the applicable acts and regulations that pertain to the proposed undertaking and The Proponent's project team have the demonstrated experience and ability to prepare the necessary information and design plans to obtain the required permits and approvals, as well as having shown the ability to operate within the requirements of such acts and regulations at the Touquoy mine and other previously completed surface mining projects in other first world jurisdictions. The following

provides a listing of some pertinent acts that may be applicable for the undertaking and/or were considered in the preparation of Project Description. Further reference will be made to specific legislation in the EIS/EARD.

Federal Legislation

- *Canada Wildlife Act* and Regulations
- *Canadian Environmental Assessment Act* and Regulations
- *Canadian Environmental Protection Act* and Regulations
- *Fisheries Act* and Regulations, including Metal Mining Effluent Regulations
- *Migratory Birds Convention Act* and Regulations
- *Transportation of Dangerous Goods Act* and Regulations
- *Species at Risk Act*
- *General Nuclear Safety and Control Act* and Regulations

Based upon the absence of any designations of local waterways, the requirement of permits for navigable waters is not anticipated to be required for the Project under the current *Navigation Protection Act*. The federal government recently proposed changes to these regulations and a Proposed Canadian Navigable Waters Act that would replace the *Navigation Protection Act* is under review and is expected to come into effect as early as June 2019. There is potential that, under this new regulation, waterways within the PA could require permitting. Further consultation with Transport Canada will be required as more information on the new act becomes available.

A contract explosives supplier will provide the blasting supplies and materials for the mine. Emulsion will be the primary blasting agent as the majority of holes will be wet. Explosives and all accessories will be supplied on an as needed basis from the contractor's base location off-site and delivered to the Proponents explosive storage facilities or directly to the blast holes typically using the contractor's equipment. All on and off-site permitting requirements will be the responsibility of the contractor through Natural Resources Canada for this Project. Nuclear density gauges will be used in the mill and as a consequence a license will be required under the *General Nuclear Safety and Control Act* and Regulations.

Provincial Legislation

- *Environment Act* and Regulations
- *Dangerous Goods Transportation Act* and Regulations
- *Endangered Species Act* and Regulations
- Labour Standards Code
- *Mineral Resources Act* and Regulations
- *Crown Lands Act* and Regulations
- *Occupational Health and Safety Act* and Regulations
- *Wildlife Act* and Regulations

The Proponent will follow provincial processes for watercourse and wetland permitting and standard mitigation methods (both Nova Scotia Environment (NSE) and DFO) will be adhered to for watercourse alteration, culvert installation and wetland alteration. Culvert installations will be completed in accordance with Nova Scotia Watercourse Alteration Standard (NSE 2015) and DFO Guidelines for the Design of Fish Passage for Culverts in Nova Scotia (DFO February 2015). Should internal mine site road re-alignment be required to ensure safe passage for truck traffic, the new road sections will be aligned at 90 degrees to the watercourse channel at the crossing location wherever practical.

During the design process, the Proponent will work to avoid wetland habitat where practical across the Project. Where avoidance is not feasible, wetland alteration permitting will be completed to support mine development.

NSE will require an IA to construct, operate, reclaim and abandon the proposed mine; and Water Approval, to withdraw surface or groundwater for mining operations, to alter waterbodies and/or wetlands within the mine development. All approvals are as described under the Activities Designation Regulations (*Nova Scotia Environment Act*, 2014) as follows:

Industrial Approval: An IA defines specific operational conditions and limitations, including dust, noise, surface water and groundwater discharge criteria and monitoring plans. An IA application would be made by the Proponent when EA approval is received. An application for an amendment to the Touquoy IA will also be made to allow for the acceptance and processing of FMS concentrate and disposal of the associated minor volumes of tailings in the Touquoy TMF and open pit.

Water Withdrawal Approval: This approval will be required prior to withdrawing groundwater or surface water to support mine development at a rate greater than 23,000L/day.

Wetlands Alteration Approval: This approval will be required prior to altering any wetlands in the Project Area. The approval application will include a functional assessment of the wetlands in question and a compensation plan.

Watercourse Alteration Approval: This approval will be required prior to altering any watercourse in the Project Area. The approval application will include a detailed assessment of the watercourses in question and a description of fish habitat and a fisheries off-setting plan.

1.3.3 Description of Potential Changes in Review of Various Federal Acts

The *Fisheries Act* protects the sustainability and productivity of recreational, commercial and Aboriginal fisheries. The distribution of fish in the PA watercourses is currently affected by the presence of dams controlled by Nova Scotia Power Inc (NSPI) at Seloam Lake and the downstream Anti-Dam Flowage. Neither of these dams have fish ladders and prevent movement within this system both upstream to Seloam Lake and also to the downstream environment below Anti- Dam Flowage. The proposed rerouting of Seloam Brook around the open pit will result in a direct impact to fish habitat and as a result it is expected to cause "serious harm to fish" as defined under the *Fisheries Act*. It is expected, therefore, to require DFO authorization and offsetting under the *Fisheries Act*. The Proponent will follow standard mitigation practices, in consultation with DFO, which could include fish capture and safe rescue from the area to be impacted, and compensation with the creation of new habitat to offset that which is disturbed. The potential for residual effects to fish, fish habitat, and aquatic resources from the Project more broadly will be based upon impacts of the Project to surface water quantity and quality. The Proponent will follow provincial processes for watercourse and wetland permitting and standard mitigation methods (both NSE and DFO) will be adhered to for watercourse alteration, culvert installation and wetland alteration. Provincial wetland alteration permitting may also trigger DFO "serious harm to fish" authorization if wetland habitat proposed for alteration is evaluated to be fish habitat and if impacts to those wetland(s) are considered significant.

The *Migratory Birds Convention Act* protects migratory bird species. The potential effects related to migratory birds that are associated with the construction and operation phases of the Project are:

- Direct loss of habitat for birds due to clearing and grubbing of the open pit, TMF, processing plant, administration area, stockpile(s), and waste rock storage areas;
- Destruction or displacement of birds in areas of excavation and stockpiling of mined materials;
- Increase in dust levels from heavy machinery operation and a general increase in vehicular activity, amongst other things, may affect vegetative growth and indirectly cause a decrease in prey populations;
- Bird injury and mortality from vehicle collisions and entrapment (i.e. in the open pit);
- Disturbance resulting from reduced habitat, anthropogenic noise, dust and vibrations;
- Attraction and disorientation resulting from night-lighting; and,
- Other effects.

More details on migratory birds can be found in this report.

The *Species at Risk Act* protects wildlife species from becoming extinct through prohibitions against killing, harming, harassing, capturing or taking species-at-risk, and against destroying their critical habitats. More information on the baseline condition and potential impact to species at risk can be found in this report.

1.4 Jurisdictions and Parties Consulted

The following jurisdictions and parties have been consulted during the preparation of this project description:

Government

The Government of Canada

- Environment and Climate Change Canada
- The Canadian Environmental Assessment Agency
- Fisheries and Oceans Canada
- Natural Resources Canada
- Transport Canada

The Province of Nova Scotia

- Premier's Office
- Environment (Environmental Assessment, Wetlands, Protected Areas)
- Natural Resources (Geoscience and Mines, Crown Lands, Wildlife, Forestry)
- Labour and Advanced Education (Health and Safety - Technical Services)
- Transportation and Infrastructure Renewal
- Office of Aboriginal Affairs
- Finance (Statistics)

Halifax Regional Municipality

- Planning and Development

First Nations

Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO)

Assembly of Nova Scotia Mi'kmaq Chiefs

Sipekne'katik First Nation

Millbrook First Nation

Native Council of Nova Scotia

1.5 Subject to Other Jurisdictions

The Project requires a Class 1 environmental assessment under Nova Scotia provincial legislation. The designated project is not subject to environmental assessment and/or regulatory requirement of any other jurisdiction other than the permits required from the government bodies listed above.

1.6 Other Environmental Studies

A review of CEAA and NS EA Projects database indicates that no regional environmental studies have been undertaken or are currently being conducted for the region or in the vicinity of the designated project within the spatial confines of the databases. The studies that have been completed for review closest to the proposed project site include: Touquoy mine - 35 km (2008); Cooks Brook Sand and Gravel Pit – 61 km (2013), ScoZinc Operations Southwest Mine Expansion - 65 km (2011), Goldboro LNG Plant – 70 km (2014), Loch Katrine Quarry Expansion- 52 km (2016), and Beaver Dam mine – 17 km (2017). Of these projects, only Beaver Dam mine include the Project in their regional context.

Beaver Dam Mine Project considers the Project in its cumulative effects assessment. No adverse cumulative effects were predicted.

No relevant regional studies of environmental effects from other projects are available.

1.7 Federal Funding and Lands

No federal funding will be sought or has been received for this Project.

Changes to the environment are not expected to occur, as a result of carrying out the Project, on federal lands, in a province other than the province in which the Project is proposed to be carried out, or outside of Canada. No federal lands will be used to undertake this project.

The Project is located within central Nova Scotia, a distance of over 100 km from the nearest provincial boundary - New Brunswick. The site is over 200 km from the United States (Maine border).

Kejimikujik National Park is the only National Park located on mainland Nova Scotia and is approximately 230km from the Project (as the crow flies). The closest national historic site is the Isgonish National Historic Site which is located approximately 77km from the Project. The two closest Mi'kmaq communities are the satellite communities to the Millbrook

First Nation of Beaver Lake and Sheet Harbour. These two Indian Reserves (Beaver Lake IR 17, Sheet Harbour IR 36) are both located approximately 33km from the Project.

Expected impacts from the site activities include localized noise and light, localized air quality impacts from vehicle use and roads and land disturbance and potential impact to wildlife and aquatic habitat that will be described elsewhere in this document. All of these valued components (VCs) have been evaluated for effects within the PA, Local Assessment Area (LAA) or Regional Assessment Area (RAA), depending on the nature of each VC. None of the VCs evaluated within the PA or LAA are expected to extend to the federal lands described above. Air quality and Mi'kmaq considerations are expected to be evaluated at the RAA level and overlap with federal lands (Beaver Lake and Sheet Harbour IRs) is possible.

2. Project Information

2.1 General Description

The Project will comprise the development, operation, closure and reclamation of a surface gold mine near Trafalgar, Nova Scotia. This will consist of the development of an open pit mine, milling facilities (e.g. primary crusher and concentrator), WRSF, TMF, mine haul roads and associated mine infrastructure (e.g. maintenance facilities, local supply systems, explosive storage, fuel storage and mine offices). Associated with development of the Project will be additional gold production output from the existing processing facility at the Touquoy mine which will process concentrate from the Project and include deposition of concentrate tails into the Touquoy TMF and the exhausted Touquoy pit.

The total infrastructure footprint of the Project is approximately 280 hectares (ha) as detailed below. The PA for the purpose of the environmental assessment is the infrastructure footprint plus an associated buffer. Upgrades to existing road infrastructure, such as minor widening, improving the road base, ditching and other potential improvements will also occur. Project development will include a 1.3 km diversion of Seloam Brook to allow construction of the open pit at the Project. Project components with respective areas are provided below:

i. Ore extraction area (open pit) (20 ha);
ii. Materials storage (waste rock, till/overburden, low grade ore) (65 ha);
iii. Crusher and concentrator facilities (10 ha);
iv. Site infrastructure (5 ha);
v. TMF (165 ha);
vi. Mine site haul roads (10 ha);
vii. Access roads (5 ha); and
viii. Seloam Brook Diversion (1.3 km).

At closure, all facilities will be removed, disturbed lands rehabilitated, and the property returned to otherwise functional use according to approved reclamation plans and accepted practices at the time of closure. Figure 2-1 shows the location of the Project in relation to surrounding features.

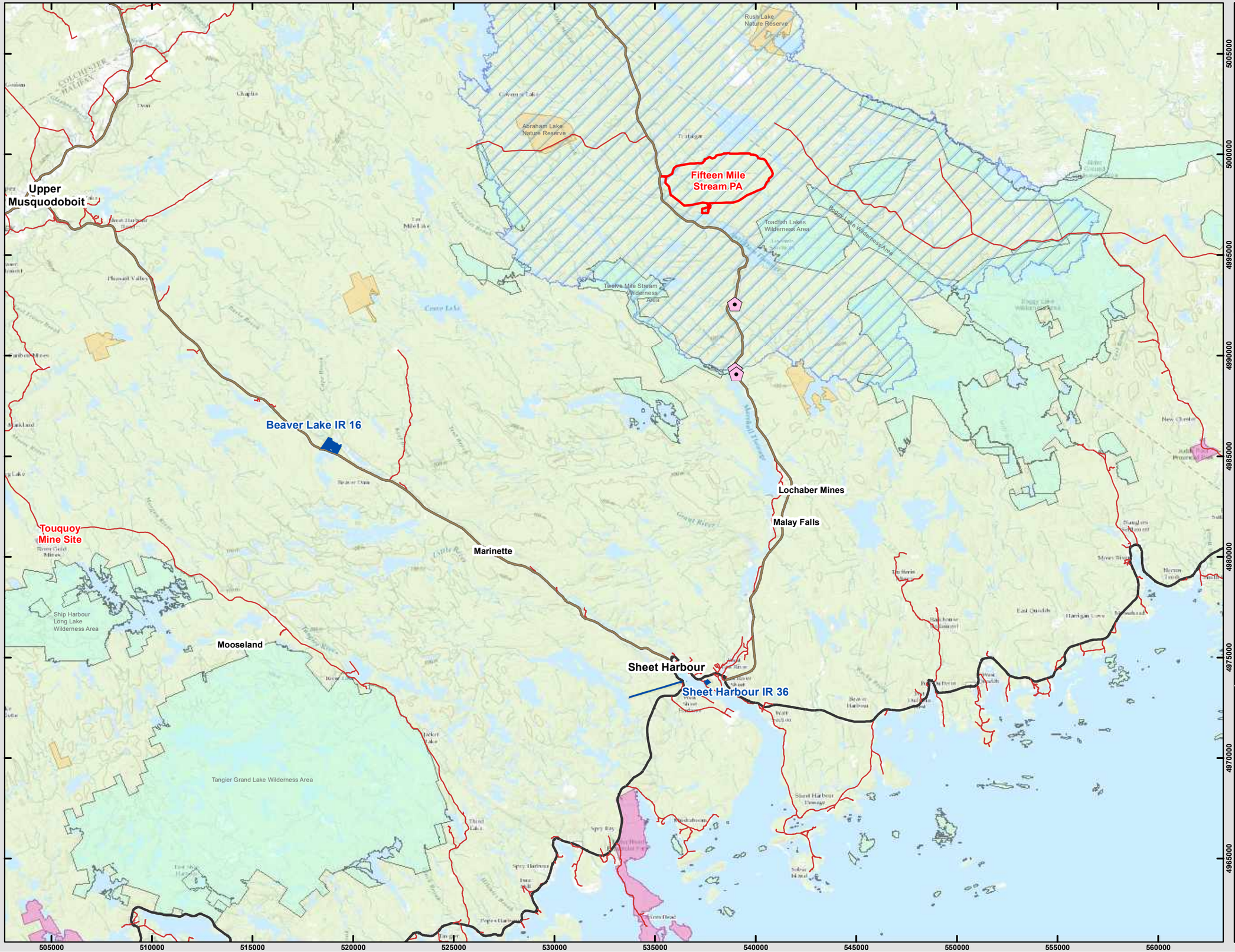

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FIGURE 2-1

Fifteen Mile Stream Gold Project: Mine Location and Surrounding Area

Trafalgar, NS
Halifax County

- Closest Residences
- Trunk / Arterial
- Collector
- Local
- Liscomb Game Sanctuary
- Indian Reserve
- Nature Reserve
- Wilderness Area
- Provincial Park
- Fifteen Mile Stream PA

Coordinate System: NAD 1983 CSRS UTM Zone 20N
Projection: Transverse Mercator
Datum: North American 1983 CSRS
Units: Meter

0 2.5 5 10 Km

1:175,000 Scale when printed @ 11" x 17"

Drawn By: LP

Date: 2018-05-16

McCallum Environmental Ltd.

2.2 Design Standards

The design of the Project is based on nationally and provincially accepted design standards and criteria. The Project will be constructed and operated in accordance with all applicable legislation for mining and construction projects in Nova Scotia. All construction activities will be completed under the supervision of qualified staff with the appropriate credentials for work in Nova Scotia.

Social and environmental concerns have been carefully considered in the planning and preliminary design of the Project. These are described herein as potential effects on valued components. To support this assessment, additional information sources pertinent to the review of mining projects were consulted.

2.3 Project Components and Activities

2.3.1 Geology

Nova Scotia can be divided into two distinct metallogenic terranes; the Avalon Terrane to the north and the Meguma Terrane to the south. These two terranes developed independently until they were juxtaposed along the Cobequid-Chedabucto Fault Zone during the mid-Devonian Acadian Orogeny.

The gold deposits in Nova Scotia are contained within the Meguma Supergroup which is divided into, the basal greywacke dominated Goldenville Group (5,600 m thick) and the overlying, finer grained, argillite dominated Halifax Group (4,400 m). These sediments were uplifted and deformed into a series of tightly folded subparallel northeast trending anticlines and synclines during the Acadian Orogeny. The Meguma Group rocks are metamorphosed to greenschist to amphibolite (staurolite) facies and were intruded by granites and minor mafic intrusions by circa 370 Ma (Smith and Kontak, 1996).

The FMS deposit is hosted in folded and faulted strata of the Moose River Formation within the axis and limbs of a north-dipping, overturned regional anticline. In this area, the anticline is commonly referred to as the FMS anticline; however, it may be equivalent to the Moose River–Beaver Dam anticline that hosts the Touquoy and Beaver Dam gold deposits to the southwest.

Parasitic folding and small-scale faulting in the FMS hinge zone is focused in the thick, comparatively incompetent and penetratively-foliated meta-mudstone units (e.g., Orient, Siegel), rather than in the more competent meta-sandstones. As a result, gold mineralization and bedding-parallel quartz veins are mainly confined to these meta-mudstone intervals. Metre-scale saddle-reef quartz veins also commonly occur within meta-mudstone units in the hinge zone, including a thick bedding-parallel quartz vein referred to as the 'Big Bull Vein' in the centre of the property. However, these veins are generally barren, with mineralization instead focused in meta-mudstone wall rock and in thinner bedding-parallel quartz veins.

There are three zones of mineralization at the Project, with Egerton-McLean being the main deposit. Gold mineralization the Egerton–McLean Zone is generally disseminated and hosted by folded and structurally-thickened meta-mudstone within the anticline hinge-zone. However, coarse visible gold (approximately 0.1–3 mm diameter, rarely larger) and anomalous gold values also commonly occur within buckled and folded bedding-parallel quartz veins enclosed within mineralized and folded meta-mudstone. Quartz veins are either massive and milky white, or smoky and laminated, the latter containing vein-parallel wall rock inclusions. Wall rock alteration associated with veins include disseminated carbonitization and, local sericitization. Coarse (visible) gold also rarely occurs directly in folded and/or faulted meta-

mudstone, typically within sulphides formed at the intersection between axial-planar cleavage and bedding or in shear zones. Sulphide minerals associated with gold mineralization in meta-mudstone and quartz veins include arsenopyrite, pyrite, and pyrrhotite. Rare trace amounts of galena and chalcopyrite also occur with gold and other sulphide minerals in bedding-parallel quartz veins.

Mineralization in the Hudson Zone is confined to the Egerton–McLean stratigraphy, i.e., within folded meta-mudstone units (Orient and Siegel mudstones) in the FMS anticline, and comprises disseminated gold in altered folded and faulted meta-mudstone and coarse gold in quartz veins. The lack of evidence of parasitic folding and thus structural thickening in the Hudson Zone may limit the overall thickness of the mineralized zone relative to the Egerton–McLean Zone.

The Plenty Zone, located approximately 400 m southeast of the Egerton-McLean area, consists of a succession of steeply-dipping (~75^{o}) overturned silty meta-mudstone and meta-sandstone strata, possibly representing the overturned south limb of the FMS anticline. Disseminated gold mineralization occurs in meta-sandstone, with anomalous coarse gold in bedding-parallel quartz veins.

Surficial geology consists of primarily stony till plain and drumlins, with smaller amounts of organic deposits. Till, stony and sandy matrix material is derived from local bedrock deposits. Drumlin facies are siltier due to erosion and incorporation of older till units by glaciers. The topography is flat to rolling with many surface boulders. Drumlins are oval or elongate hills veneered by stony till with underlying multiple till layers.

The surface topography can be characterized as unpopulated, gently rolling and forested with elevations between 110 and 175m above sea level. The main drainage pattern on the property is from the northeast to west-southwest via Seloam Brook, a major tributary to Fifteen Mile Stream that flows south into the Atlantic Ocean near Sheet Harbour. Seloam Brook originates from a small power dam located near the southwest corner of Seloam Lake and flows west-southwest across the property and adjacent to the Egerton-MacLean and Hudson Areas. Consequently, the topography in the Egerton-MacLean and Hudson Areas is low-lying and swampy (Photo below).

Photolog 1: Current conditions along Seloam Brook at Egerton-MacLean area.

2.3.2 Exploration and Production History

The first mining in the area is reported from 1874 with development along the Jackson Lead, approximately 300m south of the Egerton-MacLean area where much of the mining activity would later take place.

A number of different companies, including the Hall Bros., the Hall-Anderson Gold Mining Company, Egerton Syndicate, the Egerton Gold Mining Company and the New Egerton Gold Mining Company were active in the Old Egerton and MacLean Shaft area between 1874 and 1893. Small mines were worked from various shafts with the deepest recorded workings on the Egerton Lead and with two stamp mills operating, the Egerton Mill and smaller, Stanley Crusher.

Gold was discovered in the Hudson area in 1879 and some mining appears to have taken place between 1883 and 1887. Work finished in 1887 when the mill and hoist were destroyed by fire.

From 1893, the focus of mining shifted to an area approximately 200m southwest of the Old Egerton Mine area following the discovery by the New Egerton Gold Mining Company of what was to become the Mother Seigel mine. Mining was interrupted in 1897 or early 1898 by an underground collapse in the Mother Seigel Mine. A subsequent attempt to continue mining via an open-cut (the Mother Seigel Open-Cut) wasn't considered successful despite producing gold at a grade of the order of 5 gpt.

Further financing was obtained with the support of an English group and the Egerton Syndicate formed with development and mining between 1901 and 1903 via the Borlace Shaft, approximately 70m northwest of the Mother Seigel Open-Cut. Last recorded production from this area, including the Mother Seigel mine is from 1903.

Minor production is recorded in the Fraser McLeod area, approximately 100m southeast of the Egerton-MacLean area in 1910 and 1911. There does not appear to have been any other development or mining in the district between 1903 and 1938 after which time, the provincial government took over the leases in the area and undertook a rehabilitation project with the aim of training older or unemployed men and to further test the potential of the gold district. Between 1939 and 1941, the former MacLean shaft was rehabilitated and deepened to 67m with some mill testing of material using a portable 5-stamp mill.

There appears to have been very little work in the area from 1941 until 1980 with the exception of a program that sampled tailings from the Egerton Stamp Mill in 1973.

In 1980, St Joseph Explorations staked claims in the area, undertaking humus and soil geochemical surveys. The results included several strongly anomalous values to the south of the Egerton-MacLean area which were attributed to contamination by mine tailings.

In 1981, Pan East Resources completed an airborne VLF-EM and magnetic survey and later that year acquired 8 claims immediately to the west of the Hudson Zone, completing a soil humus geochemical survey in 1982 and follow-up geological mapping in 1983. They were sufficiently encouraged to acquire claims covering the Egerton-MacLean, Mother Seigel and Hudson workings.

From 1985 through 1988, Pan East and other companies working within the terms of agreements with Pan East and utilizing MPH Consulting to manage the programs, completed 134 diamond drill holes from surface for 26,612m, including 84 drill holes for 18,654m concentrated on the Egerton-MacLean and Hudson Zones and the area between. MPH reported in 1987 that drilling results indicated that a gold deposit of substantial grade and tonnage had been identified, however, while

several informal resource estimates were undertaken, MPH decided in 1988 that it was not possible to estimate resources with the current information, partly due to the erratic distribution of coarse gold within the samples, and recommended that the Egerton-MacLean Zone of gold mineralization be further explored from underground.

In the same period, several geophysical surveys were completed, including detailed ground magnetics that allowed the main anticlinal axis to be traced across the property, together with VLF-EM and dipole-dipole IP surveys. The Egerton-MacLean Zone was noted as displaying a 100nT magnetic high and strong, coincident VLF-EM response together with a strongly anomalous 40-50msec chargeability anomaly.

A soil orientation geochemical survey was completed in 1987 with the majority of samples anomalous in both gold and arsenic and with several anomalies identified that may have been derived from as-yet unidentified primary sources.

The detailed geophysical data together with geochemical data were used to define targets along the anticlinal axis and led to the discovery of the 149 East Zone in 1988. Broad intervals of distinctly anomalous gold mineralization which included occasional visible gold and frequent values in excess of 0.5 gpt were intersected in mudstones, associated with pyrrhotite aligned along axial planar cleavage.

In the NovaGold area, covering the Plenty Zone, three diamond drill programs were completed between May 1986 and Oct 1987 with 97 holes drilled for a total of 13,822m. In 1988, a decision was made to excavate an open pit on the Plenty Zone in order to take a bulk sample. Eight more diamond holes for 1594m were drilled in 1988 in support of this approach and two bulk samples then taken via an open-pit. The first sample comprised 4030 tonnes of hand-selected material and was processed at Westminer Canada's Gays River plant with estimated recovery of 93.7% and a head grade of 2.0 gpt. Results were considered disappointing and the second sample, comprising 1788 tonnes was processed at Murray Brook Resources Cochrane Hill plant in the same year. Results from this test are not available but were also described as disappointing.

There was very little exploration undertaken in the historic mining areas from 1989 until 2008 when Hudgtec Consulting completed a resource estimate for Acadian Mining, utilizing data from holes drilled by the various companies associated with Pan East Resources in the Egerton – MacLean Zone.

In 2009, Acadian Mining started re-examining some of the historic drill core and in 2010, Acadian took 2139 samples representing previously unsampled intervals from 22 of the historic drill holes. They demonstrated that much of the previously unsampled core was mineralized and that mineralization was more extensive than had been recognized. In 2011, Acadian drilled 29 diamond holes for 3,741 m. Twenty holes were drilled in the Egerton – MacLean area, ten holes in the Hudson area and the remaining hole in the 149 East Zone. This new information was utilized, together with the historic drill data by Snowden Consulting for a 2012 estimate of resources.

In 2014, Acadian Mining was acquired by Atlantic Gold Corporation. FSSI Consultants completed a resource update using the same database as that used by Snowden Consulting in the 2012 estimate. In 2016, Atlantic Gold commenced an exploration drilling program to determine mineralization extents at the FMS site. A total of 11 holes were drilled for 945 m. The program was continued in 2017 with a further 180 holes drilled for 23,044 m. In the same year Atlantic Gold commenced infill drilling to improve resource confidence and supplement drilling completed in the early 1980s. A total of 186 holes were drilled for 26,062 m. These additional holes were utilized, together with the historical drill data, by FSSI Consultants to complete a 2017 resource update.

Based on the results of the previous infill drilling program and subsequent resource up date, Atlantic Gold commenced another infill program with the objective of (i) identifying additional gold resources immediately peripheral to those resources previously defined at the Project, (ii) upgrading previously defined inferred resources to measured and indicated categories - particularly at the Hudson and Plenty zones, and (iii) to identify additional new resources within the 350m gap between the Plenty and Egerton MacLean zones. This program was completed by the end of February 2018, and a total of 238 holes were drilled totaling 26,846 metres.

Department of Natural Resources (Bates 1987) records indicate that 21,292 ounces of gold were produced in the Fifteen Mile Stream Gold District between 1878 and 1941. A bulk sample taken by Novacan and NovaGold Resources from the Plenty area in 1988 constitutes the only modern mining in the area. Some 4300 tonnes of quartz vein material was selectively mined via an open cut and processed at Westminer Canada's facility in Gays River, Nova Scotia for a reported grade of 2.0 gpt gold. A second sample comprising 1,788 tonnes of selectively mined material was processed at Murray Brook Resources processing plant at Cochrane Hill, Nova Scotia. The recovered gold content of the sample is not recorded but was described as disappointing.

2.3.3 Physical Works

The main elements of the Project, as described in NI 43-101 Technical Report on Moose River Consolidated Phase 1 and Phase 2 Expansion, are as follows:

- An open-pit mine (Egerton-McLean deposit) from which an estimated 32.4 Mt of rock will be excavated, comprising 10.8 Mt of ore at 1.24 g/t Au, 20.3 Mt of waste rock and 1.3 Mt of overburden. The pit will be 625 m long and 425 m wide and will have a maximum depth of 150 m based on the current mining scenario;
- Twelve month pre-production period, followed by five and a half years of production at an average extraction rate of 16,430 tpd, including ore production of 5,579 tpd;
- Construction of a 1.3 km diversion channel to divert Seloam Brook to the north of the planned open pit. This will divert the majority of the surface water away from operations. The surface and groundwater that finds its way into the open pit will be collected using sumps and pumping stations and will be directed to the TMF. Runoff from the waste rock piles will be directed to seepage collection ditches and/or ponds. If unsuitable for discharge to the receiving environment it will be directed to the TMF to supplement process water requirements;
- Crushing and Concentrator facilities to process 2.0 Mt/yr of ore producing a gold concentrate for transport to the Touquoy processing facility;
- Transportation of gold concentrate via existing highways and Beaver Dam haul road of up to 300 tpd using a C Train truck configuration;
- Separate Run of Mine (ROM) stockpile and an LGO, for a total capacity of 0.1Mt and 1.1 Mt respectively;
- A WSRP, with a capacity of 16.2Mt of waste rock. Additional waste rock will be used to build the TMF;
- Overburden piles which will contain 1.2 Mt of material;
- Top soil and organics storage piles that will contain 0.1 Mt of material;
- Tailings storage in an above ground management facility (TMF) with a design storage capacity of 8.3 Mm^3 of tailings solids;

- Discharge works associated with the removal of surplus water from the TMF. Initial water balance calculations indicate the TMF will operate under surplus water conditions and require a discharge. Further work will be undertaken to determine the need for and design of any treatment works to ensure such discharge meets environmental discharge requirements;
- Administrative, mine employee, and maintenance buildings and a small volume petroleum product storage facility;
- Additional minor tailings storage initially in the Touquoy TMF and then in the mined out open pit as a result of final processing of gold concentrate with a water cover on reclamation; and
- On-site borrow and quarry development to support infrastructure requirements for aggregate and till/clay materials. Some or much of this material may be generated from waste rock and till recovered from the pit and vicinity, however, further quarrying/borrowing may be required in the event the pit material is insufficient in quantity or quality. An aggregate/borrow investigation study will be conducted to assess these requirements during the IA application phase of the Project.

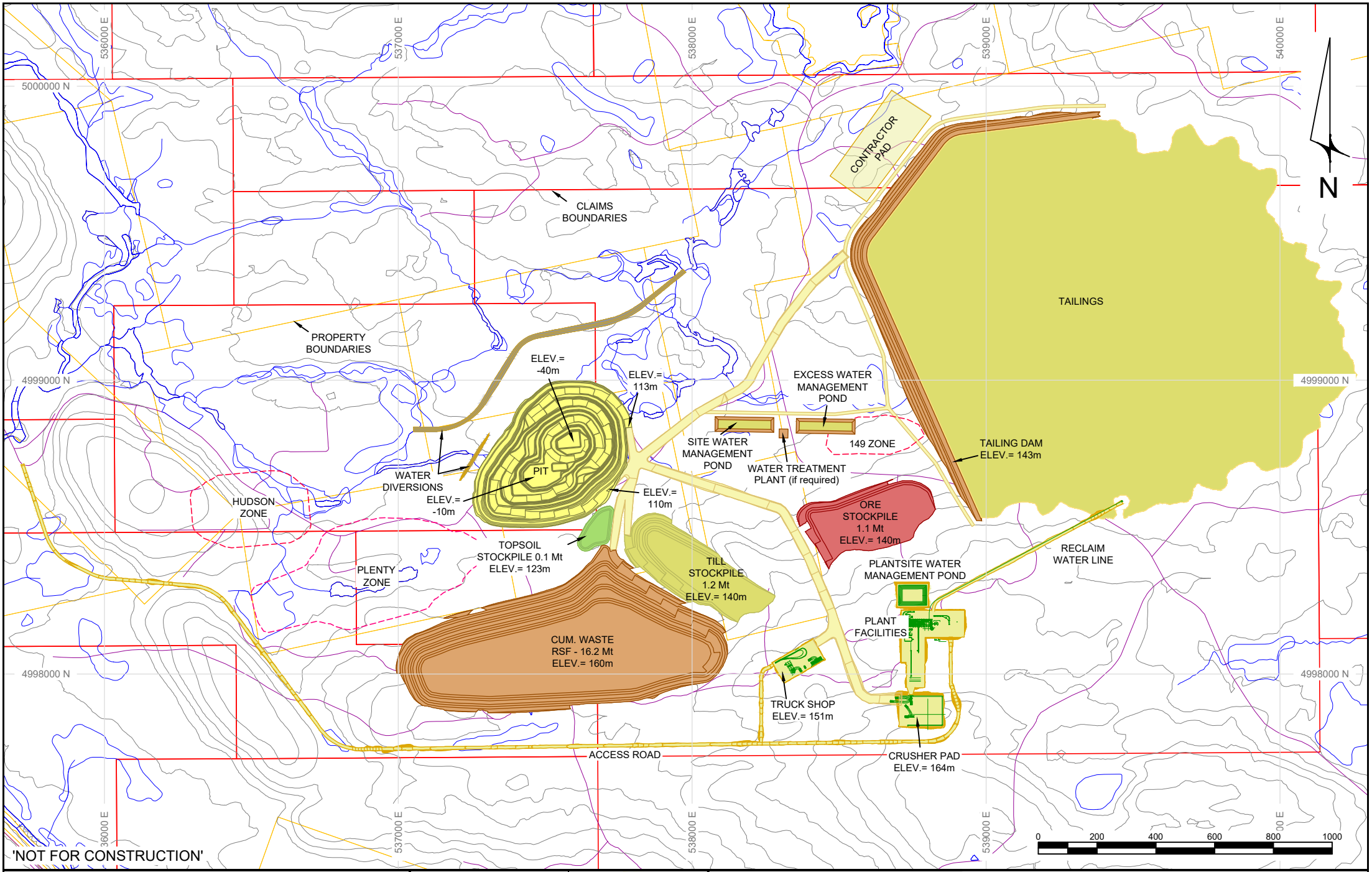
2.3.4 Mine Development and Operations

The surface mining operations are planned to be typical of similar small-scale operations in generally flat terrain. The mine operations at the Project are planned to commence in year 2021 with gold concentrate being transported to the Touquoy processing facility for final processing. The footprint of the surface mine development in relation to the environment is shown on Figure 2-2.

2.3.4.1 Development

A twelve-month pre-production period is anticipated to supply material for construction including internal haul roads and TMF starter dams. The planned mine mobile equipment fleet will be procured and utilized for pre-production operations.

The open pit footprint, mine infrastructure and waste rock storage areas will be cleared and grubbed in advance of operations with the timing informed by Environment and Climate Change Canada (ECCC) directives relative to migratory bird nesting. Topsoil will be salvaged to a nearby stockpile for later use in reclamation activities. Glacial till overburden within the open pit footprint will be salvaged to a till stockpile storage area for later use to support reclamation activities.



'NOT FOR CONSTRUCTION'

ATLANTIC GOLD CORP. - PREFEASIBILITY STUDY

END OF PERIOD - YEAR 5 - FIFTEEN MILE STREAM GOLD

DATE:	2018/05/03	APPROVED BY:	MS
DRAWN BY:	DH	FILE:	FMS Y5 (180503)
		PROJECT:	AGC_FMS_2017

Moose Mountain Technical Services

ATLANTICGOLD

LEGEND

- PROPOSED PITS
- NEW WASTE RSF
- PREVIOUS WASTE RSF
- TAILINGS INFRASTRUCTURE
- TAILINGS
- WATER DIVERSION
- HAUL ROAD
- MINE FACILITES PAD
- ORE STOCKPILES
- TOPSOIL STOCKPILE
- TILL STOCKPILE
- EXISTING ROADS
- SITE INFRASTRUCTURE
- WATERCOURSE
- TOPOGRAPHY
- HUDSON ZONE
- 149 ZONE
- PROPERTY BOUNDARY
- MINERAL CLAIMS

CONTOURS AT 5m INTERVALS

2.3.4.2 Operations

An open-pit mine will be developed, from which 32.4 Mt of material will be excavated, comprising 10.8 Mt of ore at 1.24 g/t Au, 20.3 Mt of waste rock and 1.3 Mt of overburden. The pit will be 625 m long and 425 m wide and will have a maximum depth of 150 m based on the current mining scenario. The pit will be developed as a series of pushbacks in an effort to minimize upfront stripping and to maximize ore extraction. Access to active mine areas will be via a single ramp system designed to allow dual lane traffic flow. Pit walls will be developed based on independent geotechnical engineering recommendations to ensure stability and safety.

In the active mining area, in-situ rock is drilled and blasted on 5 m to 10 m bench heights. Diesel powered down-the-hole hammer drills will be used for production drilling and will also be used for horizontal highwall depressurization drilling on the ultimate pit walls. Blasting will typically occur two to three times per week.

Additional grade control drilling is carried out to better delineate the ore and waste rock in advance of mining. Ore and waste rock will be defined in the blasted rock material with a grade control system based on dedicated reverse circulation (RC) grade control drilling and sampling, and a fleet management system will keep track of each load.

A contract explosives supplier will provide the blasting supplies and materials for the mine. Emulsion will be the primary blasting agent as the majority of holes will be wet. Explosives and all accessories will be supplied on an as needed basis from the contractor's base location off-site and delivered to the Proponents explosive storage facilities or directly to the blast holes typically using the contractor's equipment. All on and off-site permitting requirements will be the responsibility of the contractor through Natural Resources Canada for this Project.

Diesel powered hydraulic excavators will load both ore and waste rock into haul trucks. These loading units will also function to re-handle low grade ore material from stockpile and load overburden and topsoil for transport to stockpile.

All ore will be loaded into off-highway rigid frame haul trucks and hauled to the ROM pad and primary crusher. All waste rock will be loaded into off-highway rigid frame haul trucks and hauled to the WRSF. If dust is generated from hauling in the warmer months of the year, it will be controlled by applying dust suppression measures that may include water and/or chemical dust suppressants to the haul roads utilizing specialized water trucks.

At the ROM pad, haul trucks will dump ore material directly into the primary crusher or place it in an active stockpile on the pad, to be re-handled as crusher feed later on. Crusher loading of the stockpiled ore will be accomplished with a diesel-powered wheeled loader.

At the WRSF, the haul trucks will dump waste rock in lifts.

A small support fleet will be utilized for mine operations support services. These services will include:

- Haul road maintenance
- Pit floor and ramp maintenance
- Ditching
- Reclamation
- Open pit dewatering
- Open pit lighting
- Mine safety and rescue

- Transportation of personnel and operating supplies
- Snow removal

A fleet of diesel powered mobile equipment is specified to handle the above pit support activities and include a hydraulic excavator, wheeled loader, track dozers and motor grader.

Maintenance activities on the mine mobile fleet will be performed in a mine maintenance facility located near the primary crusher, as well as in the field. Fuel, lube and field maintenance will be performed with a mobile maintenance fleet of equipment by qualified and trained staff.

Diesel fuel and lubricant storage will be located near the primary crusher, and a dedicated fuel and lube truck will deliver these materials to the mine and maintenance mobile fleet. Diesel will be supplied from local sources by road tankers and stored in approved, above ground double walled tanks. From here, fuel will be distributed to equipment consumers by means of a dedicated fuel truck or cardlock system located at the storage facility.

The fleet of road trucks required to transport the gold concentrate from the Project to the process plant at the Touquoy mine will be refueled at the Project site as needed using the cardlock system noted above.

The workforce at the Project will be approximately 200 persons working two shifts per day or approximately 50 persons per shift (personnel will work four days on and four days off), similar to that at the operating Touquoy mine.

In addition, the trucking operation hauling concentrate from the Project to the Touquoy mine will create approximately ten jobs which will be contract positions to drive the highway trucks and conduct vehicle maintenance.

2.3.4.3 Waste Rock Management

All waste rock removed from the open pit will be placed in the WRSF, shown on Figure 2-2.

The WRSF will range in height from 15 m to 40 m above the existing ground surface and will contain waste rock excavated from the pit. This height generally conforms with local topographic variations. A haul ramp along the north-eastern limit of the WRSF will provide access to the lift elevations. Total capacity of the WRSF will be 16.2 Mt. A separate stockpile will be constructed to the northeast to contain unconsolidated overburden. This material will be utilized for reclamation of the WRSF.

The WRSF will typically be built bottom-up in lifts, spread out and compacted by track type dozers. Haul trucks will deliver the waste rock to the WRSF, then dump out either as free dump piles, or off the edge of an established dump lift over a safety berm. Once these smaller lifts reach 10 m in height, the face of the lift will be re-sloped to 2:1 for use in reclamation activities. Re-sloping will be completed by track type dozers and small hydraulic excavators.

The waste rock will be placed according to standard practices and will ensure compliance with provincial regulations with respect to slopes, potentially acid generating material (if any), and surface water run-off.

Runoff from the WRSF will be collected in seepage ditches and/or ponds prior to release to the environment. If unsuitable for release to the environment such seepage water will be directed to the TMF to supplement processing water requirements.

2.3.4.4 Low Grade Ore Stockpile

To ensure continuity of mill feed and allow initial processing of higher grade material, an LGO will be developed to the north of the plant (Figure 2-1). The northern edge of the LGO will have a maximum height of 25 m while the southern edge will be tied into natural topography. Total capacity of the LGO will be 1.1 Mt.

As with the WRSF, the LGO will be built bottom-up in lifts, spread out and compacted by track type dozers. Haul trucks will deliver the low-grade ore to the LGO, then dump out either as free dump piles, or off the edge of an established dump lift over a safety berm. Unlike the WRSF, this stockpile is planned to be progressively reclaimed for milling over the mine life. The remaining footprint will be reclaimed upon closure.

The LGO will be placed according to standard practices and will ensure compliance with provincial regulations with respect to slopes, potentially acid generating material (if any), and surface water run-off.

Runoff from the LGO will be collected in seepage ditches and/or ponds prior to release to the environment. If unsuitable for release to the environment such seepage water will be directed to the TMF to supplement processing water requirements.

2.3.4.5 Other Stockpiles

Prior to construction, areas planned for development will be grubbed and topsoil removed and stockpiled for use in reclamation upon closure. In general, topsoil stockpiles will be located adjacent to areas stripped to allow stockpile sizes to be minimized thus minimizing compaction and improving the quality of material for reclamation.

2.3.5 Milling Operations

The mill is located south-east of the proposed pit area and southwest of the TMF. The approach by road to the plant will be from the west off of Highway 374.

The main plant building houses the grinding, gravity recovery, flotation, concentrate dewatering and reagent sections. The concentrate storage will be located in a separate building. The three-stage crushing circuit is based on modular mobile crushing equipment and will be located to the south of the main plant building. The fine ore stockpile is covered for snow protection and dust control.

Process water will be reclaimed from the TMF for re-use in the milling operations. Initial start-up water and ongoing make-up water is expected to be sourced from nearby Seloam Lake or Anti-Dam Flowage through application for a surface water withdrawal approval (NSE).

Figure 2-2 shows the plant location in relation to the overall Project site. Figure 2-3 outlines the process flow at the Project.

2.3.5.1 Crushing

Run-of-mine (ROM) ore from the pit will be hauled to the primary crusher using off-highway haul trucks with a nominal capacity of 64 t. The haul trucks direct tip ore into the ROM bin while a front-end loader (FEL) will supplement the direct tip feed from the ROM stockpiles to maintain a continuous crushing operation. The ROM pad is sized at approximately 105 x 150 m to provide storage of ROM blend piles. Mine operations retrieve any oversize and either use a mobile rock breaker to reduce the lump size or return oversize to the pit.

The crushing plant package consists of an outdoor three stage crushing circuit. The crushing plant produces a fine ore sized to a P80 of 10 mm. The throughput of the crushing plant package is 5,479 t/d or 326 t/h at a crushing plant availability of 70%.

The vibrating grizzly feeder feeds the primary jaw crusher at the front of the mobile crushing circuit. The oversize from the vibrating grizzly enters the single toggle jaw crusher. A tramp magnet removes steel trash from the primary crushed ore as it transfers by conveyor to the secondary crushing module. Both the secondary and tertiary crushers are similarly sized cone crushers that have closed size settings of 31 and 13 mm respectively. The fine ore product of P80 of 10 mm is conveyed by a stockpile feed conveyor to a nominal 12,000 t fine ore stockpile (FOS).

The FOS is protected with a cover to reduce moisture and dust and subsequent freezing of the fine ore. The FOS has a live volume of approximately 3,000 t or 12 hours residence time.

2.3.5.2 Grinding

Crushed ore from the FOS will be reclaimed and fed into the ball mill for grinding. A single stage ball mill grinding circuit is proposed for the primary grinding circuit. The primary grinding circuit will consist of a Ball Mill in a closed circuit with primary classifying cyclones. The circuit will be equipped with two gravity concentrators to recover gravity recoverable gold (GRG). Approximately 50% of the primary cyclone U/F will be fed to two gravity concentrators simultaneously. The proposed circulation load for the closed circuit is 300%.

The primary grinding circuit will grind the crushed product to P80 of 240 µm. The major equipment in the primary grinding circuit will include:

- One 4.3 m diameter by 7.0 m ball mill driven by one 1,900 kW motor
- One primary Hydrocyclone cluster, consisting four 650mm diameter cyclones (three operating, one standby)
- One secondary Hydrocyclone cluster, consisting five 375mm diameter cyclones (four operating, one standby)

As required, steel balls will be added into the ball mill to maintain grinding efficiency.

The primary cyclone overflow will be pumped to the Secondary Cyclones where the fines (below 150µm) will be separated from the coarse (above 150µm) to be fed to conventional flotation and Hydroflotation.

2.3.5.3 Gravity Concentration

A portion of the ball mill circulating load will be split and fed into two 50% duty parallel gravity concentrator trains. The gold concentrate solution recovered will be stored in a mobile hopper.

The equipment is arranged to provide a gravity cascade under the cyclones. The gravity circuit splitter box provides the feed slurry to two gravity concentrator trains. Each train will consist of a scalping screen, gravity concentrator and gravity area electric chain hoist. The two gravity concentrators in parallel are sized for 188 t/h solids feed rate.

The oversize from the scalping screen will gravitate to the ball mill feed chute, while the undersize will feed the concentrator. The tailings from the concentrators will be transferred back to the ball mill circuit and the gold-containing pregnant solution will be stored in a hopper. Two hoppers will be located on each train. Once a hopper is full, the hopper will be changed out via overhead crane and put onto a flatbed truck for transportation to the Touquoy mine for final processing.

The gravity concentrate tailings will be transferred back to the cyclone feed hopper in the grinding circuit.

2.3.5.4 Split Circuit Flotation

The slurry from the secondary cyclone overflow will gravity flow to the conventional flotation circuit while the underflow will gravity flow to the Hydroflotation circuit. The Flotation Circuit consists of:

- 6 x 30 m^3 Rougher/Scavenger Flotation Tank Cells
- 2.8m diameter Hydroflotation Cell
- 125 kW High Intensity Grinding (HIG) mill as a Hydrofloat concentrate regrind mill

Rougher/Scavenger Flotation

The secondary cyclone overflow (fines slurry) gravity flows into the 30 m^3 tank flotation cell. In the rougher flotation cells, the PAX collector and MIBC frother are added to enhance the flotation performance.

Concentrates from six conventional 30m^3 tank cells will be pumped to a cleaner circuit where re-ground Hydrofloat concentrates will join prior to the cleaning stage. The rougher/scavenger tailings will be pumped to TMF.

Hydroflotation

The secondary cyclone underflow flows to the Hydrofloat feed inlet. The PAX collector and W34 frother are added to enhance the flotation performance.

Hydrofloat concentrate is thickened in 10m diameter thickener to optimize the grinding prior to feeding to regrind circuit. Once reground, the Hydrofloat concentrate joins with the rougher/scavenger conventional cell concentrates to be fed to a cleaner circuit. The Hydrofloat tailings will be pumped to TMF.

2.3.5.5 Rougher and Cleaner Flotation

Concentrates from the Hydrofloat will flow to the Hydrofloat concentrate thickener where the concentrate will be thickened to 50% solids to optimize the re-grind. Hydrofloat concentrate will be reground down to P80 of 80 µm with 125 kW HIG mill.

There will be one stage cleaner flotation with 6 x 5m^3 tank cells. The tailings from the cleaner flotation circuit is pumped to the rougher/scavenger fines conventional flotation cells to minimize the Au loss.

2.3.5.6 Concentrate Thickening, Filtration and Storage

The concentrate thickening, filtration, storage and loadout facilities for Au consist of:

- 19m Concentrate Thickener
- 23 plate 1,500mm x 1,500mm vertical plate frame Concentrate Filter Press
- Concentrate Stockpile

Concentrate Thickener

The final cleaner flotation concentrate will be thickened to approximately 60% solids in a 19m diameter high-rate thickener. The concentrate will be mixed with diluted flocculant solution at the thickener feed well. The flocculated solids settle towards the thickener discharge cone and are pumped away while the supernatant water overflows an internal weir into the overflow launder. The overflow water gravity flows to the Concentrate Thickener Overflow Tank where the water is pumped to the Process Water Tank and used as process water for the plant. The thickened solids exit the discharge cone at a nominal target solids underflow density and pumped to the Concentrate Surge Tank.

Concentrate Filtration & Storage

The concentrate thickener underflow with approximately 60% solids will be pumped to concentrate surge tank where the concentrate will be pumped to a plate and frame pressure filter for dewatering on a batch basis. The filtrate from the pressure filter will flow by gravity back to the Concentrate Thickener while the final filtered concentrate will be discharged for stockpiling in the concentrate loadout area. The final moisture content is expected to be 12% capacity if the concentrate loadout provides for 3.5 days of production.

2.3.5.7 Tailings Disposal and Reclaim Water

The combined flotation tailings slurry (both from the rougher/scavenger flotation tank cells and the hydrofloat cell), will flow by gravity pipeline to the TMF for storage and recycling. The supernatant from the tailings pond will be reclaimed by the Reclaim Water Pumps and recirculated via pumping to the Process Water Tank and re-used as process water.

2.3.5.8 Reagents

The reagents will be prepared and stored in a separate, self-contained area within the process plant and delivered by individual metering pumps or centrifugal pumps to the required addition points. All reagents will be prepared using raw water.

Potassium Amyl Xanthate (Collector)

Preparation of the PAX will require:

- A bulk handling system;
- Mixing and holding tanks; and
- Metering pumps.

Potassium Amyl Xanthate (PAX) is used as a collector in the flotation circuit and is supplied in 25 kg bags in the form of pellets. The pellets are mixed with raw water to produce 15% solution strength. The PAX mixing system is a skid package provided by the vendor. The PAX solution is distributed to the flotation circuit by three reagent metering pumps.

Methyl Isobutyl Carbinol (Frother)

Methyl Isobutyl Carbinol (MIBC) is used as a frother in the fines rougher/scavenger and cleaner flotation circuit and is supplied in bulk tote containers in liquid form. MIBC is pumped directly from the tote by two reagent metering pumps and is used as 100% solution strength.

W34 (Frother)

W34 is used as a frother in the flotation circuit and is supplied in bulk tote containers in liquid form. W34 is pumped directly from the tote by two reagent metering pumps (one duty and one standby) and is used as 100% solution strength.

Flocculant

The flocculant will be supplied in 25 kg bulk bags as a dry powder. The flocculant is mixed with raw water and diluted to 0.50% mix concentration. The flocculant mixing system is a skid package provided by the vendor. The mixed solution is supplied to the thickeners by two flocculant metering pumps.

As a result of the concentrate being transported and processed at the Touquoy mine, no cyanide will be used at the Project.

2.3.5.9 Air Services

Blower Air

The flotation blowers will supply air to the rougher/scavenger tank cells, hydroflotation and cleaner tank cells. The installed blowers are multiple-stage, centrifugal type blowers and will be used with a "blow-off" arrangement to adapt to fluctuations in flotation air demand.

Plant & Instrument Air

Rotary screw air compressors will provide high pressure compressed air operating in lead-lag mode, to meet the demand for plant and instrument air requirements.

Pressure filter will use the wet high-pressure air produced from the rotary screw air compressors. There will be a dedicated air receiver to store necessary compressed air required for pressure filter operation.

Wet Plant air will be stored in the plant air receivers to account for variations in demand prior to being distributed throughout the plant. Instrument air will be dried in an Instrument Air Dryer before distributed throughout the plant.

2.3.5.10 Water Services

Raw Water

Raw water will be pumped from the Seloam Lake or Anti-Dam Flowage to the Raw and Fire Water Tank.

Raw water in the tank is used to supply the following services:

- Primary crushing circuit dust suppression water;
- Reagent preparation water;
- Slurry pumps gland seal water;
- Cooling water systems;
- Make-up water for the process water system; and
- Fire water.

Raw water is supplied to the plant by two Raw Water Pumps in a duty standby configuration.

Potable Water

Potable water will be sourced from on-site drilled wells, or the confirmed raw water source (Seloam Lake or Anti-Dam Flowage) and treated as necessary.

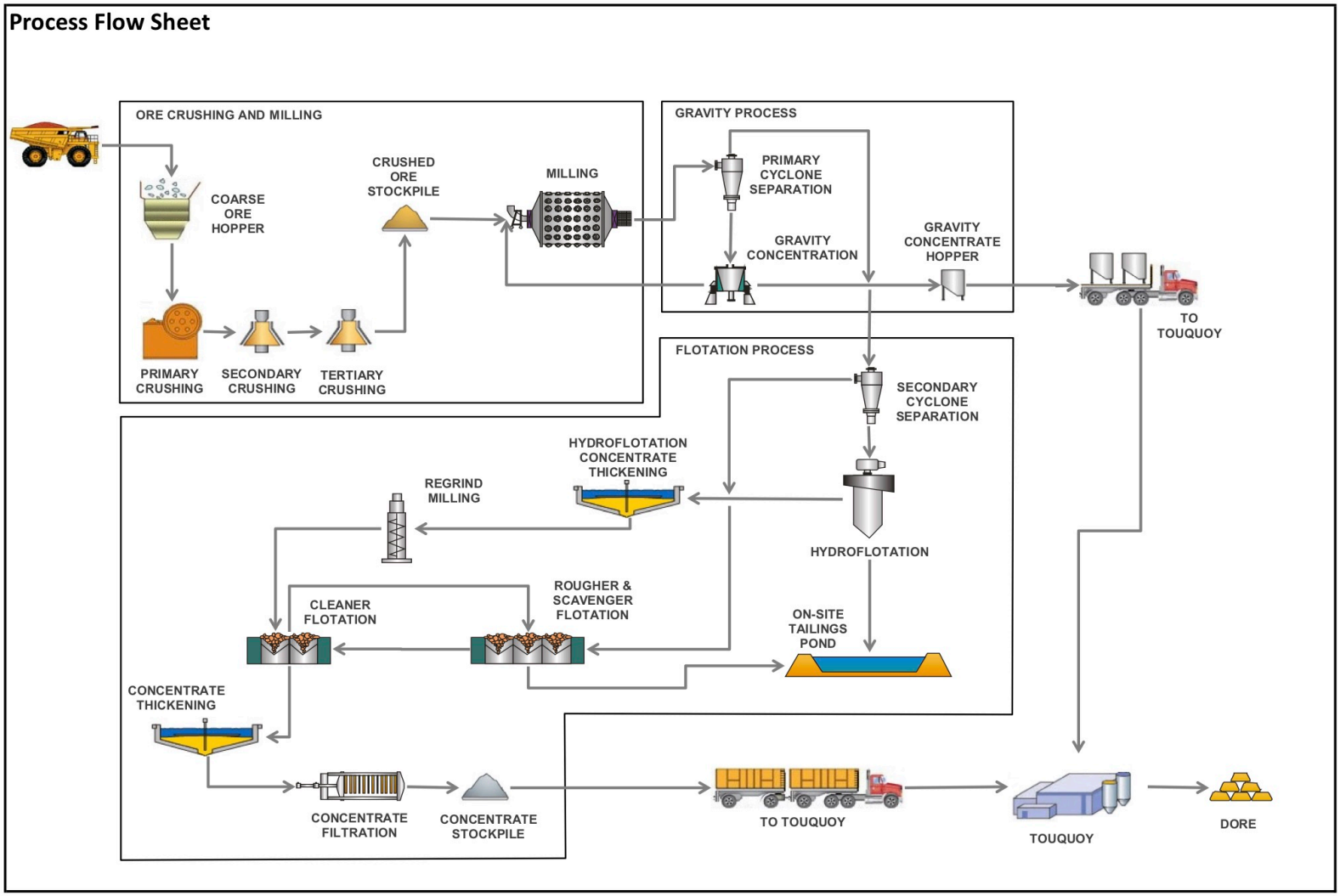
Gland Water

Gland water is supplied from the raw water and distributed to the plant by two Gland Seal Water Pumps in a duty standby configuration.

Process Water

Process water is comprised mainly of concentrate thickener overflow water and tailings pond reclaim water. Process water is stored in the process water storage tank and distributed by the two Process Water Pumps, in a duty – standby configuration.

Figure 2-3: Fifteen Mile Stream Gold Process Flow Diagram



2.3.6 Concentrate Loading and Haulage

The gold concentrate produced will consist of a gravity concentrate and a float concentrate. The gravity concentrate represents a small portion of the gold concentrate produced and will be stored and transported in specialized hoppers. The hoppers will be transported on the back of a flatbed once a hopper has been filled [in the order of one hopper every two days]. The majority of concentrate to be hauled will be float concentrate. Up to 105,000 t will be hauled on an annual basis in purpose built side dump haul trucks. The trucks will be loaded inside the concentrate loadout area by front-end loader. The concentrate will be covered to prevent any losses and the trucks weighed prior to leaving to ensure appropriate loading.

The concentrate will then be transported to the Touquoy process plant along a combination of existing public roads and private road. The initial route proposed is along Highway 374 south to Highway 7, east along Highway 7 through Sheet Harbour to Mooseland Road at Tangier, and then north-west along Mooseland Road to the Touquoy mine. Once the Beaver Dam mine comes online (proposed in 2022), FMS haul trucks are expected to travel along Highway 374 south to Highway 7, east along Highway 7 through Sheet Harbour to Highway 224 and then north-west along Highway 224 connecting with the upgraded Beaver Dam Haul Road to Mooseland Road.

The initial route uses only public roads, with the 58 km section of public Highway (Highway 374 - 31 km and Highway 7 - 27 km) which forms a large part of the link being dual lane sealed roads built to support heavy truck traffic. The Mooseland Road (35 km) is a provincially owned road that has sealed and unsealed sections. The second phase of hauling will also use mainly public Highways (Highway 374 – 31 km, Highway 7 – 4 km, Highway 224 – 17 km). The Beaver Dam Haul Road (Moose River Cross Rd. - existing logging roads - 12.7 km) is a private logging road that will be upgraded as a result of the development of the Beaver Dam project. This upgrading will involve widening to two lanes and improving alignment to provide safer curves and gradients and, where necessary, to achieve an operational design speed of approximately 70 km/h.

The upgrade of the Beaver Dam Haul Road between Highway 224 and the Touquoy mine will be completed separately from the Project, as part of the Beaver Dam Mine Project. The Project is not dependent on this upgrade as the initial haul route exists and as such, this project will not be considering this upgrade as a project activity.

Truck payloads will be consistent with the limits applied by the Nova Scotia Highways department to comply with the proposed route segments. Trucks with trailers in a C Train configuration will be used to haul concentrate. The 8 axle, 58,500 kg C Train is a standard across Canada. Based on the requirement to haul 300 t/d and a maximum payload of 38 t, 8-11 return trips per day will be required. Assuming a single 12 hour shift, this would result in approximately one truck per hour, however, the exact number will depend on the final hauling schedule. Reduction in truck loads could be realized through an adjustment based on payload. This would also allow for additional GHG reduction through a reduction in total number of trucks required to transport concentrate. Approximately four trucks would be required necessitating the hiring of eight drivers plus supporting personnel for truck maintenance and road maintenance. During construction and pre-production there will be no concentrate hauled.

The Spring Weight Restriction period in Halifax County, Nova Scotia is legislated from March 23 to May 18 of each year but is typically adjusted (shortened) due to yearly conditions and can be expected to be in place for approximately one month. Highway 374, 7 and 224 in the area of interest are exempt from the Spring Weight Restrictions and the Beaver Dam Haul Road (including Moose River Cross Rd. between Highway 224 and Mooseland Road) is private and is therefore not subject to provincial restrictions. Mooseland Road is currently subject to spring weight restrictions, however, as the majority of the haul route is not subject to weight restrictions an exemption will be applied for the Mooseland Road section

of the initial haul route, approximately 35 km. Alternatively, the Mooseland Road could be upgraded to allow a gross vehicle operating weight of 58,500 all year round.

The majority of dwellings located along the proposed haul routes are located in the community of Sheet Harbour with a lower density of dwellings located between Sheet Harbour (Highway 7), Mooseland (Mooseland Road), Tangier, and Marinette (Highway 224). These dwellings are currently exposed to highway traffic which includes logging trucks and aggregate haulers. For the remainder of the haul route, there are a small number of houses that will be affected by these vehicles.

The proposed truck traffic is envisioned to have a minor impact on the existing traffic on the segment of Highway 374, Highway 7, Mooseland Road, and Highway 224. Records of traffic volumes for nine years between 2007 and 2016 are detailed in Table 2-1.

Table 2-1: Average Traffic Volumes 2007 to 2016

Highway #	Section Length (km)	Section Description	Average Daily Traffic #	Average Annual Daily Traffic #	Comments
374	20.6	Halifax-Guysborough County Line to 15 Mile Stream Bridge	196	191	
374	6.8	15 Mile Stream Bridge to Lewiston Road (Lochaber Mines)	220	218	
374	11.0	Lewiston Road (Lochaber Mines) to Tk 7	360	352	
7	3.6	Rte 374 to Rte 224	2623	2552	Sheet Harbour
224	8.8	Tk 7 to Marinette-Sheet Harbour Line	514	494	
224	8.3	Marinette-Sheet Harbour Line to Beaver Dam Road	357	343	

Nova Scotia NSTIR Open Data: https://data.novascotia.ca/Roads-Driving-and-Transport/Traffic-Volumes-Provincial-Highway-System/8524-ec3n (accessed February 2018)

2.3.7 Tailings Management – FMS

The principal design objectives for the TMF are to protect the regional groundwater and surface water resources during both operations and in the long term (after closure), and to achieve effective reclamation at mine closure. The design of the TMF takes into account the following requirements:

- minimizing impact and risks to the surrounding environment;
- permanent, secure, and total confinement of all solid tailings materials within engineered storage facilities;
- control, collection, and removal of free-draining liquids from the tailings during operations for recycling as process water to the maximum practical extent;
- discharge of surplus water collected in the TMF with treatment as necessary;
- the inclusion of monitoring features for the facility to demonstrate performance goals are achieved and design criteria and assumptions are met;

- staged development of the facility over the life of the proposed project to allow for efficient use of materials from pre-production and operational pit development as construction materials for the TMF; and
- Some of the materials may be obtained from separate aggregate quarries and borrow pits based on volume and quality factors.

To meet the design criteria the facility must be capable of retaining 10.5 Mt of tailings solids and allow for appropriate management of water entering the facility.

The selected TMF option is located to the east and up-gradient of the proposed open pit and is situated in a position that limits impacts to wetlands and streams frequented by fish to the maximum practical extent. The TMF positioned in this manner allows the mine facilities to be clustered upstream of the open pit and simplifies surface water and groundwater management requirements for the mine site. The TMF has been designed to permanently store tailings material generated by the ore milling process. Specific features of the TMF are listed below:

- Zoned water-retaining earth-rockfill dam;
- Interior rockfill causeways located within the TMF;
- Diversion channels and dams that route water around the TMF during construction;
- Perimeter road and seepage collection ditches;
- Sediment ponds and seepage collection ponds;
- Surplus water pipelines, pump systems, and surplus water management pond;
- Tailings distribution system;
- Reclaim water system;
- Raw water intake and pipeline for initial filling of TMF and ongoing makeup water for the plant operations;
- Tailings beaches;
- Supernatant water pond; and
- Discharge works associated with the removal of surplus water from the TMF. Initial water balance calculations indicate the TMF will operate under surplus water conditions and require a discharge. Further work will be undertaken to determine the need for and design of any treatment works to ensure such discharge meets environmental requirements.

The current conceptual design of the TMF will be contained on two sides by a continuous embankment and on two sides by natural ground as shown on Figure 2-4. Rockfill causeways raised with the accreting tailings mass will separate the facility into three cells to increase filling efficiency and allow for positioning of the reclaim water pumps and pipeline. The TMF embankment is designed as an earthfill-faced rockfill embankment with appropriately graded filter and transition zones. The primary construction materials for the embankment will be non-acid generating (NAG) rockfill and clay fill sourced locally from the open pit and surrounding areas. Tailings from the mill process will be delivered by gravity from the mill to the TMF. The tailings slurry will be conveyed to the TMF by pipeline and deposited on a subaerial tailings beach from discharge points located along the embankment crest and interior tailings distribution causeway.

The Stage 1 embankment will be 15 m high in maximum section and requires approximately 550,000 m^3 of material to construct. Approximately 420,000 m^3 of pit-run rockfill will be provided by pre-stripping the open pit with the balance of material requirements coming from local borrow areas for glacial till and crushing/screening rockfill for the embankment filters. An upstream liner of compacted fine-grained earthfill is included in the Stage 1 design to reduce seepage gradients prior to development of the tailings beach.

The embankment will be raised in two additional stages, throughout the mine life, by downstream method to an ultimate elevation of approximately 142 m. The ultimate embankment will be 25 m high from crest to toe in maximum section and the maximum depth of stored tailings within the facility will be approximately 20 m. Sustaining embankment construction will require 1.2 Mm^3 of construction material with 910,000 m^3 of pit-run rockfill and the balance sourced from external borrows or stockpiles. An additional 420,000 m^3 of pit-run rockfill will be used for the interior rockfill causeways over the life of the mine.

Seepage will largely be controlled by the low-permeability embankment face constructed prior to the development of the tailings beach, the tailings deposit, and the low-permeability foundation materials. Seepage through the embankment will be collected in the embankment filter and drain system before reporting to the seepage collection and recycle ponds. Seepage in the foundation would follow the natural topography to report to seepage collection ditches along the perimeter road. Water will be conveyed to a central seepage collection point downstream of the embankment and pumped back to the tailings facility during operations and closure until water quality is suitable for release to the downstream receiving environment.

Runoff from the active mine areas will generally be collected in a combination of seepage ditches and/or ponds and if of suitable quality will be released to the receiving environment, or if unsuitable conveyed to the supernatant pond in the tailings facility and reused as a source of process water.

Initial water balance calculations indicate the TMF will operate under surplus water conditions. The TMF will be designed to handle storm events, however, at some point, water will be required to be discharged. Discharge works will be designed and constructed to remove surplus water from the TMF to prevent surplus water accumulation. Further work will be undertaken to determine the need for and design of any treatment works, including an effluent treatment plant and polishing pond, to ensure the discharge meets environmental requirements.

The anticipated scenario for closure of the facility is that exposed tailings beaches will be covered and then re-vegetated. A spillway invert will be lowered within the tailings pond to allow free flow of runoff out of the facility once water quality monitoring indicates pond water to be suitable for direct discharge.

Erosion protection against wind and runoff will be provided on exposed surfaces. The erosion protection will be clean mine rock that will be appropriately stockpiled for this purpose during the operating period. The preliminary design of the TMF is subject to on-going engineering studies.

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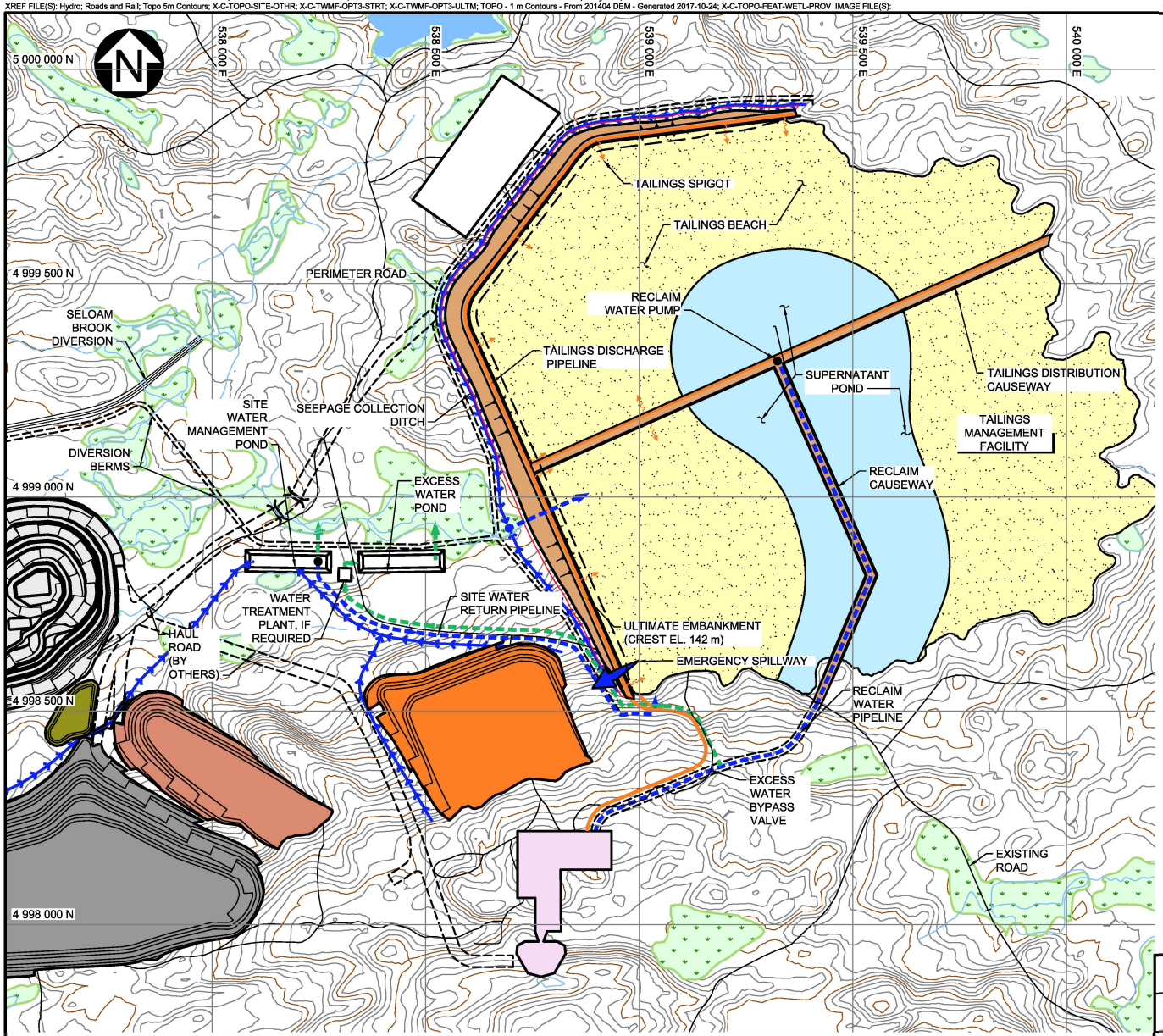
XREF FILE(S): Hydro; Roads and Rail; Topo 5m Contours; X-C-TOPO-SITE-OTHR; X-C-TWMF-OPT3-STRT; X-C-TWMF-OPT3-ULTM; TOPO - 1 m Contours - From 201404 DEM - Generated 2017-10-24; X-C-TOPO-FEAT-WETL-PROV IMAGE FILE(S):



PLAN
SCALE A

LEGEND:

- WATER
- TAILINGS
- EMBANKMENT FILL
- SUPERNATANT POND
- WETLAND
- ORE STOCKPILE
- TILL STOCKPILE
- WASTE ROCK STOCKPILE
- PLANT SITE
- STREAM
- EXISTING ROAD
- PROPOSED ROAD
- SEEPAGE COLLECTION DITCH
- TAILINGS DISCHARGE PIPELINE
- TAILINGS SPIGOT
- RECLAIM WATER PIPELINE
- EXCESS WATER DISCHARGE
- RECLAIM WATER PUMP
- SEEPAGE COLLECTION POINT
- EMERGENCY SPILLWAY
- CULVERT

NOTES:

1. COORDINATE GRID IS NAD83, ZONE 20 T.
2. CONTOURS BASED ON 2014 LIDAR OBTAINED FROM GEONOVA, REPRODUCED AND DISTRIBUTED WITH THE PERMISSION OF INTERNAL SERVICES. CONTOURS HAVE BEEN PRODUCED BY KNIGHT PIESOLD LTD. AND INCLUDES DATA PROVIDED BY INTERNAL SERVICES. THE INCORPORATION OF DATA SOURCED FROM INTERNAL SERVICES WITHIN THIS PRODUCT SHALL NOT BE CONSTRUED AS CONSTITUTING AN ENDORSEMENT BY INTERNAL SERVICES OF OUR PRODUCT.
3. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
4. EMBANKMENT ALIGNMENTS ARE PRELIMINARY AND SUBJECT TO CHANGE AS THE DESIGN PROGRESSES.

SCALE A: 150 75 0 250 500 750 m

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
B	25APR'18	ISSUED FOR INFORMATION	JAM	RAF	DDF

ATLANTIC GOLD CORPORATION

FIFTEEN MILE STREAM GOLD PROJECT

TAILINGS MANAGEMENT FACILITY PLAN

Knight Piésold CONSULTING

P/A NO.	REF NO.
VA101-708/2	VA18-00726

FIGURE 2.3 REV B

2.3.8 Water Management

The landscape in the PA is characterized by undulating to rolling topography, wetlands and woodlands dissected by a few lakes and streams. The Project is situated to the east of Highway 374 and Fifteen Mile Stream and to the south of Seloam Lake. The project facilities are located entirely in the drainage area of Seloam Brook or its tributaries and are confined by natural topography to the west and south.

The proposed open pit lies below Seloam Brook, which will necessitate diversion of Seloam Brook around the open pit limits prior to commencement of mining. Seloam Brook will be re-routed into a permanent constructed stream channel approximately 1,300 m long. The route design will avoid existing fish habitat to the greatest extent practical and requires construction of a trapezoidal shaped channel approximately 2 m deep and 5 m wide. The channel design will be completed in consultation with regulatory agencies and affected stakeholders and will include appropriate gravel streambed material and fish habitat complexing. The stream re-route will isolate the mine facilities to the south and east from the unaffected areas to the north and west and maintain drainage of Seloam Lake through to Fifteen Mile Stream. The TMF will act both as containment for tailings and site contact water unsuitable for discharge. Initial water balance calculations indicate the TMF will operate under surplus water conditions and require a discharge. Further work will be undertaken to determine the need for and design of any treatment works to ensure such discharge meets environmental requirements.

Water collection ditches will be established surrounding the bases of the WRSF and LGO stockpiles. Relief is designed into these facilities so that surface water that comes into contact with them will run to the surrounding collection ditches by gravity, wherever possible. Runoff from the active mine areas will be collected in the site management pond and discharged to the receiving environment or conveyed to the TMF supernatant pond if unsuitable for discharge and used as process water.

A plant site management pond will be located adjacent to the plant facilities. Water collection ditches will be established surrounding the facilities area, as well as the ROM ore stockpile, that will divert collected surface water to this water management pond. The earthworks for the facilities are designed with enough relief that contact surface water will run by gravity into these surrounding collection ditches, and into the water management pond. Settled water will be released to the environment if of suitable quality or if unsuitable pumped to the TMF for use as process water. In addition to the Seloam Brook diversion channel, locally placed berms surrounding the open pit will direct clean surface water away from the open pit and into the surrounding drainage basin. An in-pit water diversion ditch will be established along the top bench of the open pit to intercept any surface water that makes it through the berm and comes into contact with the open pit. This ditch will direct water to in-pit sumps for collection, where it will be pumped out of the pit and to the TMF.

Where necessary, sub-horizontal drain holes will be established in the final open pit walls as they are exposed. On the active bench floor, the water that is collected from these drain holes, along with surface runoff, will be directed to a sump. All collected ground and surface water in the pit will be handled by high lift skid mounted pumps installed in each active pit bottom as part of the in-pit pumping system. The mine sump pumps will be connected to semi-permanent and permanent piping systems to convey water through a HDPE pipe directly to the TMF located east of the open pit. The in-pit sumps will be installed with each box cut as the benching is advanced.

Seepage from the tailings facility and runoff from the TMF embankment will be captured in the seepage collection ditches beyond the ultimate footprint of the embankment. Water will be conveyed to a central seepage collection point downstream of the embankment and pumped back to the tailings facility during operations and closure until water quality is suitable for release to the downstream receiving environment.

Water suitable for discharge will be released to a wetland area adjacent to the surplus water management pond and will subsequently flow northwest to Seloam Brook re-route and the downstream receiving environment.

2.3.9 Site Infrastructure

This section provides a description of the site infrastructure provided to support the operation of the Project.

2.3.9.1 Roads

A well maintained bituminized road (Highway 374), which connects several large towns in Pictou County (Stellarton, New Glasgow) with the coastal community of Sheet Harbour, provides access to the site. The administration office and plant site are accessed via a mine access road. This road will utilize the existing Seloam Lake Road for approximately 1 km at which point a dedicated 4 km mine access road will be constructed. This road will not be paved.

In addition to the mine access road, three major onsite roads will be constructed using the mine fleet during the pre-production period, and will be required to haul ore and waste rock material. The ore haulage road is 1.5 km and connects the mine open pit to the ROM stockpile pad. The waste rock haulage road will consist of two roads, one connecting the open pit with the WRSF (0.4 km) and the other connecting the open pit with the TMF (1.1 km).

Additional onsite roads/tracks will include:

- A track for decant line and tailings line;
- A track for accessing the raw water intake at Seloam Lake or Anti-Dam Flowage;
- A track for power line and engineered discharge to Seloam Brook; and
- A track around the perimeter of the TMF.

2.3.9.2 Power Supply and Reticulation

A three phase 69kV hydroelectric transmission linking Sheet Harbour and New Glasgow is located west of Highway 374. This line will supply power to the plant via a 69kV spur line (5.3km).

The incoming 69kV feed will be stepped down to 4.16V at the plantsite substation. Power will be distributed from this point throughout the site to supply the Gatehouse, Mine Office, Truck Workshop, Warehouse, Mining Office, Change Room Buildings and TMF. The power distribution from the plantsite substation will be via overhead power lines and buried conduits wherever required. The 4.16kV will be stepped down to each of these buildings through a bank of pole top transformers.

A 500 kW black-start diesel generator will provide emergency power. In the event of a total power black-out the generator will be started by an operator. The emergency generator will only supply back-up power to select equipment in the process plant area. The total connected load will be approximately 5.4 MW with an operating load of 4 MW as detailed in Table 2-2.

Table 2-2: Power Demand

Power Requirements (kW)	Maximum Demand	Average
	kW	kW
Crushing	1,345	719
Grinding	2,246	1,910

Power Requirements (kW)	Maximum Demand	Average
	kW	kW
Gravity	74	49
Flotation	873	633
Concentrate Dewatering	88	53
Tailings	45	30
Potable, Fresh Water	142	108
Blower & Inst. Air	461	382
Reagent	15	7
Administration & workshop - warehouse	85	57
Total site power (rounded)	5,374	3,948

2.3.9.3 Fuel Supply, Storage and Distribution

A diesel storage and distribution facility (50,000 L) will be located adjacent to the workshop/warehouse. Diesel will be delivered to site in tanker trucks and will be available for use by vehicles using a bowser arrangement with cardlock. Gasoline usage is expected to be minor, as required for light vehicles use only, and will be satisfied by purchase from local retail suppliers.

A propane storage facility will be located near the process building. The major propane use will be for space heating.

2.3.9.4 Water Supply and Distribution

Sources of water include mine dewatering operations, raw water from Seloam Lake or Anti-Dam Flowage, precipitation that includes run-off and snowmelt and return water from the TMF.

Raw water will be drawn from Seloam Lake or Anti-Dam Flowage, approximately 2.0 km north-east of the process plant, through the appropriate Water Approval: surface water withdrawal approval (NSE). The water will be recovered by submersible pumps mounted within a decant structure. Water will be delivered to the plant via a buried HDPE pipeline to the Raw Water Tank, the lower portion of which will be reserved for fire protection.

The bulk of the plant water demand for processing is drawn as a recirculating flow from the TMF pond. It will be recovered by a submersible pump mounted within a decant structure. The decant return water will be delivered via an HDPE pipeline laid on the surface and routed along the decant causeway and then alongside the tailings line, to the Process Water Tank located within the plant site.

To address TMF start up water requirements, raw water will be sourced from Seloam Lake or Anti-Dam Flowage for a short period of time, with daily water withdrawal expected to be in the range of 500,000m^3/day.

During operations, raw water will be supplied to the TMF from a number of sources including; recirculated water released from the tailings slurry as it settles and consolidates, pit dewatering, and precipitation and snow melt both onto and from run-off the undiverted portion of the catchment area surrounding the TMF. This will be supplemented, as necessary based on water quality, by contributions from plant site run-off.

2.3.9.5 Sewage and Waste

Sewage from the plant site buildings will gravitate via a pipe network buried below the frost line to septic tanks with leach drains.

Chemical waste from the laboratory will be either, depending on type, pumped to the tailings hopper or stored for off-site disposal. Office waste and waste from the meals areas will be collected and disposed of off-site in accordance with the applicable regulations.

2.3.9.6 Plant Buildings

Buildings located at site will include:

- Gatehouse;
- Administration office;
- Mining office and change rooms;
- Truck workshop, warehouse and wash facility;
- Plant offices and change rooms;
- Plant workshop;
- Fine ore stockpile;
- Filtration, Storage & Loadout;
- Process plant;
- Ball mill lube room;
- Plant switch room;
- Raw water supply; and
- Laboratory.

All buildings will have a heating and ventilation system, using propane space heaters.

Gatehouse

The guardhouse will be located on the site access road where security staff can control entry to the mine and process plant areas.

Administration

The Administration Office will include private offices, open plan offices, meeting and training rooms, kitchen, toilets, change-house and first aid facilities. The building will be of a similar area and construction as that at the Touquoy mine.

Mining Office and Change Room

Mining Office and Change Room facilities for the workforce will be constructed in the mine facility area and will be approximately 400m^2. These facilities will have wet and dry areas complete with showers, basins, toilets, lockers and overhead laundry baskets.

Truck Workshop and Warehouse

The Truck Workshop and Warehouse will be approximately 720 m^2 and will be positioned adjacent to the mine office. This area will be divided, one section for warehousing spare parts and the other will be a maintenance workshop. Other maintenance activities will be performed outside the building on a hardstand area. Lifting and handling activities will be fulfilled by an overhead crane within the building and forklift.

A vehicle wash-down facility will be provided adjacent to the workshop/warehouse and will be similar to that used at the other sites.

Plant Office and Change Room

The Plant Office and Change Room facilities for the process plant will house the majority of the employees associated with the processing facilities. A meals room and all ablutions will be provided within the building for these employees including wet and dry areas complete with showers, basins, toilets, lockers and overhead laundry baskets. The building will be approximately 265 m^2.

Plant Workshop

The Plant Maintenance building will be located adjacent the concentrator building and will house maintenance personnel undertaking maintenance activities in support of ore processing. The Plant Workshop will be approximately 300 m^2. This building will be a pre-engineered building

Fine Ore Stockpile

The Fine Ore Stockpile is used to keep the ore dry and heated to prevent freezing during the winter. The building will be approximately 2 100 m^2. This building will be a pre-engineered building.

Filtration, Storage & Loadout

The Concentrate Loadout will provide secure storage, stockpiling and loading facilities for gold concentrate prior to trucking to the Touquoy mine for final processing. The building will be located adjacent to the Concentrator building and is nominally 730 m^2 (27 m long and 27 m wide). It will also include a concentrate thickener and filter press to remove surplus water from the concentrate prior to trucking. This water will be recirculated for use as process water. This building will be a pre-engineered building.

Process Plant

The Process Plant Building will be approximately 1,550 m^2 (24 m wide x 65 m long) and will house milling, gravity, flotation and reagent equipment. The building will be divided into two sections. The first section contains the mill; the second section contains the gravity, flotation and reagent system equipment. Both sections are serviced by overhead cranes. The building will be heated using electrical space heaters. This building will be a pre-engineered building.

Individual areas within the process building will be bunded, each with a sump, to provide for process upsets and spill management.

Ball Mill Lube Room

The Ball Mill Lube Room will be located outside the Process Plant Building, adjacent to the Ball Mill section. The building will be approximately 80m^2. This building will be a pre-cast concrete building.

Plant Switch Room

The Plant Switch Room will be located just outside the Process Plant Area. This building will house the control equipment for the switch yard. The building is approximately 160m^2. This building will be a pre-cast concrete building.

Raw Water Supply

The Raw Water Supply Building will be located at Seloam Lake or Anti-Dam Flowage and house the pumping equipment. The building will be 36m^2 and will be a pre-engineered building.

Laboratory

The laboratory will be situated adjacent to the plant and is approximately 300m^2 in area. The building houses all laboratory equipment for the site, including the metallurgical and environmental requirements. Any mechanical items associated with the dust collection equipment will be located external to the building.

2.3.9.7 Fire Protection

Fire protection for the plant site will be via a "wet system" with hydrants located around the plant site area. The water contained within the lower portion of the raw water tank will be reserved for fire protection. A main fire alarm indicator panel (MIFB) for surface facilities will be provided in the main control room, cabled to fire detectors in the following areas:

- process plant MCC rooms;
- main control room;
- workshop store and offices; and
- laboratory.

In each area, a combination of heat and smoke detectors will be provided with break-glass units mounted externally to the buildings. Within the process plant MCC rooms, very early smoke detection alarms (VESDAs) will be installed for early smoke detection and alarm initiation.

The large primary mining fleet including excavators, front end loader, haul truck, dozers and drills will be fitted with fire suppression systems in case of fire.

2.3.9.8 Lighting

3m pole-mounted high intensity discharge type weatherproof lights will be utilized for plant and conveyor lighting, while 8m pole-mounted floodlights will be utilized for ROM, crushing and plant area lighting. High bay and low bay lighting will be used for process plant building operating floors. Energy efficient LED type lighting fixtures will be applied where suitable. Emergency lighting will be also installed throughout the plant, in stairways and exits to provide sufficient light to allow safe egress of personnel from the buildings.

Lighting throughout the active mine areas and material storage areas will be by diesel lighting towers.

2.3.10 Touquoy Processing

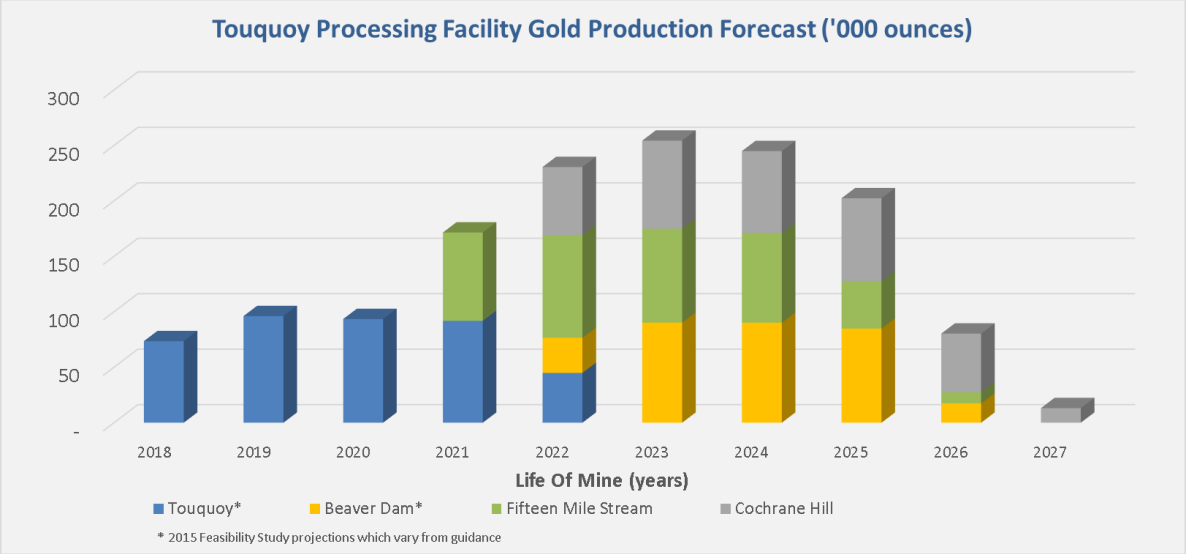
Final processing of gold concentrate will take place at the existing Touquoy facility currently operating at the Touquoy mine. The Touquoy plant has the capacity and is designed to be able to treat the concentrate with only minor modifications required including:

- Concentrate storage;
- Gravity concentrate leach reactor; and
- Gravity electrowinning cell.

This can be accommodated in the existing process building footprint. Figure 2-6 outlines the process flow at the Touquoy mine for final processing of FMS concentrate.

The current gold production forecast for the combined output from the Touquoy processing plant is shown below in Figure 2-5.

Figure 2-5: Touquoy Processing Facility Gold Production Forecast



2.3.10.1 Intensive Cyanidation

Gravity gold concentrate will be transported to the Touquoy mine within a mobile hopper. The hopper will be designed to connect directly with the intensive batch leach system, thus avoiding re-handling of concentrate. The intensive batch leach circuit will receive the periodic gold concentrate for treatment in an intensive leach reactor. The gold-containing pregnant solution will pump periodically to a dedicated eluate tank in the gold room.

2.3.10.2 Carbon-in-Leach

Flotation gold concentrate will be transferred into the leach feed box for slurry conditioning prior to leaching. The leach feed slurry will be mixed with lime slurry in the leach feed box to raise the slurry pH for cyanide gold extraction. The feed box will gravitate to the leach tank and optionally can feed directly to CIL Tank 1.

The circuit is a hybrid CIL type and consist of one leach tank and six adsorption tanks in series, each having a live volume of 1,169 m^3. The design allows for a 250 t/h solids feed rate at 50% solids for an average 24 hour residence time. Each tank will be interconnected with launders to allow slurry to flow sequentially by gravity to each tank in the train.

Barren carbon will enter the adsorption circuit at CIL Tank 6. The carbon will advance countercurrent to the main slurry flow during periodic transfers of slurry and carbon using air lift movement from a downstream to upstream tank. Carbon concentrations of 10 to 15 g/L are required in all tanks. Carbon will be retained in the upstream tank by an intertank screen. The countercurrent process will be repeated until the carbon becomes loaded and reaches CIL Tank 1. Then a recessed impeller pump will be used to transfer slurry and carbon to a loaded carbon recovery screen. The loaded carbon will be washed with water and released to the acid wash column located inside the main plant, in the desorption area. The slurry will be returned to CIL Tank 1.

Following elution of the loaded carbon and thermal regeneration, the barren carbon will be screened and report to CIL Tank 6. Fine carbon will be discarded to the CIL tailings hopper.

Tailings slurry from CIL Tank 6 will flow by gravity to the vibrating carbon safety screen to recover any carbon in the event of damage, wear or other issues with the CIL Tank 6 interstage screen. Recovered carbon will be collected in a bin that can be manually transferred for re-use or disposal. Tailings discharging from the safety screen will gravitate to the cyanide detox Tank 1 in the cyanide detoxification circuit.

2.3.10.3 Desorption and Regeneration

Carbon will be acid-washed.

The pressure Zadra elution circuit (elution column, strip solution tank, strip solution pump and a strip solution heater package) will operate in a closed loop with the electro-winning cells located inside the gold room.

After completion of the elution process barren carbon will be transferred from the elution column to the kiln dewatering screen and into the carbon regeneration kiln feed hopper. Regenerated carbon discharges from the kiln to a quench tank and will be pumped to the carbon sizing screen. The screen oversize will return to CIL Tank 6, while the quench water and fine carbon will report to the tailings hopper via the carbon safety screen for disposal in the TMF.

2.3.10.4 Gold Room

Three electro-winning sludging cells will be used; one cell will be dedicated to the intensive cyanidation circuit and the other two to the elution circuit.

The electro-winning cell dedicated to the intensive cyanidation circuit will be fed leach solution via a fixed speed centrifugal pump from the gravity leach liquor storage tank. Solution will be pumped to the electro-winning cell and then gravitates back into the gravity leach solution storage tank in a closed loop until suitable gold recovery is achieved. The duration of this cycle varies with the quantity of gold recovered by gravity but is projected to be less than 24 hours.

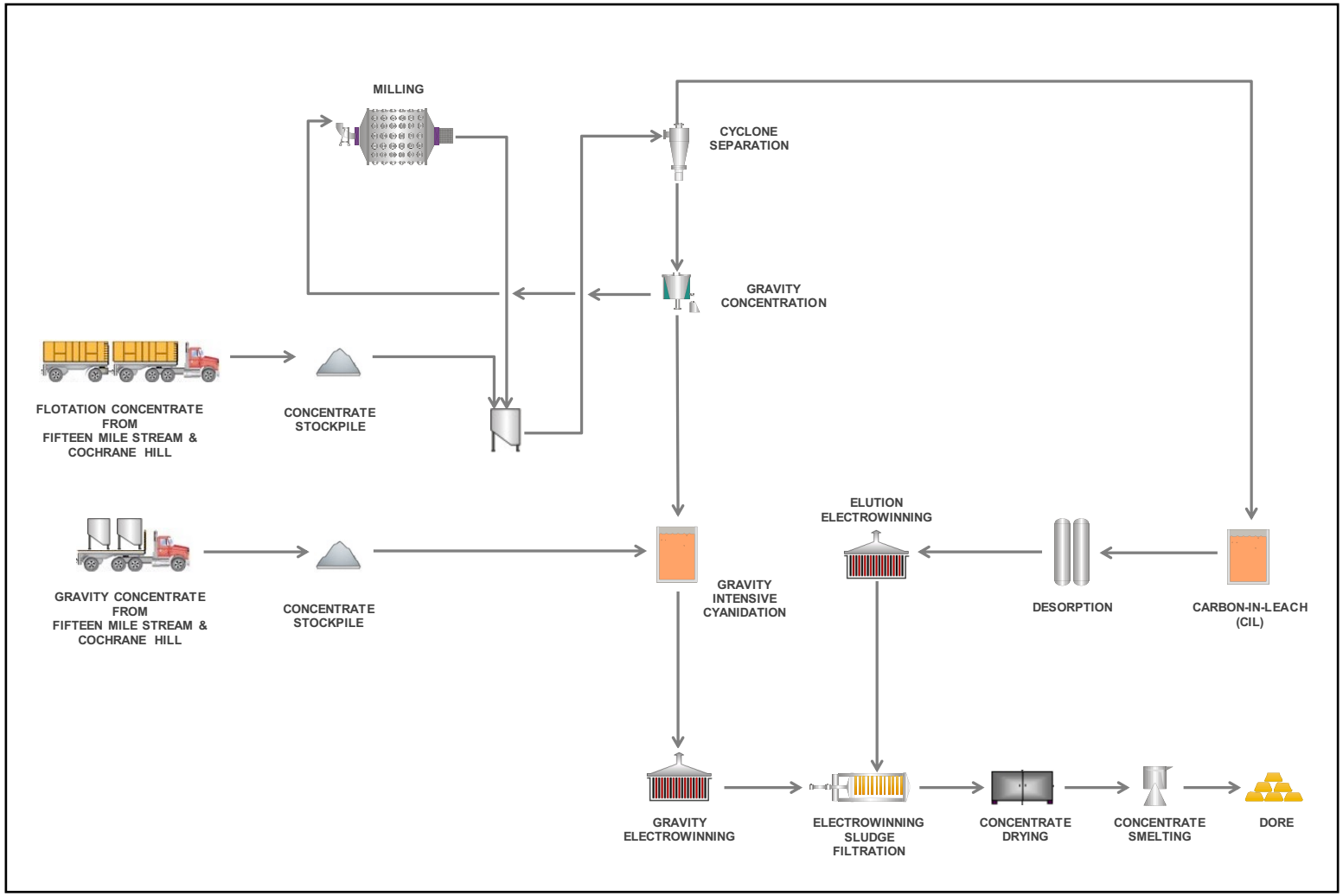
The two electro-winning cells dedicated to the elution circuit will operate in a closed loop with the elution column and associated equipment. Eluate will flow directly from the top of the elution column to the electro-winning cells after cooling through heat exchangers. The eluate will flow through the electro-winning cells and then gravitate back to the strip solution tank and then be pumped to the elution column in a continuous closed loop. The duration of this cycle is approximately 16 hours.

2.3.10.5 Cyanide Detoxification and Tailings Disposal

Slurry passing through the carbon safety screen will gravitate to two 300 m^3 cyanide detoxification tanks which are designed on the conventional air-SO_2 process and can operate in series or parallel for operational flexibility. The average slurry residence time at 250 t/h is 1.5 hours.

The detoxified slurry stream will gravitate to the tailings hopper from where it will be pumped through a single pipeline to the Touquoy TMF and then the exhausted pit for storage. Supernatant water and run-off from precipitation will be collected in the exhausted Touquoy pit. If necessary based on water quality, this water will be pumped to TMF for treatment and release.

Figure 2-6: Touquoy Process Flow Diagram – Gold Concentrate



2.3.11 Tailings Management - Touquoy

Final processing of the gold concentrate will be undertaken at the Touquoy facility. The small volume of additional tailings generated from this operation will be pumped to the existing TMF at the Touquoy mine until mining operations cease at the Touquoy pit, approximately 12 months after start-up of the Project. Upon completion of mining in the open pit, tailings will then be discharged to the mined out Touquoy pit for storage. Process water will be recycled from the Touquoy TMF. At some point, based on the results of water balance, process water may be sourced from the exhausted Touquoy pit.

It is anticipated that approximately 105,000t of tailings will be deposited into the Touquoy TMF from the Project. This figure represents the first year of production, as the Project will commence production 12 months prior to the cessation of mining in the Touquoy pit. It is anticipated that this additional quantity of tailings will have a negligible impact on the existing facility as the additional tailings represents only approximately 1% of the total tailings contained within the facility. Tailings disposal will be transferred to the mined out Touquoy pit following completion of mining at the Touquoy mine. Tailings from the FMS concentrate will be deposited in conjunction with tailings from Beaver Dam ore and Cochrane Hill concentrate. The FMS tailings deposited represents an increase of approximately 7% volume over and above the total Beaver Dam tailings that will be deposited into the pit.

Source terms from FMS tailings supernatant will be used to update the Touquoy water quality model to predict potential changes in water quality in the Touquoy TMF and open pit as a result of the addition of tailings from processing of FMS concentrate at the Touquoy mine. This information will be used in support of an application for amendment of the Touquoy IA to accept processing of FMS concentrate and disposal of tailings from FMS concentrate to the Touquoy TMF and open pit.

The Touquoy Pit is not expected to completely fill with water during the processing of the concentrate but if this does occur, surplus water will be pumped into the existing Touquoy tailings dam in order that it can pass through the water treatment system.

2.4 Emissions, Discharges and Waste

Dust emissions resulting from mine construction and operation will be controlled with the application of water obtained from Seloam Lake or Anti-Dam Flowage via a stand pipe on the raw water line, or the use of wet/chemical dust suppressants. Stockpiled soils and tills will be progressively revegetated as piles become stabilized. With a relatively short mine life, the majority of reclamation activities will be commencing at the end of the mining operation. However, where possible, inactive disturbed areas including stockpiles and roads will be reclaimed upon cessation of activity.

Combustion emissions, including nitrogen oxides (NO_X), carbon monoxide (CO), carbon dioxide (CO_2), sulphur dioxide (SO_2), and particulate matter (PM), will be generated from the operation of Project equipment and vehicles. Emissions will be reduced by proper equipment selection, maintenance and inspection. Modern diesel engines utilizing low sulfur diesel fuels have reduced particulate and sulfur dioxide emissions compared to similar engines used in the past. Air quality monitoring will be conducted as per the conditions of an IA, Nova Scotia Air Quality Regulations and the National Ambient Air Quality Objectives. Predictive modelling relating to dust deposition is planned as part of the environmental assessment.

Noise and vibration from blasting and equipment will be controlled by attenuation (the distance between a noise source and a receptor), vertical separation, and equipment design. Predictive noise modelling is also planned to support the environmental assessment process.

Sediment and erosion control measures will be in place throughout all phases of the Project to ensure that surface runoff generated during operations is appropriately managed. Surface runoff will be collected in ditches and/or ponds and if of suitable quality discharged to the receiving environment. Groundwater and precipitation in the open pit, will be directed or pumped to the TMF for use as process water. Water from the water management pond(s) may be used in for dust suppression, to the extent feasible. Water management pond development will be staged with the overall development and needs of the Project. Details regarding the required pond volumes required for the proposed mine will be defined during the detailed design and reported in the EIS and/or EARD. Final design details will be a requirement of the provincial IA application.

Water discharges will be monitored and sampled in accordance with the terms and conditions of the provincial IA. Monitoring will ensure that total suspended solids (TSS) levels do not exceed the approved final discharge limits. The Proponent is aware of the requirements of the Metal Mining Effluent Regulations (MMER) and will comply with said requirements as applicable to the site. Since this is a satellite mine operation with no cyanide processing on-site, effluent will generally be tested for TSS, metals and pH and any other requirements stemming from Environment Canada or the Province via the IA process.

Solid and hazardous waste generated onsite will be minimal and limited to office and domestic refuse and oily waste. Waste streams will be managed by accredited waste collection contractors who will regularly pick up waste for transport to authorized/approved off-site disposal or recycling facilities utilizing legislated or approved methods. If a spill occurs, contaminated material will be removed from the site for disposal and recycling to an approved waste receiving facility. An on-site septic system will be designed and built for sewage and greywater disposal.

2.5 Reclamation

The goal of the reclamation plan is to return land and water disturbed by development to a safe and stable condition compatible with the surrounding landscape and final land use as determined by the appropriate level of community consultation. The plan will employ recognized reclamation best practices, acknowledged principles of ecological restoration, and consultation with relevant stakeholders. The site has been used for past mining and exploration activities (decline installed, roads, exploration camps, water management pond system, and small waste piles of rock and overburden along with successive tree harvesting and silviculture activities) for the last 100 plus years. Evidence of limited recreational use of the land (hunting, fishing and off-road vehicles) at the site suggests that these activities could be re-instated after the mining operation ceases and reclamation activities completed. The majority of the lands proposed for the mining operation and infrastructure are majority owned by a privately held company (MacGregor Properties Ltd.) and the Provincial Crown.

All marketable timber or biomass will be removed from the pit, crusher, plant site, TMF and waste rock disposal areas. Organic debris (roots, stumps, brush) will be stockpiled in conjunction with topsoil and used for reclamation at closure. All reclaimed areas will be covered with overburden and growing medium to a depth suitable to establish and support a self-sustaining vegetative cover.

At closure, all infrastructure will be removed. The open pit will be allowed to flood creating a lake. Re-contouring of the WRSF will be carried out progressively throughout the Project life where practical. The crusher site will be contoured to match the local topography.

The anticipated scenario for closure of the TMF is long term wet cover. Where practical, exposed tailings beaches will be covered and then re-vegetated. A spillway invert will be lowered within the tailings pond to allow free flow of runoff out of the facility once treatment is no longer required. Re-vegetation will establish hardy pioneer species and grasses to colonize disturbed areas and stabilize soil. Native species will be planted to hasten a return to a natural ecosystem reflecting the pre-development site.

All runoff associated with the site will be contained and directed to either the TMF or open pit until determined to be suitable for discharge. Runoff in the vicinity of the open pit will be directed as dispersed flow into the open pit to speed filling. The flooded pit will have shallow margins along the pit perimeter and will sustain a seasonal flow channel downstream of the pit. Runoff from stockpiles will be directed to stable channels and released to the natural drainages.

Decommissioning of the site will require approximately three to five years after cessation of operations. Two years will be needed to complete the regrade and re-vegetation of the site, after which monitoring will continue until deemed no longer necessary – typically two to three years post-reclamation. The reclamation measures are designed to enable eventual walk away from the site, leaving the site in a safe and stable state. The self-sustaining site will be compatible with the surrounding environment and future land use. The Project site is intended to be returned to its previous land use after mining: recreation and forestry. Other opportunities may exist for the site. The final disposition of the site will be informed through consultation with community stakeholders throughout the course of the Project life and adherence to applicable legislation.

2.6 Project Development

2.6.1 Background

For context, a description of the existing Touquoy mine, and proposed Beaver Dam and Cochrane Hill mines and their permitting history/status are outlined below.

2.6.1.1 Touquoy Gold Mine

DDV Gold Limited, the project Proponent in 2007 (subsequently acquired by Atlantic Gold Corporation in 2014), submitted an Environmental Assessment Registration Document (EARD) to NSE on March 15, 2007 for the Touquoy mine. As a result of the subsequent review, the Minister of Environment and Labour directed DDV Gold to prepare a Focus Report to provide additional details on certain specific aspects of the project. During the provincial EA review, the document was also reviewed by federal agencies. Under the former Canadian Environmental Assessment Act in 2008, a federal environmental assessment was not required. The Canadian Environmental Assessment Agency (CEAA) file number for this review was 10700-40.

The nature of the Focus Report was detailed in the Terms of Reference (TOR) in a public letter to DDV Gold dated April 15, 2007. The Focus Report Study Area (FRSA), as designated by the Minister, encompasses an area of 54,337 ha in the general area of Moose River Gold Mines in Halifax County. Geographic boundaries extend north to Caribou Mines, south to the community of Lake Charlotte, west to Shaw Little Lake, and east to Snowshoe Lake.

The TOR specified that the Proponent should examine the impact of the project on the surrounding area, in particular the downstream watershed, existing nearby wilderness areas, and undeveloped lands to the southwest. The physical, biological, ecological, and cultural aspects of the FRSA were to be described. The decisions underlying the project design were to be detailed and all measures employed to mitigate and monitor impacts were to be explained.

Based on the Focus Report details, the Nova Scotia Minister of Environment approved the above project on February 1, 2008 in accordance with Section 18 (a) of the Environmental Assessment Regulations, pursuant to Part IV of the Environment Act.

The Touquoy mine had been considered with respect to potential adverse effects and environmental effects, including effects on socio-economic conditions. The Minister was satisfied following a review of the information provided by DDV Gold Limited, and through the government and public consultation as part of the environmental assessment, that any adverse effects or significant environmental effects of the undertaking could be adequately mitigated through compliance with the attached terms and conditions.

The Touquoy mine is currently operating under an IA from Nova Scotia Environment issued in March 2014, with subsequent amendments. All necessary supporting permits are in place including water withdrawal approvals, and wetland and watercourse alteration approvals.

2.6.1.2 Beaver Dam Gold Mine

In October 2015, Atlantic Gold Corporation (Atlantic Gold) submitted a Project Description for the Beaver Dam Mine Project to the Canadian Environmental Assessment Agency (CEAA) under the Canadian Environmental Assessment Act 2012 (CEAA 2012). The Beaver Dam Mine is planned to be operated as a satellite surface mine operating at a rate of approximately two million tonnes (Mt) of gold-bearing ore per year. Beaver Dam ore will be crushed and hauled by on-road trucks to the Touquoy processing facility, a distance of just over 35 km. Beaver Dam will not include a concentrate operation and will not require a TMF. This ore will be processed in conjunction with ore supply from the Touquoy, FMS and CH surface mines. Beaver Dam will supply ore to the Touquoy processing facility over a period of five years (2022 - 2026) of the total ten years of its operation (2018 - 2027) based on the combined feed from all four operations. In December 2015, CEAA determined that a federal Environmental Assessment was required for the Beaver Dam Mine Project pursuant to the CEAA 2012 and released EIS guidelines in January 2016. Atlantic Gold submitted an Environmental Impact Statement in June 2017, and following a technical review by CEAA, information requests were made of Atlantic Gold to provide further information in August 2017. Atlantic Gold is currently working on responding to these requests as part of the federal Environmental Assessment process.

2.6.1.3 Cochrane Hill Gold Mine

Cochrane Hill Gold Mine is located on Highway 7 in Melrose, Nova Scotia. This mine is proposed as a satellite gold mine with a similar operation as the Project. Cochrane Hill Gold Mine will supply concentrate to the Touquoy processing facility over a period of six years (2022 - 2027) The Cochrane Hill Gold Mine project description is expected to be submitted to CEAA in Q2 2018.

2.6.2 FMS Project Phases and Scheduling

The construction of the pit operations will be timed so that the concentrate supply to the Touquoy process plant will begin as the Touquoy deposit is reaching exhaustion (one to two year overlap) and ahead of, and concurrently with, Beaver Dam mining operations (four to five years overlap). The Touquoy facility will undergo routine maintenance and minor upgrades in preparation to receive FMS concentrate which will be processed at the Touquoy processing plant.

Removal of topsoil, overburden and waste rock from the top benches of the open pit will begin one and a half years prior to the crusher installation. Timing will be in informed by nesting bird directives or as approved subject to pre-construction

nesting bird surveys. During this time, stockpiles for the topsoil and overburden will be built, and the initial lift of the WRSF will be constructed. Also, surface and ground water management facilities, including monitoring wells, ditches and berms will be constructed.

All other development work on the plant site and TMF including construction and commissioning of the support infrastructure will be completed in the twelve months prior to commencement of operation.

Supply of power to the site and placement of the fuel storage facility and support facilities will be linked to the start of early mining pre-strip operations.

The following Table 2-3 briefly outlines the Project schedule and the relationship between activities at the Touquoy mine and the Project.

Table 2-3: Mine Development, Operation and Reclamation Schedule

Event	Timeline
Touquoy Construction	Year -1.5
Touquoy Operation	Year 1 – 5
Fifteen Mile Stream Construction	Year 3
Fifteen Mile Stream Operation	Year 4 – 9
Touquoy Reclamation (WRSF, Tailings)/Monitoring	Year 6 – 9+
Fifteen Mile Stream Reclamation / Monitoring	Year 9 – 11+
Touquoy Reclamation (Plant, Pit) / Monitoring	Year 9 – 11+

2.6.3 Opportunities for FMS Mine Life Extension

The proposed development plan and current mine life for the Project as described in the foregoing section is based upon extraction of the proven and probable reserves of 10.8 Mt of ore grading 1.24 g/t from the Egerton-MacLean Zone. At this time, these are the only mineralized zones on the property which have sufficient definition in order to determine them as being economic to mine.

As with most mining properties, however, additional mineralized zones have been identified within the PA which have been the subject of various levels of exploration over time.

At the Project, the most significant additional exploration targets include:

- extensions to the current mineralization at Egerton–McLean;
- the Hudson Zone located approximately 800m west of Egerton–McLean;
- the Plenty Zone located approximately 400m southwest of Egerton–McLean;
- the 350 m gap between the eastern end of the Plenty Zone and Egerton–McLean; and,
- the 149 Zone located approximately 1.5 km east of Egerton–McLean near the proposed TMF area.

Available information on the geology and exploration history of these zones is provided in Section 2.3.1 and 2.3.2 above, respectively. The locations of the Hudson, Plenty and 149 Zones in relation to the current development plan are depicted on Figure 2.1. Given their locations in close proximity to the planned site infrastructure, development of these additional zones would result in only a minor increase in the area of mine operations.

In the case of Hudson and Plenty, currently identified mineralization at these exploration targets can at best be classified as an Inferred resource, and will require additional infill and/or exploration drilling and feasibility studies in order to determine the viability and economics of recovering the resource. Factors that may affect this determination will include, amongst other things: the size and grade of mineralization zones, the geometry and continuity of mineralization zones, metal prices, exchange rates, operating costs, etc. Should any or all of the Hudson and Plenty zones be determined to be economically recoverable, it is expected that they would be subsequently mined sequentially, thus extending the mine life, as opposed to being mined concurrently, thus increasing the daily ore production capacity.

The 149 Zone is located adjacent to the TMF area. Drilling to date has identified possible gold mineralization in the area. At this stage, insufficient work has been undertaken to determine the economic viability of the mineralization. However, if development can be justified, mining would take place concurrently with TMF starter dam construction and in advance of use of the TMF for water and tailings storage. This would avoid any impact with development of the TMF. Ore would be stockpiled in advance of operations in order to supplement ore from the main Egerton–McLean open pit. The 149 Zone pit would then potentially be utilized for storage capacity of excess TMF water prior to release.

As further exploration and infill drilling is undertaken, and resource estimates upgraded, any decision to mine these additional zones will be preceded by contact with regulatory authorities and applications to amend the appropriate operating permits and approvals.

2.7 Alternative Methods of Carrying Out the Project

Alternative methods of carrying out the Project are defined as means of similar technical character or methods that are functionally the same. Alternative methods differ from alternatives in that they represent the various technical and economically-feasible ways that a project can be carried out, and which are within the applicant's scope and control. The analysis addresses alternatives to extraction methods; site layout and infrastructure configuration; and, processing options. The planned project is to develop a surface mine, crush material, concentrate ore on site and transport a gold concentrate for processing at the Touquoy processing facility to take advantage of surplus capacity within the existing plant at the Touquoy mine.

The alternatives that have been addressed during the design phase include mining methods; ore processing; mined materials management; tailings management; site infrastructure; power supply; and road access.

2.7.1 Mining Methods

The preferred mining method is dictated primarily by the location, geology and grade of the mineral resource or ore body. Mining can theoretically be undertaken by either underground or open pit methods. Underground mining as a primary extraction method typically requires relatively high grade and vein type mineralization following a fault-like structure in order to make practical or economic sense. In the case of the Project, the resource is relatively low grade, disseminated and near surface making it better suited to open pit extraction. A continuation of the surface mining into an underground operation below or adjacent to the pit bottom may be viable depending on the final depth of the deposit, but this is currently not under consideration and would likely not be economic unless there was a dramatic increase in grade with depth and/or gold price.

2.7.2 Ore Processing

Ore processing at the Project is proposed to be undertaken by conventional crushing, grinding and flotation methods. The principal alternative considered in respect of ore processing is to limit production to a gold concentrate for shipment by highway truck 76km to the existing Touquoy plant for the final carbon in leach and electro-winning processes to produce the gold doré end product. This eliminates the need for construction of additional facilities the Project and restricts the use of cyanide and need for cyanide extraction to the existing facilities at the Touquoy mine, both of which are deemed preferable.

2.7.3 Mined Material Management - Waste Rock, Low Grade and Other Stockpiles

The major design considerations in evaluating alternative stockpile locations are proximity to source (haulage distance), storage capacity (surface area and height), environmental considerations, geotechnical suitability and reclamation, including conforming to adjacent topography to the extent practical. In general, stockpiles have been designed to be in close proximity to other planned facilities in order to minimize the project footprint and area of disturbance, and located adjacent to areas stripped to allow stock pile sizes to be minimized thus minimizing compaction and improving the quality of material for reclamation.

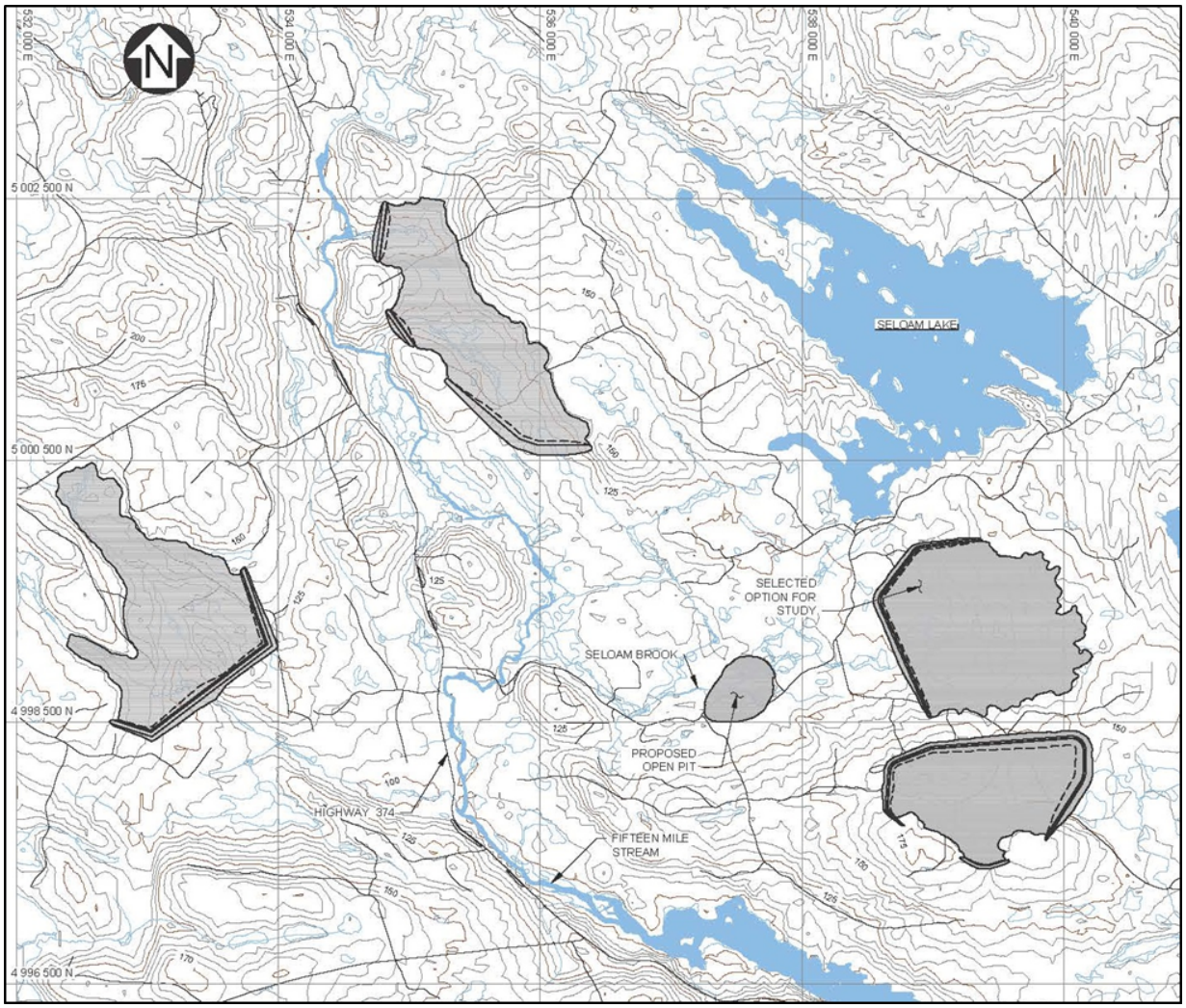
2.7.4 Tailings Management

Several alternative TMF site locations were considered during preparation of the design as shown on Figure 2-7. The primary considerations in evaluating potential TMF locations are the storage capacity and initial water balance, surface area, the number and size of containment structures required including their design and stability, proximity to other facilities (particularly the mill for the purposes of tailings transport and reclaim water) and potential for impacts on fisheries and aquatic resources and other valued environmental components.

The PA is situated to the east of Highway 374 and Fifteen Mile Stream and to the south of Seloam Lake. The landscape in the PA is characterized by undulating to rolling topography, wetlands and woodlands dissected by a few lakes and streams. The major project facilities are located entirely in the drainage area of Seloam Brook or its tributaries and are confined by natural topography to the west and south.

The preferred TMF option selected for design purposes is also located within the Seloam Brook drainage to the east and up-gradient of the proposed open pit and is situated in a position that limits impacts to wetlands and streams frequented by fish to the maximum practical extent. The TMF positioned in this manner allows the mine facilities to be clustered upstream of the open pit and simplifies surface water and groundwater management requirements for the mine site, including gravity flow of tailings to the TMF.

Figure 2-7: Tailings Management Facility Location Options



2.7.5 Site Infrastructure, Power Supply and Road Access

The location of the open pit is fixed given the location of the mineral resource. Site infrastructure has been located in as close proximity to the open pit as practical in order to minimize the footprint and disturbed area requiring reclamation.

An existing three phase 69kV hydroelectric transmission line is located west of the PA. This line will supply power to the site for mine operations via a small spur line (5.3km).

With respect to road access, Provincial Highway Route #374 and the existing Seloam Lake Road provide access to within approximately 4km of the proposed administration office and plant site area. A new 4km gravel access road will connect the site to the existing road following the shortest practical route in order to minimize disturbance.

In addition to the mine access road, three primary on-site roads will be constructed: a 1.5 km ore haulage road connecting the open pit to the ROM stockpile pad, a 0.4 km waste rock haulage road connecting the open pit with the WRSF and a 1.1 km haul road connecting the open pit with the TMF.

Additional minor on-site roads/tracks will include:

- A track for decant line and tailings line;
- A track for accessing the raw water intake at Seloam Lake or Anti-Dam Flowage;
- A track for power line; and
- A track around the perimeter of the TMF.

All access road alternatives were evaluated and selected based upon the proximity to proposed site infrastructure and sited to minimize the extent of new disturbance and the potential for impacts to fisheries and aquatic resources and other valued environmental components.

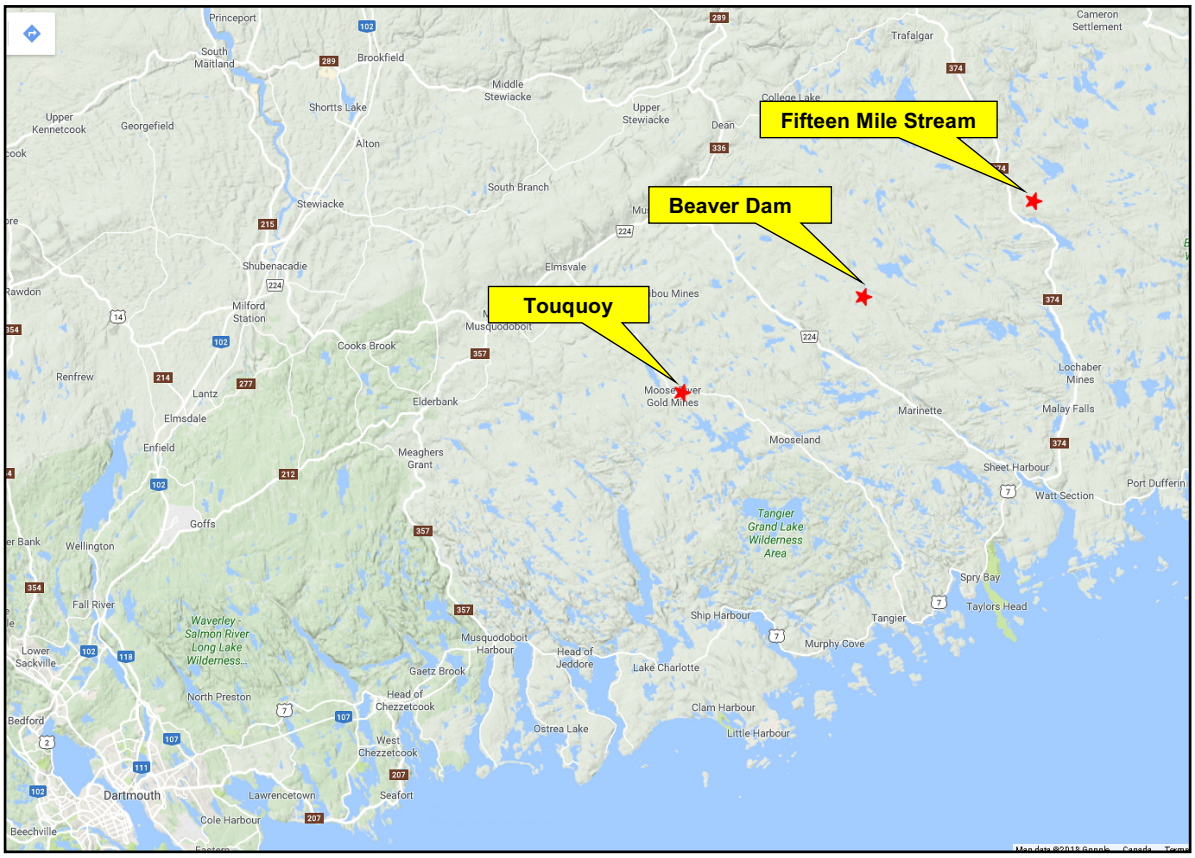
3. Project Location

3.1 Location Description

3.1.1 Location

The Project is located at the eastern boundary of Halifax County, in central Nova Scotia, approximately 95km northeast of Halifax and 17km to the northeast of Atlantic Mining's Beaver Dam Project (Figure 3-1).The property covers the historic Fifteen Mile Stream Gold District located on NTS sheets 11E01/C and 11E02/D and is centred at 45°08'30" north latitude and 62° 32' 00" west longitude. The Touquoy mine is located on the NTS sheet 11D15 and is centred at 44°59'09" north latitude and 62° 56' 16" west longitude.

Figure 3-1: General Property Location



3.1.2 Accessibility

Access to the site is via Highway 374 which connects several large towns in Pictou County (Stellarton, New Glasgow) with the coastal community of Sheet Harbour, a small village of a few hundred inhabitants located approximately an hour drive east of metropolitan Halifax (Figure 3-1). The site can be accessed from Highway 374 via the Seloam Lake Road which intersects Highway 374 approximately 30 km north of Sheet Harbour and links with the Project 1.1km from the highway.

Highway 374 is a well maintained bituminised road which is generally passable year-round.

3.1.3 Climate and operating season

Eastern Nova Scotia is characterized by northern temperate zone climatic conditions moderated by proximity to the Atlantic Ocean. Seasonal variations occur, with winter conditions of freezing and/or substantial snowfall expected from late November through late March. Spring and fall seasons are cool, with frequent periods of rain. Summer conditions can be expected to prevail from late June through early September with modest rainfall and daily mean temperatures in the 15°C to 20°C range. Maximum daily summer temperatures to 30°C occur, with winter minimums in the minus 25°C to minus 30°C range. Mineral exploration programs can efficiently be undertaken during the period of May through late November, while winter programs can be accommodated with appropriate allowance for weather delays.

3.1.4 Local Resources and Infrastructure

A large proportion of the surface rights in the PA are held by Mac-Gregor Properties Ltd of Halifax, including the area over the Egerton-McLean, Hudson and Plenty Zones. An agreement is in place with MacGregor Properties Ltd. whereby Atlantic Gold Corporation, through Acadian Mining Corporation a wholly owned subsidiary, can both explore and mine on the property after meeting various financial requirements. Most of the remaining surface area is held by the Crown (administered by the Province of Nova Scotia).

A three phase 69MV hydroelectric transmission linking Sheet Harbour and New Glasgow is located approximately 1km west of Highway 374, within 4km of the Egerton-McLean Zone and could potentially supply power for a processing facility.

There are several lakes within and near the edge of the PA, including Seloam Lake and the Anti-Dam Flowage, such that an abundant water supply is available. Further evaluation is required to confirm preferred water source for the mine development and a subsequent surface water withdrawal permit will be required from Nova Scotia Environment (NSE).

It is anticipated that the majority of personnel required for any mining operation at the Project would be recruited from people living within daily driving distances of the project, with specific training programs initiated as required.

Potential Project tailings storage areas, waste rock storage areas and plant site locations present no significant technical hurdles.

3.2 Land and Water Use

3.2.1 Zoning

The Project is located within the Musquodoboit Valley/Dutch Settlement Plan Area. The properties are designated Mixed Use (MU) and zoned Mixed Use (MU). The MU zone permits extractive facilities as a listed permitted use (pers. Comm. Langille, 2018).

3.2.2 Legal Description and Ownership

The PA is located in eastern Halifax County in central Nova Scotia, approximately 95km northeast of the provincial capital, Halifax (Figure 3-1). The property covers the eastern half of the historical Fifteen Mile Stream Gold District (NTS 11E1C / 11E2D, UTM NAD 83 Zone 20 approximately 538,000 East / 4,999,000 North).

In terms of surface rights, there are two main landowners in the property area: MacGregor Properties Ltd. of Halifax and the Crown. Three of the four main zones of mineralization, the Egerton-McLean, the Hudson and the Plenty zones, occur on the MacGregor lands, with the 149 East Zone situated on land owned by the Crown.

An agreement to explore, develop and mine is in place with MacGregor Properties Ltd. Acadian signed an Access Agreement and Option to Lease with MacGregor Properties Limited on April 8, 2010, which provides Acadian with exclusive rights to conduct exploration on the MacGregor Properties Ltd. land and thereafter the option to lease the lands for mining. The exploration period timeframe extends until December 31, 2019 and the lease period timeframe extends from the lease commencement date until December 31, 2034. If a mine is operating on the area on December 31, 2034, then the lease period may be extended by agreement.

The property consists of one Special Licence, SL 11/90, and two Exploration Licences (EL 10406 and EL 05889). The three licences comprise a total of 45 contiguous claims covering a surface area of approximately 701 ha. Annual work commitments total $33,600. There are sufficient work credits to maintain SL11/90 until its 2021 anniversary, EL 10406 until its 2021 anniversary and EL 05889 until its 2019 anniversary, without further assessment work being filed. The annual claim renewal fee for all three Licences totals $13,440.

The mineral rights for the Project are wholly-owned by Atlantic, subject to the following royalties:

- Special Licence 90/11 is subject to a 1% Net Smelter Return (NSR) payable to members of the Felderhof family (G. William Felderhof, David H. Felderhof and Dick P. Felderhof)
- Exploration licence 05889 is subject to a 3% NSR, payable to Mr Scott Grant, with The Proponent able to purchase up to 2% of that royalty from Mr Grant for $500,000 for the first percentage point and $1,000,000 for the second percentage point, or pro-rata for parts thereof.
- Former Exploration Licence 06135, now part of EL 10406, is subject to a 1% NSR payable to Meguma Resource Enterprises Inc. The Proponent may purchase the NSR for $250,000. The area of this former licence is, however, located to the south of and remote from the FMS deposit. The area of the current Mineral Resource estimate is therefore outside the influence of this royalty.

A Mining Lease will be sought once the Project receives Environmental Assessment Approval.

3.2.3 Current Land Use

The principal economic activity in the PA is forestry. Coastal settlements to the south support a long standing lobster and fishing industry. Streams and waterways in the area support trout fishing and other recreational uses.

The PA has had previous exploration and mining activity. A series of historical and abandoned mine openings are present across the PA and Seloam Brook has been ditched and re-routed in multiple locations that allowed for mining activities to occur in the past. There is a road network on the site to support previous exploration and mining activity, as well as forestry activity on provincially owned land within the PA. Access roads have been in place for decades for forestry and mining activities; others may use the roads from time to time for seasonal activities on the private and crown land. The use of the land by First Nations communities at this point has not yet been fully revealed and is currently being evaluated. The roads present opportunities for recreational vehicle use and foot traffic but the degree of use of the private and crown roads is not well documented.

The transportation route for concentrate between the PA and the Touquoy mine has been previously described in detail. The initial haul route utilizes existing provincial highways and roads (Highway 374, Highway 7 and Mooseland Road). Once Beaver Dam is operational, the transportation route will involve Highway 374, Highway 7 to Sheet Harbour, then north on Highway 224 to the Beaver Dam Haul Road to Mooseland Road.

3.3 Proximity

The PA is unpopulated and the nearest village to the property is Sheet Harbour, 33 km to the south along Highway 374, which has a population of approximately 800 people and services a broader population of approximately 5000 people, mostly distributed in a string of small communities along the coastline. It provides many amenities including a deep-water port from which wood chips are currently shipped to various international destinations.

4. Environmental Effects

Environmental studies began in June 2017 to support exploration and will be continuing until August 2018 to support the Environmental Assessment for Project. Descriptions of existing conditions are based on desktop, regional knowledge from similar projects and preliminary field study. Potential effects are therefore drawn on this limited knowledge base and will be refined as further study and analysis is completed. To that end, the work that is planned to complete the analysis is also provided. Plans may be modified depending on findings. Where possible, some project components may be modified to accommodate potential environmental effects.

4.1 Ecological Context

The Project is located in the eastern ecoregion, and further subdivided into the eastern interior ecodistrict. The ecoregion is underlain by quartzite and slate of the Meguma Group, with granitic intrusives. A variety of landforms are found in this ecoregion, which include rolling till plains, drumlin fields, extensive rockland, and wetlands. The bedrock is highly visible in those areas where the glacial till is very thin, exposing the ridge topography. Where the till is thicker, the ridged topography is masked and thick softwood forests occur. There are a few drumlins and hills scattered throughout the ecodistrict with fine textured soils derived from slates (Neily et. al, 2005).

The composition of the forests in this ecodistrict strongly reflects the depth of the soil profile. Thus, many climax compositions can be found throughout. On the shallow soils, repeated fires have reduced forest cover to scrub hardwoods such as red maple and white birch, with scattered white pine and black spruce underlain by a dense layer of ericaceous vegetation. However, on the deeper, well drained soils stands of red spruce will be found. On the crests and upper slopes of hills, drumlins, and some hummocks, stands of tolerant hardwood occur. Both beech and hemlock occur on these deeper, well drained soils, but their presence is usually individual and seldom of a high percentage in any stand. On the imperfectly and poorly drained soils, black spruce will dominate the stand composition.

The PA is located in the East River Sheet Harbour Secondary Watershed (1EM-1) which measures 57,666 hectares. It is one of the moderately sized watersheds in the Province. The proposed Project infrastructure is located entirely within the Seloam Brook tertiary watershed (1EM-1-B).

The PA sits within the Liscomb game sanctuary. The closest wilderness areas are Toadfish Lakes wilderness area which is 1.8 km south of the PA, Boggy Lake wilderness area, which is 2.6 km southeast of the PA, and Twelve Mile Stream wilderness area, which is 5.5 km southwest of the PA. The closest nature reserves are Abraham Lake nature reserve which is 7 km west of the PA, and Rush Lake nature reserve which is 7 km to the northeast.

4.2 Spatial Boundaries

The Fifteen Mile Stream Gold Project Area (PA) is defined as the current preferred layout for infrastructure plus an appropriate buffer setback to evaluate direct impacts. It is important to note that additional engineering and technical studies are still required to finalize site infrastructure.

The EIS Local Assessment Areas (LAA) for each VC have been drafted and will be discussed in detail in the EIS document. EIS Regional Assessment Areas (RAA) for each VC (as determined to be required for analysis) have also been drafted.

4.3 Geochemistry (ARD/ML)

4.3.1 Existing Conditions

Acid rock drainage (ARD) that is caused by human activity refers to the outflow of acidic water from metal mines, coal mines or disturbance from construction (highways, housing, commercial developments) where, due to blasting or excavation of geologic materials, iron sulphide minerals become exposed to the atmosphere. When these environments are disturbed and come into contact with water, oxygen, and certain bacteria, the sulphide minerals may oxidize and generate acid in the process.

The acid production potential (AP) of a material, based upon its sulphide content, may be offset by its neutralization potential (NP), which is most commonly afforded by carbonate minerals such as calcite and dolomite. The balance between these two factors (NP/AP) determines the likelihood of an exposed material type to generate net acidic drainage. However, besides the relative quantities, the reaction kinetics of acid-generating and acid-buffering phases also play an important role. The rate at which mineral-dissolution reactions occur is largely driven by the grain size, texture, mineral chemistry and ambient conditions (e.g., pH, temperature, etc.) under which the material is stored.

Metal leaching (ML) is a common phenomenon at mine sites and the relationship between ARD and ML is twofold. First, many sulphide minerals commonly host base metals (e.g., Cu, Cd, Zn, Pb) and metalloids in their crystal lattice, which will be released upon oxidation of the sulphide phase. Second, most metals that are commonly considered of environmental concern in tailings porewaters are more soluble under acidic condition, although several elements that exist as oxyanions under aerobic aqueous conditions may be mobile in a pH-neutral regime (e.g., As, Se).

To date, no specific geochemical testing has been completed at the PA to assess the potential of waste rock, tailings and other-mine related materials to cause ARD/ML.

4.3.2 Potential Environmental Effects

In the absence of mitigation, ARD/ML can lead to contamination of natural waterways with elevated levels of metals and other elements as well as low pH conditions unsuitable for aquatic life.

As a mitigation measure for ARD/ML potential, materials excavated from the site will be tested to ensure that they continue to conform to the Sulphide Bearing Material Disposal Regulations. If a material type is found to be net acid producing at the site, the Proponent will proceed in accordance with the Nova Scotia Sulphide-Bearing Material Disposal Regulations, in consultation with NSE, and generally follow best management practices.

The PA lies in the same geological formation as other operating or planned mines (Touquoy, Beaver Dam) owned by the Proponent and therefore certain geological and mineralogical parallels can be drawn. For example, previous geochemical studies at the Touquoy mine have established that the risk for ARD at that site is low with the majority of waste rock being non potentially-acid generating (NPAG). This is a result of both the relatively low sulphide and the considerable carbonate contents identified in the different waste rock types. With respect to ML, arsenic was determined to be a parameter of potential concern.

4.3.3 Work Planned

Potential current effects of ARD/ML will be studied via hydrogeological and surface water sampling programs that are underway and will continue through 2018.

A Phase I geochemical assessment study will be completed in 2018 including a static test program. As part of this program, drill core samples will be collected for geochemical testing (acid-base-accounting and metals) which will inform geochemical trends and recommendations with respect to material handling and storage. A Phase II geochemical assessment may follow that would include more detailed mineralogical work and kinetic testing to better understand elemental speciation as well as acid and metal release rates.

As mining enters the development and production phases, routine geological and water quality monitoring will be required to confirm the low potential for acid generation.

A robust monitoring program of site discharges, developed for the IA, will provide data to confirm the results of the assessment. A Sulphide Bearing Materials Management Plan will be developed in conjunction with the IA Application as required.

The WRSF will be designed to ensure safe storage of mine-related materials based on the understanding of contaminant sources, pathways, and receivers. Modifications to the storage of materials can be made as operational data becomes available.

4.4 Groundwater

The PA is in a rural area of Halifax County that is sparsely populated. The nearest domestic well is likely to be, as recorded in a provincial well log database, 12.5 km away from the site, down-gradient in a southerly direction at a residence along Highway 374. Site surveys indicate no other wells in closer proximity. Domestic wells are a mix of drilled and dug wells in the area based on a review of the Nova Scotia Well Log Database (NSE 2013). Domestic water supplies in the area are typically vulnerable to surface water entry and associated coliform bacteria issues and elevated iron and manganese concentrations (Lin 1970).

The site hydrogeology consists of a shallow fractured rock aquifer system which is overlain by a thin aquifer in the till. Based on previous studies of the hydrogeology of this deposit, and others in the area, the degree of hydraulic connection between the shallow bedrock fracture systems is likely poor to moderate, and the main zones that are capable of storing and transmitting relatively large volumes of groundwater are the larger scale fault systems. The water table is close to the surface across the PA, reflecting flat lying terrain, low permeability bedrock and an excess of annual rainfall over evaporation. Thus, the bedrock sequence and part of the overlying tills will be saturated with groundwater under ambient conditions.

The Touquoy mine was subjected to a hydrogeological investigation that consisted of a series of geotechnical/hydrogeological drill holes that were monitored for groundwater quality. Given that the geology at the PA is similar to that at the Touquoy mine, it is anticipated that similar hydrogeological conditions exist. Results from the Touquoy mine indicate that groundwater is slightly basic (pH from 7.02 to 8.08) with elevated hardness (45- 160 mg/L). Certain metals such as aluminum, arsenic, manganese, strontium and zinc are elevated relative to guidelines for drinking water in Canada but within ranges found in groundwater in Nova Scotia.

The actual volume of groundwater stored in the bedrock aquifer is small, and this reflects the relatively small primary porosity of these rocks. Some of the larger bedrock structures may be hydraulically connected to surface water bodies which may become sources of aquifer recharge under a mine dewatering scenario. An ongoing predictive modelling and testing program at the Project is expected to confirm earlier investigations that indicated the future mine operation will not negatively affect flow in Fifteen Mile Stream and tributaries.

4.4.1 Potential Environmental Effects

The physical nature and extent of interaction between the groundwater and surface water and how they might be affected by mining activities will be characterized by detailed hydrogeologic studies at the PA. Given the distance to the nearest residence, it is improbable that any potable groundwater resources will be affected.

4.4.2 Work Planned

Hydrogeologic programs are being implemented at the PA in 2018. A series of multilevel groundwater monitoring wells will be installed across the site. The wells will be tested and monitored to characterize hydrogeological conditions and sampled to characterize the groundwater chemistry. Surface water stations will be established to measure elevations and flow in adjacent and nearby water bodies. The collected data will be used and incorporated into the three-dimensional groundwater models that will be developed for the sites and used as a predictive tool for the purpose of facility design and to predict and assess potential surface water and groundwater interaction. In particular, the model will be capable of predicting potential changes to receiving environment water quality due to groundwater transport. This site specific hydrogeological study is underway, and results will be provided in the EIS.

4.5 Surface Water

The PA is located in the East River Sheet Harbour Secondary Watershed (1EM-1) which measures 57,666 hectares. It is one of the moderately sized watersheds in the Province. This area is located in a region of the province characterized by rolling till plains, drumlin fields, extensive rockland, and numerous freshwater lakes, streams, bogs and wetlands. The area can be further characterized as having relatively low relief, hummocky type terrain. Forests are predominantly coniferous of red and black spruce. According to NSDNR the site is in the Eastern Interior ecodistrict, one of the largest in the province. This ecodistrict is typified by areas of thin glacial till and exposed bedrock. Where the till is thicker, the ridged topography is masked and thick softwood forests occur. Freshwater lakes are abundant. The majority of the PA is typified by hummocky topography with imperfectly drained, medium-coarse textured soils. This inland area is somewhat removed from the immediate climatic influence of the Atlantic Ocean and is characterized by warmer summers and cooler winters.

The East River Sheet Harbour drainage basin is drained by the East River Sheet Harbour and its tributaries, from north to south. Commencing in the headwaters of the secondary basin, the watershed drains south to the confluence of the Fifteen Mile Stream with the Twelve Mile Stream at Marshall Flowage, where the East River Sheet Harbour then drains south from Marshall Flowage, through the Malay Falls Flowage and Ruth Falls Flowage, to the Atlantic Ocean at Sheet Harbour. Elevation range within the catchment is 0 to 210 masl (metres above sea level), which varies from approximately 200 to 210 masl in the headwater areas and gradually decreases to sea level at the final outlet at Sheet Harbour. The headwaters of the watershed are located along the topographic divide separating it from the St. Mary's Watershed to the northeast and the Liscomb River Watershed to the northwest. In the vicinity of the site, the Fifteen Mile Stream is the main mapped watercourse along with Seloam Lake and Anti-Dam Flowage as the major mapped waterbodies. The proposed project infrastructure lies entirely within the Seloam Brook tertiary watershed (1EM-1-B). This tertiary watershed drains through the Project from northeast to west initiating in the tributaries of Seloam Lake that drains to Seloam Brook and into Fifteen Mile Stream and on to Anti-Dam Flowage.

Photolog 2: Seloam Brook

The complex system of streams, lakes, bogs and wetlands is a direct result of the underlying bedrock geology of greywacke and slate found in the region. These relatively impermeable and poorly jointed rocks result in slow groundwater recharge and most of the excess surface water is retained on the surface, often called a 'deranged' drainage pattern. The basin ultimately drains to the south via the East River Sheet Harbour, and discharge peaks are attenuated to a large extent by the numerous hydroelectric dams and associated reservoirs owned and operated by Nova Scotia Power (NSPI) through which runoff is routed (Seloam Lake, Anti Dam Flowage, Marshall Falls, Malay Falls, Ruth Falls and the Barrier Dam).

Photolog 3: Dam at outflow of Seloam Lake

The purpose of the surface water program is to establish a water quality baseline for comparison of water quality before and after site activities commence. Each sample is analyzed for general chemistry and metals (RCAp-MS), mercury (Hg), and total suspended solids (TSS). Dissolved oxygen (DO), pH and temperature are recorded in the field. Sampling, which began in August 2017, is conducted quarterly and will continue to confirm compliance with the mine's operating permits and other applicable regulatory requirements. Flow measurements are also being collected at each surface water monitoring location during quarterly monitoring events. Table 4-1 provides an overview of the sample locations.

Table 4-1: Environmental Baseline Sample Locations

Sample ID	Location	Rationale	Parameters
SW1	Unnamed tributary to Seloam Brook	To characterize water quality near project activities	RCAp-MS, Hg, TSS, DO, temperature, pH
SW2	Seloam Brook at outlet of Seloam Lake Reservoir	To characterize water quality upstream and east of the project activities	
SW3	Unnamed headwater pond	To characterize water quality upstream and southeast of the project activities	
SW4	Unnamed tributary to Seloam Brook	To characterize water quality near project activities	
SW5	Seloam Brook at western extent of PA	To characterize water quality downstream and west of the project activities	
SW6	Fifteen Mile Stream downgradient of Anti Dam	To characterize water quality downstream and south of the project activities	
SW7	Fifteen Mile Stream down gradient of Seloam Brook	To characterize water quality downstream and west of the project activities	
SW8	Fifteen Mile Stream west of PA	To characterize water quality midstream and west of the project activities	
SW9	Fifteen Mile Stream northwest of PA	To characterize water quality midstream and west of the project activities	
SW10	Fifteen Mile Stream upgradient of PA	To characterize water quality upstream and north of the project activities	
SW11	Moser Lake	To characterize water quality in a different watershed for reference	

4.5.1 Potential Environmental Effects

The physical nature and extent of interaction between surface water and groundwater resources and how they might be affected by mining will be characterized by detailed hydrogeologic studies. Runoff from the site will be collected in ditches and water management ponds (site management pond and plant site management pond) and monitored to determine suitability prior to release to the environment. Flows may be reduced in nearby surface features due to changes in groundwater elevations near the pit.

The Seloam Brook reroute will alter surface water flow within the PA. Best practices like silt fencing and erosion controls will be used to mitigate impacts to the broader surface water system during the construction and establishment of the reroute. The reroute will be designed to handle flow rates similar to the current channel. The Seloam Brook reroute is discussed in further detail in Section 4.9.

Discharges from the PA will include surface water runoff and seepage from stockpiles. Water will be collected in a combination of ditching and two water management ponds to reduce total suspended solids (TSS) prior to release to the environment. If the water quality isn't suitable for release, the water will be transferred to the TMF for use as process recycle water and for eventual treatment and release of surplus water. The areas of release will be into Seloam Brook. A monitoring program will be established at each release location (pond outfall) to confirm the quality of water chemical and general parameters meet the applicable guidelines and legislative requirements.

Source terms from FMS tailings supernatant will be used to update the Touquoy water quality model to predict potential changes in water quality in the Touquoy TMF and open pit as a result of the addition of tailings from processing of concentrate at the Touquoy mine. This information will be used in support of an application to amendment to the Touquoy IA to accept processing of concentrate and disposal of tailings from FMS concentrate to the Touquoy TMF and open pit.

4.5.2 Work Planned

Quarterly surface water samples are currently being collected (started August 2017) and analyzed for general chemistry and metals. Flow measurements are also being collected at each location. This baseline sampling provides a year-long "look" at seasonal variations in the natural flows. Watersheds will be delineated, and all water bodies characterized within the PA.

A site hydrological study will be completed to evaluate potential effects on water quality and quantity, including from storm water discharge. Groundwater to surface water interaction will be evaluated as part of the planned 3D groundwater modelling. During final design, the appropriate sized Seloam Reroute channel and water management ponds will be engineered to accept site runoff for storm events. The Touquoy groundwater model will be updated as necessary to evaluate potential impact to surface water receptors from the FMS concentrate tailings in the exhausted Touquoy pit to support an application for amendment to the IA.

4.6 Wetlands

Wetlands are known as productive natural areas that bridge the gap between terrestrial and aquatic environments. As productive natural areas, wetlands provide habitat for diverse and abundant animal and plant communities. Any project with the potential to alter a wetland (activities including filling, draining, flooding or excavating) including direct and indirect impacts, requires a provincial approval prior to commencing work.

Wetland locations are determined by a combination of available information derived from the Nova Scotia Topographic Database, Nova Scotia Wetland Database, Nova Scotia Wet Areas Mapping, and aerial photo interpretation. If identified using the above noted data sources, the wetlands are considered "mapped wetlands". There are several mapped wetlands within or surrounding the PA. This information was used to assist wetland specialists to identify the potential locations of wetlands for further field surveys and assessments. Wetland delineation surveys commenced in 2017 within the PA.

Additional field surveys will also be completed in 2018 to confirm and delineate all wetlands that were not previously surveyed. All of the mapped wetlands will be assessed during baseline environmental surveys and any additional wetland habitat within the PA will also be identified and evaluated. Wetland surveys consist of wetland delineation and evaluation including hydrological characterization, plant surveys, fauna surveys, species at risk surveys, and functional assessments.

All wetland habitats have been and will continue to be considered when planning the placement of project infrastructure.

4.6.1 Potential Environmental Effects

Wetland habitat is expected to be altered and/or lost during the construction and operation of the Project. Wetlands are regulated in Nova Scotia under the Environment Act – Activities Designation Regulations and are managed in accordance with the Wetland Conservation Policy (NSE 2011), which provides direction and a framework for the conservation and management of wetlands in Nova Scotia. This provincial conservation policy is in alignment with the Federal policy on wetland conservation.

Wetland functions are the natural processes associated with wetlands and include water storage, pollutant removal, sediment retention and provision of nesting/breeding habitat. Functions may also include values and benefits associated with these natural processes and include aesthetics/recreation, cultural values, and subsistence production.

The potential effects on wetland functions resulting from the Project may include:

- Enrichment/Organic loading
- Acidification
- Sedimentation
- Turbidity/Shade
- Temperature Increases
- Flooding
- Wildlife Displacement
- Contamination
- Salinization
- Soil Compaction
- Vegetation Removal/Alteration
- Drainage
- Fragmentation

Loss of wetlands that are directly affected by project infrastructure is expected to be the main effect to wetlands. Avoidance is the best policy and the Proponent will design and operate the Project to minimize impact to wetlands.

Outside of the infrastructure footprint, it can be assumed that direct loss of wetlands would not occur. However, a change in surface water drainage patterns and surface water quality could result in indirect impacts to wetlands outside of the project infrastructure footprint within the PA.

Any alteration/disturbance to wetlands (direct or indirect) will require alteration approval from Nova Scotia Environment (NSE). Should wetlands be determined to support fish/fish habitat a "serious harm to fish" authorization may also be required from DFO (Fisheries Act Authorization 35 (2)). The environmental assessment will detail the potential wetland impacts, proposed mitigation, and compensation approach to restoring or replacing impacted wetlands.

4.6.2 Work Planned

Survey work will continue in the 2018 field season and wetland delineation and evaluation will occur as per required methodologies. Wetland assessments will provide information in accordance with the requirements as prescribed in the Wetland Conservation Policy (Nova Scotia Environment, 2011).

During field assessments, three criteria are reviewed to determine the presence of a wetland:

- hydric soils present;
- conditions that result in flooding, ponding, or saturation of an area for a minimum period of time during the growing season; and,
- majority of dominant vegetation species associated with wetlands.

Evaluations of functional assessments of each wetland will be completed in the field in accordance with the Wetland Ecosystem Services Protocol – Atlantic Canada (WESP-AC; Adamus 2011) wetland evaluation technique.

4.7 Habitat and Flora

Within the PA, there are a number of ecosites, each within a variety of moisture regimes including dry, fresh, and moist, with poor, medium and rich nutrient regimes. These ecosites generally support forest group vegetation types from that include Black Spruce, Red Maple, Balsam Fir, White Pine, Red Spruce, Yellow Birch, and White Birch. In areas affected

by natural or anthropogenic disturbance (such as wind throw or tree harvesting), early successional stands were determined to be in the mixed wood or softwood forest group. The dominant disturbance regime in the PA is timber harvesting, which is present in patches through upland forests. Vegetation is found on a range of slope positions and most sites are non-rocky. Soils are mainly derived from glacial till deposits. Generally speaking, uplands within the PA contain immature or uneven-aged stands. Habitat assessments within the PA were initiated in 2017 and will continue in the 2018 field season as necessary.

Photolog 4: Representative habitat

Prior to commencement of biophysical studies within the PA, assessment of wildlife, including vegetation, and habitat was completed based on the requirements outlined in the Nova Scotia Environment (NSE) Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSE 2008). Development of a priority list of species for each taxonomic group was completed based on a compilation of listed species from the following sources:

1. Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the Federal *Species-at Risk Act* (SARA 2003). All species listed as Endangered, Threatened, or of Special Concern;
2. *Nova Scotia Endangered Species Act* (NSESA 1999). All species listed as Endangered, Threatened, or Vulnerable; and
3. Species of Conservation Concern listed as SRank S1-S3 by ACCDC.

This priority list of species was narrowed by broad geographic area. The priority list of species was then further narrowed by identifying specific habitat requirements for each species. For example, if a listed NSESA species required open water lake habitat, and no open water lake habitat was present inside the PA, this species would not be carried forward to the final list of priority species for field assessments.

Botanical surveys were completed throughout the PA primarily in wetlands, and intact and disturbed upland habitats during baseline assessments in 2017 and will continue in 2018. No SARA listed vascular plant species have been identified to date within the PA.

Lichen surveys were completed throughout the PA during 2017 and will continue in 2018. Lichen surveys to date have not identified any Boreal Felt Lichen (Erioderma pedicellatum) (SARA endangered, NSESA endangered) within the PA. Blue Felt Lichen (Degelia plumbea) (SARA special concern, COSEWIC special concern, NSESA vulnerable) was identified within the PA. No other SARA listed lichen species have been identified to date.

Overall, the PA is primarily comprised of disturbed areas from clear cutting and historical mining activities consisting of disturbance-thriving species. However, a series of high integrity peatland ecosystems exist consisting of high flora biodiversity. The majority of the landscapes within the PA lack the over mature red maple and balsam fir required to support many of the rare lichen species (Pepper, 2017, personal communication).

4.7.1 Potential Environmental Effects

The Project has the potential to affect habitat directly associated with site clearing activities within the PA and indirectly with disturbance associated with dust, alteration of surface and groundwater flows and habitat fragmentation. The data collected during assessments will be used to identify known, probable, or other species-specific habitat types, species at risk locations, and the likelihood of species at risk occurring within a specific area. The effects of the Project on vegetation may include total loss of species during construction and operational activities within the infrastructure footprint. Final infrastructure placement will attempt to reduce impacts to rare plants through micro-siting of infrastructure, where practicable. Appropriate best management practices and strategies will be considered and implemented to the extent possible to minimize potential effects to habitat, and vegetation.

Preliminary desktop and field analysis to date does not indicate the presence of unique habitat within the PA, or habitat that is regionally unique. All identified habitats appear to be continuous with habitats present outside the PA.

Further vegetation studies and evaluations will help confirm the presence and/or potential of presence of species at risk within the PA and the potential impacts to these species from Project activities. Final construction and operational footprint designs will take into account the results of these studies in order to mitigate the effects of the Project on species at risk.

To better categorize impacts, potential effects of the Project will be divided into two categories: loss and alteration. Loss occurs when project footprints overlap the location of a species and Project activities such as vegetation clearing or construction result in the removal of the species and loss of the functions it provides. Alteration is used to indicate a change in the quality of habitat functions provided by a system due to project effects. Alteration occurs along project edges or linear corridors such as roads and may extend out from these edges such as where dust deposition or edge effects occur. To assess these effects, a footprint-based approach will be taken. Loss will be assessed where spatial overlap of Project footprints and species occurs. Potential causes of alteration are typical and include: fugitive dust, contaminants, introduction of invasive plant species, and edge effects.

Potential effects of the Project include direct loss, habitat loss, and the introduction of invasive species. Despite application of mitigation measures, residual effects may be possible. Residual effects are anticipated for the loss of vegetation and/or rare plants within the PA not offset by reclamation. Introduction and spread of invasive and exotic species associated with maintenance and operations may occur but weed management programs will minimize the associated impacts.

Habitat alteration, fragmentation and loss can cause corresponding changes in the suitability of an area for a given species. The magnitude of the change depends on the species being considered. For large, mobile mammals, a few hectares of habitat loss may be inconsequential. However, that same amount of habitat loss may remove the entire range for species with small home ranges (e.g., amphibians), if adjacent suitable and unoccupied habitat is not available. Some habitat alterations can have positive effects for some species (e.g., vegetation clearing will create edge habitat suitable for Olive-sided Flycatcher), whereas others could have long-lasting negative impacts on habitat viability (e.g., impacts on water quality). The determination of potential effects will consider disturbance, loss and alteration.

As a part of Project design, some footprints proposed early in the design have been, and may continue to be, altered to reduce effects to sensitive locations.

4.7.2 Work Planned

Survey work was initiated in 2017 and will continue in the 2018 field season within the PA. Further habitat delineation will occur in 2018 as a function of other baseline environmental assessments. Consultation with the appropriate regulatory agencies will occur if species at risk are located and mitigation options are considered.

4.8 Avifauna

Targeted breeding season, fall migration, and Common Nighthawk surveys were completed in 2017, and opportunistic sightings of birds identified in wetland habitats were recorded as part of an ongoing avian use assessment within and surrounding the PA. Sixty-eight species have been identified, including twenty-three species of conservation interest or species at risk which have been classified as priority bird species for the purposes of the effects assessment (Table 4-2).

Table 4-2: Priority bird species identified within the PA to date

Species	Common Name	Latin Name	SARA	NSESA	COSEWIC	Srank
AMKE	American Kestrel	*Falco sparverius*				S3B
AMRO	American Robin	*Turdus migratorius*				S5B, S3N
BBWA	Bay-breasted Warbler	*Dendroica castanea*				S3S4B
BBWO	Black-backed Woodpecker	*Picoides arcticus*				S3S4
BOCH	Boreal Chickadee	*Poecile hudsonica*				S3
CAWA	Canada Warbler	*Wilsonia canadensis*	T	Endangered	T	S3B
CONI	Common Nighthawk	*Chordeiles minor*	T	Threatened	T	S2B
EVGR	Evening Grosbeak	*Coccothraustes vespertinus*	No Status	Vulnerable	SC	S3S4B, S3N
GRAJ	Gray Jay	*Perisoreus canadensis*				S3
GRYE	Greater Yellowlegs	*Tringa melanoleuca*				S3B, S3S4M
NOGO	Northern Goshawk	*Accipiter gentilis*			NAR	S3S4
OSFL	Olive-sided Flycatcher	*Contopus cooperi*	T	Threatened	T	S2B
PISI	Pine Siskin	*Carduelis pinus*				S2S3
PUFI	Purple Finch	*Carpodacus purpureus*				S4S5B, S3S4N
RBME	Red-breasted Merganser	*Mergus serrator*				S3S4B, S5N
RBNU	Red-breasted Nuthatch	*Sitta canadensis*				S3
RCKI	Ruby-crowned Kinglet	*Regulus calendula*				S3S4B
RECR	Red Crossbill	*Loxia curvirostra*				S3S4
SPSA	Spotted Sandpiper	*Actitis macularius*				S3S4B
SWTH	Swainson's Thrush	*Catharus ustulatus*				S3S4B
TEWA	Tennesee Warbler	*Vermivora peregrina*				S3S4B

Species	Common Name	Latin Name	SARA	NSESA	COSEWIC	Srank
WISN	Wilson's Snipe	*Gallinago delicata*				S3B
YBFL	Yellow-bellied Flycatcher	*Empidonax flaviventris*				S3S4B

Note: The ACCDC works with provincial and federal experts to develop rarity ranks (i.e. S-ranks) for species in Nova Scotia, as well as the other Maritime Provinces, see http://www.accdc.com/en/rank-definitions.html for more information. An S-rank of S5 means that the species is Secure - Common, widespread, and abundant in the province.

4.8.1 Potential Environmental Effects

Migratory birds may be affected via direct mortality from collisions with transmission lines, buildings, or vehicles, removal or disruption of nests, loss of habitat due to vegetation clearing, interference from Project lighting and noise, and effects to health from potential degradation of air and water quality. Project activities could potentially affect migratory birds. All effects will be evaluated in the EIS for all construction, operational and reclamation activities required for the Project.

Land disturbance, including building of roads, clearing of vegetation, excavation and blasting activities during the breeding season may affect nesting habitats of certain species and result in changes to migratory birds and their habitat. Some migratory birds may also experience sensory disturbance as a result of increased noise, lighting and other human activities associated with the Project. Finally, the Project could affect migratory birds and their habitat during emergency incidents (fires, spills and hazardous materials) which could result in a direct or indirect impact on the bird or its habitat.

Potential impacts to migratory birds and their habitat should be minimized during all stages of the Project. The Proponent will work at the Project to avoid destruction of active nests during the breeding season and will include mitigation measures such as adhering to timing windows to avoid clearing or conducting pre-clearing nest surveys to ensure the absence of nesting activity. Dust suppression mechanisms, and noise and light reduction will be considered during construction, operations and decommissioning of the Project to minimize impact to migratory birds and their habitat. Where feasible, a buffer zone of trees and vegetation will be left intact adjacent to project infrastructure to increase the distance between the operations and migratory bird habitat.

Impacts to migratory birds and their habitat could occur if a deleterious substance was released into a body of water frequented by migratory birds. Migratory birds could be affected as well should they attempt to use the TMF as a waterbody for staging, although this is unlikely given the short-term duration of such staging and the relatively low levels of deleterious substances expected to occur in the TMF pond. The Proponent will work to ensure migratory birds are considered when drafted Emergency Response Plans to effectively manage emergency spill situations to reduce or eliminate impact to the birds or their habitats.

The potential effects related to migratory birds and that are associated with the construction and operation phases of the Project are summarized as follows:

- Direct temporary and long-term loss of habitat for birds due to clearing and grubbing of the open pit, TMF, WRSF, and transmission line;
- Displacement of birds in areas of activity, including excavation and stockpiling of mined materials;
- Increase in dust levels from heavy machinery operation and a general increase in vehicular activity may affect vegetative growth and indirectly cause a decrease in prey populations;
- Bird injury and mortality from vehicle collisions;
- Disturbance resulting from anthropogenic noise and vibrations;

- Attraction and disorientation resulting from night-lighting;
- Bird injury and mortality due to exposure to hazardous products or deleterious substances; and,
- Other effects.

The increased traffic from the addition of concentrate haul trucks on local roads may cause an incremental increase in the potential for vehicle collision mortality with migratory birds although given the low numbers of additional truck traffic (approximately 10 truckloads per day) this is considered very unlikely.

4.8.2 Work Planned

Bird surveys will continue in 2018 within the PA with Spring Migration surveys, nocturnal owl surveys, and additional Breeding Bird surveys. Published and collected data and consultation with regulators will be used to further assess potential impacts to birds, including breeding birds.

4.9 Watercourses and Aquatic Habitat

The PA is located between Seloam Lake to the northeast and Fifteen Mile Stream to the west. Seloam Brook connects these two waterbodies, flowing through the PA from northeast to southwest. The PA is located within the East River Sheet Harbour Watershed, which is inaccessible to anadromous fish due to a series of water storage and hydroelectric dams constructed since the 1920s (O'Neil, Harvie and Longard, DFO, 1997). Dams are present along Fifteen Mile Stream including upstream of the PA at Seloam Lake, and directly downstream of the PA at the Anti-Dam Flowage. Further downstream, there are several dams on the East River Sheet Harbour: Marshall Falls, Malay Falls, Ruth Falls and the Barrier Dam, all of which are unpassable to fish except for Barrier Dam under high water conditions. Historical mining activity around Fifteen Mile Stream and Seloam Brook dates back to 1878 (Drage, 2015). This, in addition to watercourse management for hydroelectricity, has resulted in alterations to watercourse morphology, location, and flow, and consequently there have been countless alterations to fish habitat, populations, and distribution.

As well, previous anthropogenic activities, such as the maintenance of surface water drainage, have also altered the habitat and resulted in modifications to natural ecosystems. The locations of culverts and bridges were determined by surface water drainage and the need for road access to forest stands. To a large extent, surface water flow is maintained by these culverts, which were placed to prevent or reduce erosion and the undermining of road integrity. In some areas, surface water drainage is interrupted by the presence of roads and is directed down-gradient in roadside ditches. In most cases, these ditches direct the drainage to a culvert or stream.

Despite the historic changes to watercourses, Seloam Brook, Fifteen Mile Stream, and other unnamed watercourses within the PA provide fish habitat by supporting foraging, passage, overwintering, spawning and/or rearing habitat. The following fish species were recorded during electrofishing in 2017 within Seloam Brook: Banded Killifish, Brown Bullhead, Lake Chub, White Sucker, Brook Trout, Pearl Dace, and one Dace identified at the species level.

Evaluation of appropriate watercourse habitats (Seloam Brook to Fifteen Mile Stream, and unnamed watercourses) was completed in spring 2017 for Wood Turtle and Snapping Turtle habitat and species presence. No turtles were observed, although potential habitat was identified.

4.9.1 Potential Environmental Effects

The proposed project requires a re-route of Seloam Brook around the location of the open pit. Considering the prolonged and significant historical re-routes that have taken place on this watercourse in the last 140 years, this proposed alteration is not overly substantial. This watercourse is not pristine; its current state reflects previous resource extraction and major fluctuations in water levels due to the NSPI controlled hydro system, and as such the present fish habitat is not fully natural. Past anthropogenic activities are evident on the landscape from the unnatural straightening, ditching, side-channels, and boulder-lined banks. A new, re-routed watercourse may provide improved habitat by creating natural features in a way that was not done in the past.

The likelihood of residual effects to fish, fish habitat, and aquatic resources from the Project (Seloam Brook re-route and broader mine development) will be based upon impacts of the Project to surface water quantity and quality. The distribution of fish in waterbodies is affected by the presence of natural barriers preventing many species from occupying the upstream reaches of creeks. Re-routing of Seloam Brook will have a direct impact to fish habitat within the proposed project infrastructure area. One fish species at risk, Brook Trout (S3), was identified within the PA. Additionally, American Eel (COSEWIC T) and a remnant, isolated population of Atlantic Salmon southern uplands population (COSEWIC endangered) presence has been documented historically within Seloam Brook and Fifteen Mile Stream (NSPI, 2009), although neither were observed during 2017 baselines studies within the PA. Further assessment will be conducted to determine the potential for these species to be affected by the re-routing of Seloam Brook and broader mine development including the TMF.

Beyond the re-routing of Seloam Brook and direct loss of smaller tributaries to support mine development, the primary pathways of interaction between the Project and fish, fish habitat, and aquatic resources are expected to be a result of potential indirect:

1. changes in water quantity, due to alteration of natural drainage networks and construction of infrastructure; and,
2. changes in water quality (POL, pH, TSS) due to discharge and seepage from the Project.

Other potential effects to fish, fish habitat, and other aquatic species relating to direct mortality, erosion and sedimentation, and atmospheric deposition of dust are considered to be mitigated by Project design and the implementation of best practices and management plans. The assessment for potential residual effects on fish, fish habitat, and aquatic resources from changes in water quantity and water quality will use a combination of quantitative modelling for hydrology and water quality and qualitative analysis to predict the magnitude and extent of effects.

No watercourses within the Project boundary, or adjacent to, or crossed by the Project, are listed in the current Navigation Protection Act – Schedule (Section 3, subsections 4(1) and (3), 5(1) and 6(1), section 8, subsections 9(1), 10(1), 12(1), 13(1), 15(1), 16(1), 17(1) and 19(1), section 20, paragraphs 28(1)(e) and 28(2)(b) and (c) and subsections 29(2) to (4)) NAVIGABLE WATERS. Therefore, the Project would be exempt from application for approval under the Navigation Protection Act. Regulatory changes are expected under the Proposed Canadian Navigable Waters Act that would replace the Navigation Protection Act is under review and is expected to come into effect as early as June 2019. There is potential that, under this new regulation, waterways within the PA could require permitting. Further consultation with Transport Canada will be required as more information on the new act becomes available.

Culverts will be upgraded as necessary during project development and new crossings will also be identified on the few new mine site roads that will be constructed. Any upgrades, new crossing installations and/or watercourse alterations will be completed in accordance with the Nova Scotia Environment Watercourse Alteration approval process, and all appropriate applications for alteration will be sought prior to construction or upgrading as required.

Provided all standard watercourse alteration mitigation strategies are integrated into design, all necessary NSE approvals are acquired, and crossing structures are sized according to design flow characteristics, limited or no significant effects resulting from Project development should be expected, other than the Seloam Brook re-route and associated tributaries directly affected by mine development, for which an appropriate offsetting plan will be developed.

Seasonal fish passage within watercourses in the eastern side of the PA was observed despite low fish habitat potential and may be impacted by planned infrastructure.

4.9.2 Work Planned

Watercourse and aquatic habitat assessments have been ongoing since 2017 and will continue in 2018 within the PA. Work includes fish habitat characterization for each linear watercourse, wetland and waterbody identified, as well as determination of which species of fish are present within the PA. Surface water flow measurements and water quality sampling also took place in 2017 and will continue in 2018.

4.10 Terrestrial Fauna

Targeted field surveys and incidental observations for various fauna species were completed throughout the field season in 2017 and winter 2018 within the PA. Targeted surveys were completed for bats, mainland moose and lepidopterans. Incidental observations were recorded for all other fauna species including other mammals, reptiles and amphibians, and invertebrates (including freshwater molluscs, lepidopterans, and odonates). The goal of both targeted surveys and incidental observations was to understand which species are present within the PA and how they are using the area to allow for an evaluation of potential Project interactions and mitigation measures.

Incidental observations and all various signs of mammals in the PA were documented and photographed during field surveys. Signs included features such as dens and nests, scat, tracks, and forage evidence. Incidental observations for priority invertebrates occurred during all field programs, particularly wetland and watercourse delineation, and fish habitat surveys. Signs of odonates and lepidopterans included live adults, larvae, or cast skins. Signs of molluscs included live or dead individuals, or shells.

Twelve mammal species were observed in the PA during the 2017 and 2018 field surveys (Table 4-3).

Table 4-3: Mammal species observed in the PA

Common Name	Scientific Name	Sign	COSEWIC, SARA, NSESA	S Rank
Mainland Moose	*Alces alces americana*	Tracks, scat	NSESA Endangered	S1
Coyote	*Canis latrans*	Tracks, scat	-	S5
American Black Bear	*Ursus americanus*	Observed, tracks, scat, digs	-	S5
White-tailed Deer	*Odocoileus virginianus*	Tracks, scat, browse	-	S5
American Red Squirrel	*Tamiasciursus hudsonicus*	Observed, tracks, middens	-	S5
North American Porcupine	*Erethizon dorsatum*	Observed, tracks, browse	-	S5
Bobcat	*Lynx roux*	Observed	-	S5

Common Name	Scientific Name	Sign	COSEWIC, SARA, NSESA	S Rank
Snowshoe Hare	*Lepus americanus*	Observed, tracks, scat	-	S5
Beaver	*Castor canadensis*	Observed, tracks, dams, lodges, felled trees	-	S5
Red fox	*Vulpes Vulpes*	Tracks		S5
Short-tailed Weasel	*Mustela erminea*	Tracks	-	S5
North American River Otter	*Lontra canadensis*	Tracks	-	S5

Note: The ACCDC works with provincial and federal experts to develop rarity ranks (i.e. S-ranks) for species in Nova Scotia, as well as the other Maritime Provinces, see http://www.accdc.com/en/rank-definitions.html for more information. An S-rank of S5 means that the species is Secure - Common, widespread, and abundant in the province.

Other common mammal species, such as raccoon (*Procyon lotor*), American mink (*Neovison vison*), muskrat (*Ondatra zibethicus*), and striped skunk (*Mephitis mephitis*) are likely to inhabit the entire PA or surrounding areas, at least periodically.

No bat hibernacula were identified during any surveys in the PA and the ACCDC reports no known bat hibernacula within the PA or in close proximity to the PA. The closest known bat hibernaculum is located at the Lake Charlotte Gold Mine, approximately 35 km southwest of the PA (Moseley, 2007).

Turtles were not observed during any surveys, although suitable habitat does exist in the PA for snapping turtle.

No SARA listed mammals, amphibians or reptiles were observed within the PA.

4.10.1 Potential Environmental Effects

Habitat alteration and loss can cause corresponding changes in the suitability of an area for a given species. The magnitude of the change depends on the species being considered. For large, mobile mammals, such as bears, a few hectares of habitat loss may be inconsequential. However, that same amount of habitat loss may remove the entire range for species with small home ranges (e.g., amphibians), if adjacent suitable and unoccupied habitat is not available. Some habitat alterations can have positive effects for some species (e.g., vegetation clearing will create edge habitat suitable for Olive-sided Flycatcher), whereas others could have long-lasting negative impacts on habitat viability (e.g., impacts on water quality). The determination of potential effects will consider disturbance, loss and alteration.

The Project has the potential to affect wildlife through the loss of habitat within the PA because of site clearing activities and disturbance from noise, Project related traffic, and habitat fragmentation. The potential exists for increased mortality risk through clearing activities. Sensory disturbance can occur primarily through Project generated noise, as well as ingestion of contaminants directly or indirectly and dermal absorption. Species that may be affected may include those listed under the Species at Risk Act, COSEWIC, NSESA, or NS Wildlife Act, as certain listed species like Mainland Moose (NSESA Endangered) have been observed or have the potential to occur within the PA.

As part of the Project design, some early proposed footprints have been altered to reduce effects to species. Design adjustments may continue to take place in order to avoid negative effects to wildlife. Appropriate best management practices and strategies will be considered and implemented to the extent possible to minimize potential effects to wildlife or any priority habitat identified. Additionally, wildlife studies will continue to be conducted as part of the environmental

assessment, which will inform the analysis of potential effects. The data collected during assessments will be used to identify known, probable, or other species-specific habitat types, species locations, and the likelihood of species occurring within a specific area. Habitat selection by wildlife is primarily a response to security, thermal comfort and forage needs. Species habitat requirements (i.e. thermal, cover, security) and rates of movement through various habitats help to determine the effect of habitat availability, use, and/or fragmentation on wildlife. Fragmentation of a particular species' habitat implies a loss of habitat, reduced patch size and/or increasing distance between patches; however, fragmentation may also suggest an increase of new habitat. Thus, the effect of habitat fragmentation on a species (population) would be primarily through habitat changes, and not solely habitat loss.

Wildlife populations may disperse from the PA during periods of construction and/or operation. However, this displacement may be only a short temporal disturbance and wildlife may return after human activity has eased or ceased. Based upon the similar vegetation characteristics in adjacent areas, it is expected that displacement of wildlife will result in the movement of wildlife to nearby habitats. Development of the Project is expected to increase forage potential as grass and forb species re-establish during interim reclamation. Loss of thermal and security cover is unavoidable; however surrounding vegetation is expected to maintain these requirements. Local level changes in abundance and distribution of species may occur as the result of Project activities, but it is not anticipated than any of these changes will result in changes in overall fauna populations. While some direct loss of habitat will occur, the PA is located in an undeveloped, natural landscape with a diversity of habitats. Habitat present within the PA is not unique or rare in the local or regional context.

4.10.2 Work Planned

Targeted and incidental survey work will continue in the 2018 field season within the PA, as part of other environmental assessment programs. Data collected during assessments will continue to be used to identify known, probable, or other habitat types, species locations, and the likelihood of species occurring within a specific area. The information collected in the preliminary stages will be used to create effective best management strategies that avoid or protect species.

4.11 Air Quality/Particulate Emissions

Airborne particulate matter is a complex mixture of organic and inorganic materials. Size and particle distribution can be categorized as either coarse particles, >2.5 microns (µm) in size, or fine particles, <2.5 µm in size. Total suspended particulates (TSP) include dust, dirt, soot, smoke and liquid droplets directly emitted into the air by sources such as factories, power plants, cars, construction activity, fires and natural windblown dust. Particles formed in the atmosphere by condensation or the transformation of emitted gases such as SO_2 and volatile organic carbons (VOCs) are also considered particulate matter.

Baseline air quality sampling was completed in the PA in November 2017 for a 24-hour period in accordance with USEPA CFR 40 part 50 -Regulations for Ambient Particulate Sampling. Sampling equipment utilized by AMEC consisted of high volume air samplers equipped with 8 inch X 10 inch glass fiber filters for sample collection. PM10 and 2 TSP units were set up at two locations and samples were analyzed for PM-10 and TSP.

Mining activities such as blasting, on site vehicle operations, crushing, and wind erosion from waste rock piles all can contribute to increased particulate levels. Based on Nova Scotia Air Quality Regulations; a significant adverse environmental effect with respect to total suspended particulate is one that would reduce air quality, such that the level of total suspended particulate matter exceeds 120 ug/m^3 over a 24 hour averaging period or 70 ug/m^3 over an annual averaging period.

Modelling is currently underway to report on expected values in comparison to the maximum permissible ground level concentration of 120 ug/m^3 as outlined in Schedule A of the Nova Scotia Air Quality Regulations. Particulate releases are expected to be similar to the Touquoy mine.

4.11.1 Potential Environmental Effects

Air-borne particulate matter will be generated during construction and operation phases of the Project. During clearing and grubbing activities, topsoil and overburden will be stockpiled for use in progressive and final reclamation activities. The control of fugitive dust from the mining operations will centre on provision of moisture control measures, such as spraying with water as required. During construction, water from water management ponds may be used for dust suppression or commercially available dust suppression options such as PineBind, a natural product for dust control, and other chemical suppressants. Trucks carrying flotation concentrate off-site will be covered.

In-pit operations will not generally have much direct off-site impact but could contribute to general dust levels at critical times if not controlled. Given that most of the fugitive dust generated at the site will be from crushing processes, and dust generated from trucking operations, most of suspended particulates generated will be inorganic and in the coarser fraction (>2.5 microns) and will tend to settle out close to source.

Pieridae Energy Canada's Goldboro Liquefied Natural Gas (LNG) Project data, along with available data from other locations in the area, such as recent particulate baseline data collected for the Proponent properties in the region will be used as representative background baseline data. The National Air Pollution Surveillance (NAPS) network is a cooperative program that measures air quality across Canada. The closest NAPS monitoring location to Fifteen Mile Stream is at Lake Major, approximately 130 km away. NSEL monitors PM 2.5 levels at that location. Monthly PM 2.5 measurements for 2005 ranged from 3 µg/m^3 -7 µg/m^3. Currently USEPA regulates PM 2.5 under the National Ambient Air Quality Standard (NAAQS) at 35 µg/m^3 for a 24-hour sample and an annual average of 15 µg/m^3. Lake Major will be used if there is no other available data for certain parameters.

4.11.2 Work Planned

Baseline values for air quality are currently being evaluated and modelled. Additional air monitoring may be undertaken as a condition of IA. Mitigation strategies will be developed for dealing with any unacceptable air quality results if identified through predictive modelling and operational monitoring.

4.12 Noise

Baseline noise monitoring was completed at the PA in 2017 and modelling is underway. Noise is defined as any unwanted sound which may be hazardous to health, interfere with speech and verbal communications or is otherwise disturbing, irritating or annoying. Blasting, on site vehicle operations and crushing can contribute to an increase in noise levels. As specified in the Noise Measurement and Assessment Guidelines, L_{eq} values should be within the following limits:

1. ≤ 65 dBA between the hours of 0700 and 1900 hours;
2. ≤ 60 dBA between the hours 1900 and 2300 hours; and
3. ≤ 55 dBA between the hours of 2300 and 0700 hours.

Noise outputs are expected to be similar to the Touquoy mine. Modelling will determine the predicted levels at the receptors and if those predictions are within the above guidelines.

4.12.1 Potential Environmental Effects

Noise generated throughout the mining development and operation will included drilling, blasting, crushing and transport of concentrate that may affect the suitability of adjacent habitat and the behaviour of birds and mammals. The noise from mining will be generally contained to the PA.

Given that there are no residential buildings located within 10km of the proposed open pit area, increases in noise from operations are not expected to affect residents in that area.

4.12.2 Work Planned

Baseline values for noise are currently being evaluated and modelled. Additional noise monitoring may be undertaken as a condition of IA. Mitigation strategies will be developed for dealing with any unacceptable noise results should they be identified through modelling or operational monitoring.

4.13 Light

The PA is in a remote location. Ambient night time light conditions would be minimal and typical of an undeveloped rural area. There are no perennial artificial light sources in the PA and any artificial light would be from occasional sources like an all-terrain vehicle or highway traffic. Light monitoring was not completed in the PA during the baseline studies as ambient night time light conditions are not anticipated to cause any effects on the nearest residences over 10 km away. Hauling of concentrate will not occur overnight.

4.13.1 Potential Environmental Effects

Light can affect the behavior of birds and mammals. Impacts will be mitigated by using direct and focused light only at the Project where necessary and installing downward facing lights to limit excess light escape.

4.13.2 Work Planned

Light modelling is currently underway. Light monitoring may be undertaken as a condition of IA. Mitigation strategies will be developed for dealing with any unacceptable light results identified through modelling or operational monitoring.

4.14 Climate Change and Greenhouse Gases

Greenhouse gasses (GHGs) including carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O) can be emitted from a number of natural and anthropogenic sources. Emissions from biogenic or other sources generally exhibit little variation from one year to the next, and are considered to be nominal when compared to those resulting from the combustion of fossil fuels.

Total GHG emissions are normally reported as CO2-equivalents (CO2e). This is accomplished by multiplying the emission rate of each compound by the global warming potential (GWP) relative to CO2. CO2e considers the global warming potential of the three main greenhouse gases: carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O). The global warming potential of these gases are as follows: CO2 = 1.0, CH4 = 21 and N2O = 310. Therefore, the carbon dioxide equivalency factor (CO2e) is equal to ((CO2 mass x 1.0) + (CH4 mass x 21) + (N2O mass x 310)).

The Canada total GHG emissions for the years 1990 and 2005 and 2015 are presented in Table 4-4 (Environment Canada, 2012d).

Table 4-4: Greenhouse Gas Emissions: Canada

Sector	1990 Emissions (Mt CO2e)	2005 Emissions (Mt CO2e)	2015 Emissions (Mt CO2e)
Oil and Gas	107	157.9	189.5
Transportation	121.8	163.2	173
Buildings	73.5	85.5	85.6
Electricity	94.5	116.9	78.7
Heavy Industry	96.6	86	74.6
Agriculture	60.1	74.4	72.8
Waste and others	56.9	54.4	47.6
Total	610.4	738.3	721.8

Source: EC 2018; https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/greenhouse-gas-emissions/canadian-economic-sector.html

In 2015, oil and gas accounted for almost 81% of the CO2e emitted in Canada. There is a decreasing trend in GHG emissions in the last decade. Between 2005 and 2015, Canada saw GHG emissions fall by 16.5 megatonnes (kt) CO2e (approximately 2.2%).

The Nova Scotia total GHG emissions for the years 1990, 2005 and 2015 are presented in Table 4-5.

Table 4-5: Greenhouse Gas Emissions: Nova Scotia(1)

	1990 Emissions (kt CO2e)	2005 Emissions (kt CO2e)	2015 Emissions (kt CO2e)
Total	19,800	23,200	16,200

Note: (1) Source: EC 2018; https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/greenhouse-gas-emissions/province-territory.html

Between 2005 and 2015, Nova Scotia saw GHG emissions fall by 7,000 kilotonnes (kt) CO2e (approximately 30%).

The total estimated predicted GHG emissions for the Five Mile Stream operation for one year is presented in Table 4-6. The estimate only includes primary sources and not support or indirect sources. The primary sources include diesel hydraulic DTH drills, diesel hydraulic RC drill, hydraulic excavators, wheel loaders and haul trucks. This estimate is has been calculated conservatively, and will be refined during the EA.

Table 4-6: Predicted GHG Emissions for Five Mile Stream

Onsite Mobile Sources	Total CO2e (kt/year)
Five Mile Stream Primary Sources	20.1

The predicted total GHG emissions for Five Mile Stream represent approximately 0.12% of the total Nova Scotia GHGs (based 2015 data from the NPRI).

4.14.1 Potential Environmental Effects

Greenhouse gasses (GHGs) will be generated through fuel consumption in on-site mining equipment, power generators and off-site trucking.

The greenhouse gas discussion will address potential impacts during all phases of operations including: emissions from heavy equipment operation and project traffic; accidental spills; adverse impacts to sensitive receptors; micro-climate modifications in the vicinity of the Project; and, potential human health related effects associated with climate change and greenhouse gas emissions.

4.14.2 Work Planned

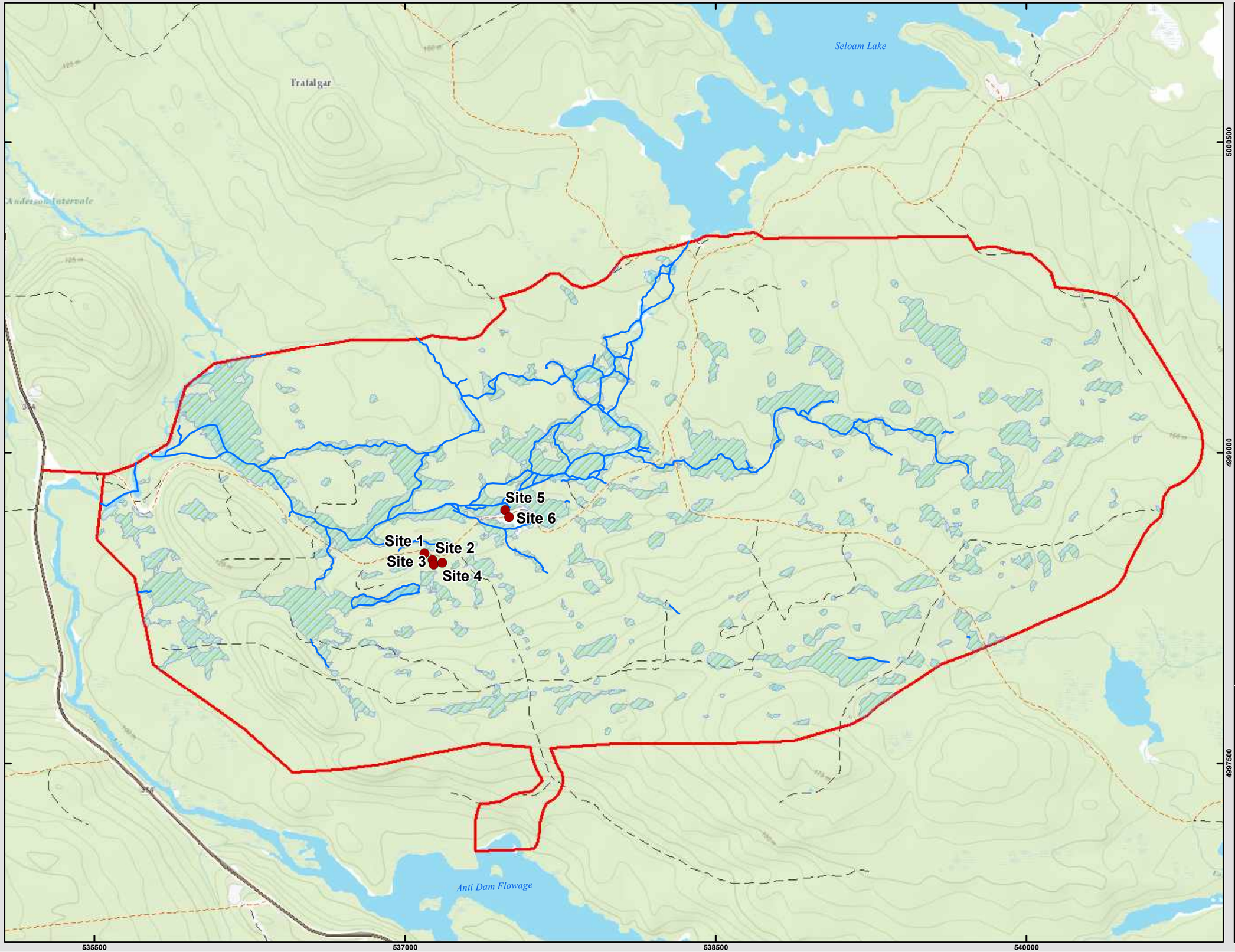
GHG modelling for each phase of the operation is currently underway. Additional emissions monitoring may be undertaken as a condition of IA. Mitigation strategies will be developed for dealing with any unacceptable emissions impacts identified through modelling or operational monitoring.

4.15 Archaeological & Heritage Resources

In 2008, Acadian Mining undertook an archaeological screening and reconnaissance program at Fifteen Mile in a specific area around the Egerton-McLean deposit. At that time, an open-pit mine was proposed as well as associated mine features including a crusher, a settling pond, stock piles of overburden and product, and service roads. The reconnaissance noted six features, all believed to be associated with past mining operations, which were within close proximity to the Egerton-McLean along the Seloam Lake road. The archaeologist (CRM Group) recommended that the features and the high potential areas be subject to shovel testing and the industrial features subject to detailed documentation if any of them fell within areas of future development.

CRM Group was again retained on behalf of the Proponent to conduct a site visit in the PA in September 2017. Building upon the research and reconnaissance undertaken on the property in 2008, CRM Group revisited several of the sites previously noted to confirm their presence and implement a buffer zone for avoidance during exploratory drilling, including the remnants of the cellar of the New Egerton Gold Mining Company office, the wooden sill foundation of a 19th century school house and features of the New Egerton Gold Mining Company store. CRM Group recommended that any development around the identified features (6 in total) would require shovel testing and intensified historical research. In addition, any development planned outside of their original study area from 2008 should be subject to a larger search (Figure 4-1).

The broader archeological field program across the PA is planned for Summer 2018 to allow for further archaeological investigation encompassing the proposed infrastructure and development footprint.



Prepared For:

ATLANTICGOLD

FIGURE 4-1

Fifteen Mile Stream Gold Archaeological Screening and Reconnaissance

Trafalgar, NS

- Archaeological Sites (CRM Group, 2009)
- Collector Highway
- Dry Weather / Seasonal Road
- Track
- Field delineated watercourses to date
- Field delineated wetlands to date
- Project Area

Coordinate System: NAD 1983 CSRS UTM Zone 20N
Projection: Transverse Mercator
Datum: North American 1983 CSRS
Units: Meter

0 200 400 800 Meters

1:17,000 Scale when printed @ 11" x 17"

Drawn By: LP

Date: 2018-05-16

McCallum Environmental Ltd.

4.15.1 Potential Environmental Effects

The loss or destruction of archaeological or heritage resources is a potential environmental effect of the Project. Based on the current area, the Project is expected to interact with two current areas of known historic resources. More resources may be identified during 2018 field programs which may also interact with project infrastructure.

4.15.2 Work Plan

In addition to work that has been completed to date, additional reconnaissance work will continue in 2018 across the PA.

Areas of potential archaeological significance which cannot be avoided in the design and development of the Project will be subject to intensified historical research to provide a comprehensive context for interpreting features and a program of shovel testing to determine whether or not buried archaeological resources are present and/or to determine the age, function and significance of identified features.

All historic industrial features which cannot be avoided in the design and development of the Project will be subjected to detailed documentation. Documentation should include video, photography and surveyed plans.

If additional historic resources are encountered during project construction or operation further survey work will be undertaken. If heritage resources are identified during construction or operation of the mine, then work will stop in the immediate vicinity until said resources can be further studied.

4.16 Traditional Use by First Nations People

4.16.1 Existing Conditions

A Mi'kmaq Ecological Knowledge Study (MEKS) has been initiated for the Project and will be completed according to the Mi'kmaq Ecological Knowledge Study Protocol (ANSMC 2007). Engagement with Millbrook First Nation, as the closest Mi'kmaq community, has also commenced to support identification of current uses of the land in close proximity to planned Project infrastructure. To date, no specific information relating to the current use of the land by the Mi'kmaq within and surrounding the PA has been revealed. There is no present indication of expected elevated current use within the PA based on distance to the nearest Mi'kmaq community (33km) and no observations of unique ecological features or species of elevated interest to the Mi'kmaq during baseline surveys to date. Additionally, the limited 2009 archaeological report completed around the Egerton-McLean deposit did identify several archaeological features, but all features were associated with historical mining activities, not Mi'kmaq resources.

Existing information relating to the baseline health and socio-economic conditions of the nearest Mi'kmaq community is limited. Interactions between the Mi'kmaq and the Project are anticipated to be low, for the reasons identified above. The expected interaction with the Mi'kmaq relates to potential use of the land for traditional hunting, plant gathering, and fishing. If the current use of the area is limited, then the need for data relating to baseline health and socio-economic conditions is low, given limited additional potential interaction with the Mi'kmaq. Collection of baseline health and socio-economic will be completed as is possible and available, and evaluation of the effects of the Project on the health and socio-economic condition of the Mi'kmaq will be completed in the EIS.

The Project lies within Eskikewa'kik or the "skin dressing territory". This particular district spans from Halifax County across to Guysborough County. Various authors and historians have differed in their description of how far this territory expands, but all have agreed that the PA lies within this district.

Beaver Lake Indian Reserve 17 is located along Highway 224, approximately 33 km as the crow flies (56 km via provincial highway) from the Project; and, is a satellite community associated with Millbrook First Nation. The reserve was established on March 2, 1867 and is approximately 49.4 ha in size. There are five homes and four small seasonal cottages or hunting camps located on the property with an estimated population on reserve of 21 persons. Lands surrounding the Reserve are used for traditional hunting and gathering. The proposed transportation route for FMS concentrate will not travel past this IR (initial transportation route or main transportation route once Beaver Dam project is operational).

Sheet Harbour Indian Reserve 36 is located just west of Sheet Harbour, approximately 33 km from the Project and is also a satellite community associated with Millbrook First Nation. The reserve is 32.7 ha in size. There are 9 homes and an estimated population on reserve of 25 people. Both proposed transportation routes for FMS concentrate will travel past this IR along Highway 7.

There is no land claim registered with the Specific Claims Branch of Indian and Northern Affairs Canada in Ottawa for any of the Mi'kmaq communities in Nova Scotia within the PA. However, that does not suggest that any other Mi'kmaw claimants for this area may not submit land claims in the future.

In the event that Mi'kmaw archaeological deposits are encountered during construction or operation of the Project, work will be halted in the vicinity of the discovery and immediate contact will be made with the Nova Scotia Museum and The Confederacy of Mainland Mi'kmaq. Should the proposed PA change or expand, additional research will be conducted. The Proponent will continue to communicate with the Mi'kmaq on a mutual benefits agreement and Memorandum of Understanding for its Nova Scotia mining interests.

4.16.2 Potential Effects

It has not been confirmed at this point whether the Project will use lands and resources that are used for traditional purposes by First Nations peoples. The MEKS will outline any potential effects the Project will have on traditional land use and provide recommendations for mitigation measures to be implemented. Health and socio-economic impacts to the Mi'kmaq were not clearly within the MEKS mandate however the Proponent will work to identify possible impacts for these aspects and proposed mitigation. Health is defined as overall health including mental, physical and spiritual for the Mi'kmaq and the Project does have the potential for both negative and positive impacts. On the negative side there is the possibility of elevated levels (above background but not out of compliance with regulated limits) of particulate and noise associated with the Project.

There is also the possibility that reduced harvesting (game, furbearers and medicinal plants) opportunities would occur if the proposed mine site is reported as a traditional use area.

The Project has the potential to bring positive socioeconomic change in the form of well-paying jobs for members of nearby First Nation Communities, and any future Mutual Benefits Agreement that is negotiated.

4.16.3 Work Planned

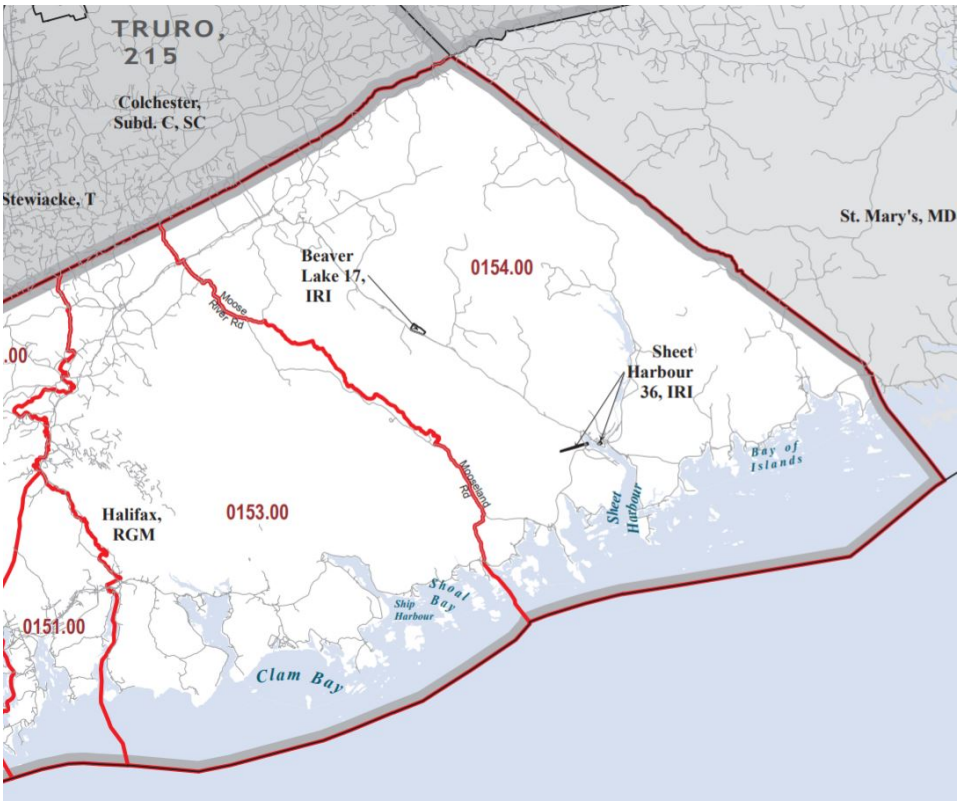
Information collected through engagement efforts with KMKNO, Millbrook First Nation and Sipekne'katik First Nation, along with the MEKS that is currently underway for the Project, will form part of the EIS that will address environmental and socio-economic effects as it relates to traditional use and other concerns raised by the community. Further engagement will be undertaken to understand the First Nation potential impacts and what mitigation is possible to build into the Project design.

4.17 Socio-Economic Setting

The region is primarily dependent on resource industries, predominantly forestry, agriculture, and to a lesser extent, mining/quarrying. Mineral exploration activity in the region has been constant for decades but has grown and declined over the years depending on the economic conditions of the day. The mining industry represents a significant potential source of employment in this region that has historically seen considerable mining focus over the last 150 years. Forestry and tourism have fluctuated significantly in response to prevailing economic conditions. Due to the strong dependence on the resource sector, the economy is typified by "boom and bust" patterns. These key activities are anticipated to continue to form the basis of the regional economy.

The socio-economic effects of the Project can potentially be beneficial for the region, as it would provide employment and taxes locally and regionally. It could potentially reduce and possibly reverse an outward migration trend of people moving to larger centres. The Proponent intends to work with local communities to maximize benefits through employment, business opportunities, training, and skills development.

Figure 4-2: Statistics Canada Census Tracts: Fifteen Mile Stream Gold Project



Statistics Canada (2016 Census data) for census tracts 0153.00 and 0154.00 align with the PA (Figure 4-2 above). Data are available which describe demographic characteristics. Previous descriptive data from Nova Scotia Community Counts on household income are also shown for 2011. The demographics of the two areas are reported in Table 4-7 and compared to Halifax Regional Municipality and Provincial figures.

Table 4-7: Demographic Summary

Statistics	CT 0153		CT 0154		Census Tract Summary		Halifax Regional Municipality	Nova Scotia
Total Population	5,950		3,225		9,175		403,131	923,598
Age 0-15	740	12%	365	11%	1,105	12%	60,510	15%
Age 15-24	545	9%	270	8%	815	9%	52,535	13%
Age 25-54	1995	34%	985	31%	2,980	32%	170,350	42%
Age 55-64	1180	20%	655	20%	1,835	20%	56,640	14%
Age 65+	1485	25%	955	30%	2,440	27%	63,095	16%
Median Income	$31,008		$25,504				$36,098	$31,813

4.17.1 Potential Socio-Economic Effects

The Project would provide many opportunities for employment in this part of Halifax County. The area has a rich natural resource history including mining and forestry. Mining jobs pay a premium over many other occupations and are among the highest goods producing wages in Nova Scotia. Due to the distance (more than 10km) of the proposed Project site from most residences and groundwater users, impacts on existing and future adjacent land uses are not expected.

4.17.2 Work Plan

The effects of the Project on the local economy will be assessed through a desktop review of existing studies and stakeholder consultation to update this body of knowledge and provide inputs to a socio-economic and environmental effects assessment.

4.18 Summary of Proposed Environmental Management Plans

During the development of the Environmental Assessment and IA Applications, relevant Environmental, Construction and Operational Management Plans will be developed, and mitigative measures will be implemented where appropriate. These plans may include, but are not necessarily limited to:

- Construction Environmental Management Plan;
- Erosion Prevention and Sediment Control Plan;
- Acid Rock Drainage Prediction and Prevention Plan;
- Soil and Overburden Management Plans;
- Fugitive Dust Management Plan;
- Fish Habitat Off-setting Plan;

- Wetland Management Plan;
- Water Management Plan;
- Invasive Weed Management Plan;
- Wildlife Management Plan;
- Archaeological and Cultural Heritage Resources Management Plan;
- Hazardous Material Management Plan;
- Solid Waste Management Reduction and Recycling Plan;
- Petroleum Management Plan;
- Emergency & Spill Response Plan;
- Explosives Management Plan; and
- Reclamation and Closure Plans.

5. Public Engagement

A key component of conducting any environmental assessment project is effective communication and involvement of interested regulatory agencies and third parties.

Primarily, public engagement with stakeholders has consisted of discussions with the landowners on site access and regulators over the nature of scientific work being undertaken in relation to the environmental baseline studies during planning and design of the Project. Engagement with local stakeholder groups and the surrounding community members has also commenced. Regulatory consultation commenced in early 2017, and a public engagement program commenced in February 2018 for the Project.

5.1 Regulatory Consultation

5.1.1 One Window Meeting

For the Project, regulatory consultation officially began on July 5, 2017 with a Provincial "One Window Process: Mineral Development in Nova Scotia" meeting to present the planned project and to receive feedback on the regulatory regime and regional expertise. The purpose of the meeting was to provide guidance to the Proponent on the processes and timelines for regulatory approvals and other issues regarding development of the Fifteen Mile and Cochrane Hill gold projects. A One Window update meeting was held February 21, 2018 to allow the Proponent to introduce their new 'Life of Mine Plan' and for attendees to share information on the processes and timelines for regulatory approvals and to discuss any issues or concerns regarding the Proponent's plan.

Informal regulatory consultation with relevant provincial and federal agencies to inform and support field programming has been on-going since Spring 2017.

The Touquoy mine has been fully permitted and has undergone several iterations of stakeholder (public, regulator) consultations and the Proponent regularly meets with the Community Liaison Committee to discuss project progress.

5.1.2 Environmental Assessment Process

Discussions have begun with the CEAA and Nova Scotia Environment to scope the Project for Environmental Assessment requirements.

5.2 Community Engagement

A public engagement program to provide project details to local communities and provide an opportunity for public input to the proposed mine development commenced in March 2018 with a public open house in Sheet Harbour and a second event is planned for Fall 2018 once more project details are available. The Sheet Harbour event on March 27, 2018 was well attended with approximately 35 people present. The event was advertised in the Chronicle Herald and flyers were posted in local businesses and also sent through Canada Post to nearby residences (approximately 600 homes). The event was held at the local Legion and consisted of a series of poster boards describing the general location and description of the project, identification of the EA process and opportunities for public input, preliminary Valued Components (VC) identified for the Project, details relating to reclamation and ore processing, and a poster outlining engagement methods and a request for people interested in participating in the planned Community Liaison Committee (CLC) for this Project. The key messages to the community at this meeting were:

- How do you want to be engaged? and,
- What questions or concerns do you have about the Project?

The open house was focused on sharing the general description of the Project and listening to the questions posed by members of the public, understanding any concerns they might have, and determining the best methods of engagement during the preparation of the Environmental Impact Statement (EIS). The attendees asked general questions about the proposed mining operation and details on operational considerations, as provided in this Project Description, were shared by the Proponent team with all attendees.

The Proponent is working with individual landowners potentially impacted by the Project and will also be meeting with local community groups and interested parties as they are identified to discuss more individualized concerns. Project information will also be communicated to the local residents in the form of a newsletter to provide overall project schedule and details, a community website with project details and contact information, and a dedicated phoneline established to receive inquiries and concerns about the Project. Meetings with municipal officials and provincial and federal political leaders will also be important to gauge local support for the Project. In completing this program, the Proponent will gather important information on the public comments, questions and concerns and use this information in mine development planning. The Proponent has a history of successful public engagement in Nova Scotia and is well aware of the high standard to conduct this component of the overall permitting program.

6. First Nations Engagement

Since the initiation of the Touquoy Project, the Proponent has engaged in a pro-active and mutually beneficial relationship with the Mi'kmaq of Nova Scotia. The relationship has been close to ten years in the making and continues to be of mutual benefit. An overview of more recent and relevant engagement is noted below.

The Made in Nova Scotia process establishes a mechanism for Mi'kmaq engagement in Nova Scotia that is unique in Canada. It is a three-government agreement between the federal, provincial and Mi'kmaq that outlines the responsibilities regardless if the Project is reviewed formally by the federal or provincial government. The Proponent has shown its commitment to this process and respect for their input by inviting representatives from the KMKNO, Millbrook and Sipekne'katik to the One Window meeting in February 2018, a meeting normally reserved for federal and provincial government officials.

Table 6-1: Summary of First Nations Consultation for Fifteen Mile Stream Gold Project

Date	Meeting Summary
February 20, 2018	Email correspondence from the Proponent team to Millbrook, KMKNO and Sipekne'katik requesting a meeting with each group to introduce the project.
February 21, 2018	KMKNO and Sipekne'katik participated in One Window update meeting at NSDNR
February 28, 2018	The Proponent and MEL met with KMKNO (Melissa Nevin) and introduced the Fifteen Mile Stream Gold Project formally.
March 2018	Sipekne'katik, Millbrook and the KMKNO were invited to attend the Open House in Sheet Harbour.
April 12, 2018	Proponent completed a scheduled meeting with Millbrook to introduce the Fifteen Mile Project.

Formal consultation is expected to continue through 2018 and 2019 as part of the EA process with the Mi'kmaq of Nova Scotia according to the Made in Nova Scotia Process. The Mi'kmaq have a knowledge level of the Project which is significant and gained through the EA process for Touquoy mine, the EA process for Beaver Dam, and through ongoing discussion relative to the Project as previously noted.

The Proponent will continue to engage with the KMKNO, Sipekne'katik First Nation, and Millbrook First Nation specific to the Project. To date, no specific comments or concerns have been received from the Mi'kmaq relating to the project. Questions asked to date have been focused on understanding project components, as described in this Project Description. The Proponent will look to find opportunities to engage with the communities to understand how the Project may overlap with traditional uses by the Mi'kmaq. Regular correspondence and face to face meetings will occur between the Proponent and KMKNO, Millbrook and Sipekne'katik and will provide all parties ample opportunity to review and discuss the Project.

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7.2 Personal Communications

Chris Pepper, Independent Lichenologist, personal communication (telephone call) October 2017.

Thea Langille, Principal Planner, Halifax Regional Municipality, personal communication (Email) April 2018.