Beaver Dam Mine Project
Environmental Impact Statement Summary

Marinette, Nova Scotia

Prepared on behalf of: ATLANTICGOLD

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088664 | 12 | Report No 5 | Revised June 12, 2017

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1. Introduction

1.1 Proposed Project

The Beaver Dam Mine Project (the Project) proposed by Atlantic Gold Corporation (Atlantic Gold) will operate as a satellite surface mine with an approximate ore extraction rate of 2 million tonnes per year (t/y). The Beaver Dam Mine Project is part of the Moose River Consolidated (MRC) Project. The MRC Project also includes the existing and fully permitted Touquoy Gold Project in Moose River, Nova Scotia.

The processing of ore from the Beaver Dam gold deposit at the existing plant at Moose River will begin upon completion of mining ore from the Touquoy gold deposit. The Beaver Dam Mine Project is anticipated to begin construction in 2021, come into production in 2022, cease operations in 2026, and then be reclaimed.

The Project is subject to both federal and provincial environmental assessment (EA) processes. This document is a summary of both the Environmental Impact Statement (EIS) and EA Registration Document (EARD) which are submitted under the federal and provincial processes, respectfully.

The Project as presented in this document is comprised of three components:

- Mining and primary crushing of ore to be loaded on trucks at the Beaver Dam mine site;
- Transporting ore from Beaver Dam along a 30.7 kilometer (km) haul road to existing facilities in Moose River; and
- Processing of ore and management of tailings at existing facilities developed as part of the Touquoy Gold Project.

The location of these Project components on a regional scale is displayed on Figure 1.

Physical activities specific to the operation of the Beaver Dam mine site will include mining of ore, crushing of ore, operation of till and waste rock storage facilities, and treatment of surface water runoff and mine discharge water through collection and settling ponds. No ore processing or tailings management will occur at the Beaver Dam mine site. Operational infrastructure will be minimal as those Project activities will use infrastructure at the site in Moose River constructed as part of Touquoy Gold Project. Electrical power required for the Beaver Dam mine site is not substantial and will be supplied by on site generators. Petroleum products will be stored on-site for generators, operational equipment, and haul trucks.

Transporting ore from the Beaver Dam mine site to the existing facilities in Moose River is required for processing the ore and managing the tailings. Portions of the haul road route (approximately 15.4 km) will require upgrading to a dual lane road to facilitate the safe passage of two-way truck traffic at a maximum speed of 70 km/h. Where possible, the upgrades will follow the course of the existing roadway; however, some adjustments to existing road alignment will be required to fulfill safe design standards. Another portion of the haul road route (approximately 4.0 km) will be new construction to allow the haul route to avoid traveling along Highway 224 and the Mi'kmaq

community of Beaver Lake. The remainder of the haul route (approximately 11.3 km) is along a dual lane provincial road (i.e., Mooseland Road). The proposed haul route does not travel by any existing residences.

The Touquoy Gold Project underwent a review in 2007 to determine if an EA was required under the existing provincial and federal legislation. It was determined by Nova Scotia Environment (NSE) and the Canadian Environmental Assessment Agency (CEA Agency) that only a provincial EA was required in accordance with the Nova Scotia *Environmental Assessment Regulations*. Under the *Canadian Environmental Assessment Act (1992)* and its pursuant regulations, there were no triggers for a federal EA when the Touquoy Gold Project was reviewed in 2007.

Changes to the Touquoy Gold Project in Moose River as a result of the Beaver Dam Mine Project will be assessed through this EA. They include: an increase in the duration of ore processing (approximately four additional years); minor adjustments with the ore processing facility; and disposal of tailings from processing of Beaver Dam ore in the exhausted Touquoy surface mine.

1.2 Proponent Information

The proponent, Atlantic Gold, is a well-financed, growth-oriented gold development group with a long-term strategy to create a mid-tier gold production group focused on manageable, executable projects in mining-friendly jurisdictions. Its board and management team, with extensive experience in geology, mining and mine development, process and metallurgy, and project financing, is currently focused on the development of its project portfolio of advanced gold development properties located in Nova Scotia, Canada.

Currently, Atlantic Gold holds four gold development projects in Nova Scotia: the MRC Project comprising the Touquoy and the Beaver Dam gold deposits; the Cochrane Hill gold deposit; and the Fifteen Mile Stream gold deposit. The permitted Touquoy Gold Project is under construction with operation scheduled for September 2017. The Beaver Dam Mine Project is in the permitting phase. Advanced exploration activities are underway at both Cochrane Hill and Fifteen Mile Stream.

Atlantic Gold is committed to the highest practical standards of corporate governance and to being a responsible corporate citizen. Safe production and environmental stewardship are keys to the Atlantic Gold organization. The company relies upon its senior management team and Board of Directors who have extensive experience with past mining developments worldwide.

As detailed in the EIS Section 1.2.2, the Proponent's corporate governance and management structure has mechanisms to ensure safe production and environmental stewardship are implemented and respected for the Project. These include but are not limited to:

- Strength and experience of its senior management team and 8-member Board of Directors;
- Code of Conduct with obligations regarding environmental standards, health and safety, contributions to local communities and respect and tolerance;
- Development of an Environmental Management System (EMS) and Environmental Protection Plan (EPP) for all phases of Atlantic Gold's development projects;
- Management and reporting structure to ensure corporate policies are implemented on a day-to-day basis;

- Establishment of a Review Board for the MRC Project which independently reports to the Chief Operating Officer on tailings management, waste rock storage and open pit mining activities;
- Maintain adequate reclamation security and environmental liability insurance with respect to Atlantic Gold's mining projects; and
- Adherence with best applicable practices (BAPs) and industry standards as per guides developed by Mining Association of Canada, such as the Towards Sustainable Mining initiative, and the Canadian Dam Association.

1.3 Environmental Assessment Context

The EIS has been prepared to facilitate the approval of the Project in accordance with the *Canadian Environmental Assessment Act, 2012* (*CEAA 2012*) and *Environmental Assessment Regulations* made under the *Nova Scotia Environment Act*. The EIS Guidelines (CEA Agency 2016) have provided a framework for the organization of this EIS.

The methodology used to conduct the EA and predict the effects of the Beaver Dam Mine Project was developed to meet the requirements of the EIS Guidelines issued by CEA Agency on January 19, 2016. The EIS Guidelines include requirements for EAs under CEAA 2012 and the *Nova Scotia Environmental Assessment Regulations* made under the *Nova Scotia Environment Act*. In addition to these requirements, the EA methodology was developed to incorporate:

- input from Indigenous Peoples and the public throughout the duration of the Project;
- environmental and social points of interest to the scientific and regulatory communities; and
- other federal, provincial, and municipal legislative and regulatory requirements that may apply to the Project.

The EIS was prepared by a consulting team comprised of GHD Limited (GHD) under contract to Atlantic Gold. GHD had direct input from McCallum Environmental Limited (MEL). GHD focused on physical and socio-economic Valued Components (VC), while MEL focused on biophysical VCs. GHD and MEL are consulting firms with extensive experience conducting environmental studies, assessments, and permitting for mining developments in Nova Scotia. Staff of Atlantic Gold provided input and review of the submission. Atlantic Gold, GHD, and MEL will be herein referred to as the "EA Study Team".

The following VCs were selected to facilitate a focused and effective EA:

Physical VCs

- atmospheric environment,
- geology, soil, and sediment quality,
- surface water quality and quantity, and
- groundwater quality and quantity;

Biophysical VCs

- wetlands,

- fish and fish habitat,
- habitat and flora,
- terrestrial fauna,
- birds, and
- Species of Conservation Risk and Species at Risk;

Socio-economic VCs

- Indigenous Peoples,
- physical and cultural heritage, and
- human health and socio-economic conditions.

Criteria or established thresholds for determining the significance of residual effects from Project activities are described for each VC in their corresponding subsection within Section 6 of the EIS. These criteria or threshold were developed through the following avenues:

- consultation with appropriate regulatory agency responsible for each VC;
- using information obtained in stakeholder and right holder consultation;
- using available information on the status and characteristic of each VC;
- using applicable regulatory documents, environmental standards, guidelines, and/or objectives; and
- using professional judgement of the EA Study Team.

These criteria or thresholds establish a level beyond which a residual effect would be considered significant. Thresholds may be based on regulations, standards, resource management objectives, scientific literature, and/or ecological processes. Significance criteria has been defined quantitatively where possible, and qualitatively with supporting justifications where no standards exist.

2. Project Overview

2.1 Project Location and History

The Beaver Dam Mine Project, as proposed, encompasses three primary locations from Marinette to Moose River Gold Mines, Halifax County, Nova Scotia. The Beaver Dam mine site will be located at the end of the Beaver Dam Mines Road in Marinette and the haul road will span from the Beaver Dam mine site to Moose River Gold Mines where the Touquoy processing and tailings management facility will be located.

The Beaver Dam gold deposit is located in an area of Nova Scotia dominated by the Meguma Supergroup, consisting of a thick basal greywacke Goldenville Group and a thick overlying, finer grained, argillite Halifax Group. Mineralization at the Beaver Dam Property occurs in the north-

dipping southern limb of an overturned anticline with gold hosted both within quartz veins and disseminated through the inter-bedded argillite and greywacke.

No federal lands will be used to undertake the Project. The nearest federal lands are the Beaver Lake Indian Reserve (IR) 17, which is a satellite community of the Millbrook First Nation and located approximately 5 km southwest of the Beaver Dam mine site. At its nearest point, the haul road route is approximately 3 km east of Beaver Lake IR 17. No federal lands are located in close proximity to the Touquoy processing and tailings management facility. Figure 1 displays all three locations and the ownership of land in which they occupy.

All blasting will occur more than 5 km away from any residential structures. There are no hospitals, retirement hospices, schools or day care centres located within 20 km of the site. Hwy 224 is the nearest access point to the mine located approximately 7 km from the site. There is no residential development in the vicinity of the Project. The closest point to permanent residences is 5.7 km south of the mine at Beaver Lake IR on Hwy 224. Three seasonal residences are located within 100 m of the haul road.

2.1.1 Beaver Dam Mine Site

The Beaver Dam mine site will be developed on approximately 145 hectares (ha) of land owned by the Northern Timber Nova Scotia Corporation (Northern Timber) in Marinette, Halifax County, Nova Scotia. Access to this land for mining purposes will be granted by a lease agreement between Northern Timber and Atlantic Gold. The approximate centre point of the mine site is 522230 E 4990025 N (UTM Zone 20 NAD83 CSRS).

The area is described as having low topographic relief with average elevations of approximately 140 masl and scattered drumlins reaching approximately 165-175 masl. Drainage in the area is generally southeast along a number of poorly drained streams, shallow lakes, and wetlands that flow out to Cameron Flowage (130 masl) and the Killag River; however a drainage divide is present inside the southwest boundary of the mine site that drains water to the south through Paul Brook. The Beaver Dam mine site is bordered on all sides by forest in various stages of regrowth due to logging activities in the region, and waterbodies, watercourses, and wetlands draining several catchment areas within the Project area.

The area has been subject to exploration and mining activity since gold was first discovered in 1868. Between 1871 and 1949, there were intermittent attempts to develop and mine the area, initially focused on the Austen Shaft area and later on the Mill Shaft area located approximately 1.2 km west of the Austen Shaft. The small Papke Pit located approximately 400 m west of the Austen Shaft was excavated in 1926; however, the majority of development was focused on a belt of quartz veins in greywacke and slates that was approximately 23 m wide where intersected from the Austen Shaft. Approximately 967 ounces of gold production is recorded for Beaver Dam between 1889 and 1941. From 1978 until 1988, several companies drilled a combined 251 diamond drill holes for 47,935 m. Some of these drill holes were completed underground via an exploration decline that reached a maximum depth of 100 m below surface. In 1987, a small open pit was also excavated in the Austen Shaft zone. Approximately 2,445 ounces of gold production was also recorded for Beaver Dam between 1986 and 1989. Between 2005 and 2009 two companies drilled a combined 153 diamond drill holes for 22,010 m and also completed several other exploration

programs including an aeromagnetic survey, a till survey, and a follow-up reverse circulation drilling program for geochemical purposes. Atlantic Gold secured the mine site in 2014 and immediately executed an exploration program whereby 38 diamond drill holes for 7,810 m were completed over the proposed surface mine area with the goal of converting inferred resources to measured or indicated resources.

The provincial abandoned mine openings (AMO) database records 20 AMOs in the area near the proposed Project area. Of these openings, 18 will be consumed by the proposed surface mine. The openings consist of shafts, pits, and raises that have had various forms of safety protection afforded to them over the years. Some openings are still considered hazardous. Historical openings are depicted on Figure 2, Existing Mine Conditions.

2.1.2 Haul Road for Transporting Ore

The haul road will be developed on land owned by Northern Timber, the Nova Scotia Department of Natural Resources (NSDNR), and other private enterprises and residents. The general course of the haul road already exists; however deviations that result in new road construction to fulfill safe design standards will encroach on Crown and private land. Portions that require upgrades only will follow the general course of the existing haul road and may encroach on Crown and private land as well. The portion requiring new construction through a “greenfield” environment will be done so on land owned by Northern Timber and NSDNR. No residences are known along haul road sections requiring upgrades, with the exception of two seasonal cottages, one near the intersection of Beaver Dam Mines Road and Hwy 224 and one near the intersection of the haul road and the Mooseland Road.

Beaver Lake IR 17, located approximately 3 km west of the haul road at its nearest point, hosts five permanent homes and four seasonal cottages. It abuts Hwy 224, which currently experiences considerable heavy truck traffic from forestry and other resource operations in the region. Other residences are located along Hwy 224 in the area but outside the boundaries of the IR.

2.1.3 Touquoy Processing and Tailings Management Facility

The Touquoy processing and tailings management facility is an approved facility that is currently being constructed as part of the Touquoy Project in Moose River Gold Mines, Halifax County, Nova Scotia. It is being developed on land owned by Atlantic Gold and NSDNR, and centered at 504599 E and 4981255 N (UTM Zone 20 NAD 83 CSRS). Access to Crown land for the construction of the Touquoy Project has been granted through a Crown Land Lease Agreement with NSDNR (Lease No. 2794371 and Petition No. 37668).

The area, currently being developed for the Touquoy Project (2017), is zoned mixed use under the Musquodoboit Valley and Dutch Settlement Land Use By-law. Processing of ore and the management of tailings, which will be undertaken as part of the Beaver Dam Mine Project, is not specified in the by-law as these activities are governed in the provincial and federal regulatory regime (pers. comm. L. Walsh 2016).

Camp Kidston, which operates only in the summer months, is located 3.5 km northeast of the site. According to the Proponent, the nearest permanent full-time occupied residences are located approximately 5.8 km to the north of the open pit along Caribou Road. The next closest permanent

residences to the Touquoy processing and tailings management facility are approximately 7.4 km to the northwest and 11.7 km to the southeast.

2.2 Project Components

The Beaver Dam Mine Project will operate as a satellite surface mine with an approximate ore extraction rate of 2 million t/y. Ore produced at Beaver Dam will be crushed on site, loaded onto trucks, and transported along a haul road for processing at an existing facility constructed as part of the Touquoy Project. Tailings will be disposed of in the exhausted Touquoy surface mine.

The primary components associated with the Beaver Dam Mine Project include the following:

- Beaver Dam mine site
  - surface mine for extracting ore and waste rock,
  - mine site roads,
  - waste material storage piles for waste rock, till, and topsoil,
  - run of mine (ROM), high grade, and low grade ore stockpiles,
  - crusher and operational facilities; and,
  - water management
- haul roads for transporting ore; and
- Touquoy processing and tailings management facility.

Figures 3 to 5 display the location of components at the Beaver Dam mine site, the haul road route, and the location of processing and tailings management facilities at Touquoy, respectively.

2.2.1 Beaver Dam Mine Site

2.2.1.1 Surface Mine

The primary feature of the Beaver Dam mine site will be a surface mine from which 46.9 million tonnes of ore and non-ore bearing waste rock will be removed. Figure 3 displays the development of the surface mine in two phases over the three year extraction period. At completion, the surface mine will measure 900 m along its east-west axis, 300-450 m along its north-south axis, and have a depth of 170 m. The total area comprising the surface mine will be approximately 30 ha.

Holes will be drilled into the host rock to receive explosives used for blasting. Previous exploration drilling has mapped the host rock for ore-bearing potential; therefore blasting patterns will be executed to maximize production of ore and minimize production of non-ore bearing waste rock. All blasting activities will be conducted by a licensed contractor.

On average, 35,480 tonnes of rock will be extracted from the surface mine per day. Of that, 5,480 tonnes will be ore-bearing and 30,000 tonnes will be waste rock. Ore and non-ore bearing waste rock will be loaded into off-highway haul trucks for transport out of the surface mine. From there, ore will be separated into low and high grade stockpiles prior to entering the crusher, while non-ore bearing waste rock will be stockpiled at its final disposal point.

2.2.1.2 Mine Site Roads

Mine site roads will be constructed to enable the mining fleet (loaders, dozers, off-highway haul trucks) to access topsoil and till stockpile locations. Mine site roads will also enable off-highway haul trucks to transport ore and non-ore bearing waste rock to stockpile locations. The ore haulage road will be dual lane and connect the surface mine exit with the run-of-mine (ROM) stockpile, crusher, and operational facility area. The waste haulage road will be dual lane and connect the surface mine exit with the topsoil, till, and non-ore bearing waste rock stockpiles.

2.2.1.3 Material Storage Piles

Material storage at the mine site will include two topsoil, two till, and one non-ore bearing waste rock stockpiles comprising a combined total of 92 ha. All of these locations will be cleared and grubbed concurrently with the surface mine area.

2.2.1.4 Ore Stockpiles

The ore stockpiles (5 ha) will include low grade and high grade ore piles, located east of the crusher and operational facilities pad, and a ROM stockpile at the crusher.

The ROM stockpile has up to a 30-day capacity for storing ore during plant shut-downs or short term periods where ore extraction from the mine exceeds crusher or plant capacity. The ROM stockpile can also accommodate plant feed when ore hauling from the mine is reduced.

2.2.1.5 Operational Facilities

The following operational facilities (9.5 ha) at the mine site will be located in a central ROM and facilities pad that provides access to the haul road:

- crusher and conveyors;
- underground septic tanks and leach drains;
- raw water and potable water tank;
- diesel fuel storage and distribution system;
- skid-mounted diesel generators and power distribution overhead transmission lines;
- pole mounted lighting;
- vehicle washdown facility;
- pre-fabricated office facility and workshop building; and
- fire protection systems.

Figure 3 displays the general location of all the above ROM and facilities components.

A simple satellite primary crushing facility consisting of a grizzly feeder, jaw crusher, and primary coarse ore stockpile feed conveyor will be required for the Beaver Dam mine site. Used Touquoy equipment will be utilized where practical. However, a new ROM hopper will likely be installed at the Beaver Dam crusher.

2.2.1.6 Water Management

Surface run-off water from the Beaver Dam mine site ROM and facilities pad will flow by gravity, with the aid of berms and channels, to a collection pond located between the crushing operation and water storage tanks. A culvert located beneath the mine entrance road will facilitate decant overflow from the pond to a water diversion structure that splits the two ore stockpiles. The water diversion structure will discharge to a channel that will run down gradient to the northeast and ultimately discharge to Cameron Flowage. The discharge point will be equipped with a concrete flow-control structure. The final design of the collection pond will be submitted as part of the Provincial Industrial Approval process. Due to the use of the Touquoy processing facility to process the Beaver Dam ore, no reagents will be utilized on Site, with the exception of the potential use of flocculants, which will be available for use as required in the settling ponds.

Surface water run-off from the non-ore bearing waste rock stockpile, mine site roads, and till stockpiles will flow by gravity, with the aid of berms and channels, to a settling pond located west of the surface mine. This settling pond will also receive water from the surface mine dewatering program. Water will be gradually decanted to Cameron Flowage by gravity via a water diversion structure that runs northeast from the settling pond. The final design of the settling pond will be submitted as part of the IA process.

Minimal volumes of water will be re-used on Site for dust suppression purposes, as required. The majority of water collected in the settling pond will be released to Cameron Flowage. Reagents will be reviewed with the local NSE inspector for acceptability if anything other than water is determined to be required for dust suppression.

A berm surrounding the surface mine will direct surface water runoff into a water diversion channel that discharges to the settling pond to the west. The berm will be keyed into the bedrock to prevent shallow groundwater flow and/or surface water originating in Cameron Flowage from entering the surface mine. An in-mine water diversion ditch will be established along the top bench of the mine to intercept any surface water that infiltrates the berm and flows into the mine. This ditch will direct water to in-mine sumps where it will be pumped out of the mine.

Sub-horizontal drain holes will likely be established in the surface mine walls as they are exposed. On the active bench floor, the water that is collected from these drain holes will be directed to a sump where it can be pumped from the mine. Ditches will be constructed into mine benches to collect the water and direct it to a sump in an area where the bench is sufficiently wide. The water from subsequent sumps will be drained to the next bench below and collected into another sump. Generally, there will be a sump on the active pit floor. Drainage from the berms above will be down the pit ramp towards the sump. Vertical boreholes will likely be drilled at the mine crest and progressively on some benches as the mine is developed; piezometers will be installed to monitor groundwater levels as needed.

2.2.2 Haul Roads for Transporting Ore

As Beaver Dam will operate as a satellite surface mine, ore produced will require transport by road to the Touquoy Processing and Tailings Management Facility. Portions of the existing haul road (approximately 15.4 km) will require upgrading to a dual lane road (8 m) to facilitate the safe passage of two-way truck traffic at 70 km/h.

A new section of road (approximately 4.0 km) constructed to the same design standards through a greenfield environment will also be required between the Beaver Dam Mines Road and the existing Moose River Cross Road. The alignment displayed in Figure 4 is based on preliminary engineering design. Final design will consider safety, social, and environmental constraints to ensure the best case scenario for worker safety and environmental effects is developed. The new section of road is being construction to avoid travel on Hwy 224, through Beaver Lake IR 17. The alternate route as shown on Figure 4 was presented in the stakeholder and Mi'kmaq engagement and is no longer being proposed based on feedback received.

Approximately 20 highway trucks will be required to transport the ore from Beaver Dam to Touquoy. The exact number will depend on the hauling schedules, which will likely be a single 12 hour shift or two 8 hour shifts per day. This would mean approximately 60 individuals will be required to operate the highway transport fleet. The number of return truck trips per day will be an annual average of approximately 185 for 12 or 16 hours per day, 350 days per year for the anticipated duration of the Project (3.3 years). During construction and pre-production (8 months), the number of trips will be less and required for moving material from Touquoy to Beaver Dam and construction and upgrade of the haul roads.

The haul road will be upgraded where required to enable the safe and economic transportation of ore. Along the existing haul road at locations where the proposed road upgrade alignment will fall, it is anticipated that there will be up to 13 opportunities to improve fish habitat with new culvert installation and old culvert removed, up to 12 net zero scenarios where a new culvert will be installed, and 9 watercourses that will not be affected. Relict portions of the existing portions of the haul road that are not reclaimed during haul road construction will be properly reclaimed at the end of the Project lifespan, or returned to the original owner as per lease agreements.

Upon completion, the haul road will be 30.7 km long. The haul road configuration includes four sections of road: the existing Beaver Dam Mines Road southwest to Hwy 224 (7.2 km); crossing Hwy 224 to a newly constructed road through a greenfield environment (4.0 km); the Moose River Cross Road (so-called) southwest to the Mooseland Road (8.2 km); and the Mooseland Road northwest to the Touquoy Mine Site (11.3 km).

2.2.3 Touquoy Processing and Tailings Management Facility

The Beaver Dam Mine Project will utilize the processing facility at the Touquoy site to process Beaver Dam ore. This will begin upon completion of mining ore from the Touquoy deposit. Beaver Dam tailings will not be stored in the Touquoy tailings management facility, but instead will be permanently stored in the open pit after the Touquoy deposit has been mined. As a result, no tailings management will be needed at the Beaver Dam mine site. All other aspects of the Touquoy Gold Project will remain as assessed and approved through the Nova Scotia EA process in 2008.

Changes to the Touquoy Project as a result of the Beaver Dam Mine Project will be assessed through the EIS and include the following:

- an increase in the duration of ore processing (four additional years);
- minor alterations to the Touquoy processing facility to accommodate Beaver Dam ore; and
- disposal of tailings from Beaver Dam ore processing in the exhausted Touquoy mine.

The Touquoy Processing and Tailings Management Facility will be operational for an additional four years beyond the current lifespan anticipated for the Touquoy Project. This will result in four additional years of ore processing, water management, and tailings management and disposal. Ore extracted and hauled from the Beaver Dam mine site will be processed at the Touquoy processing facility once reserves at Touquoy have been exhausted. The Touquoy processing facility main building houses ball mill, gravity recovery, reagent make-up, elution, and refinery sections. The crushing, carbon in leach (CIL), and cyanide destruction sections are located outdoors. Tailings produced from processing Beaver Dam ore will be disposed of in the exhausted Touquoy open pit mine. Water from the deposited tailings will be recirculated through the processing facility in a closed loop. Top up water requirements will be sourced from Scraggy Lake or from natural precipitation as per NSE approvals. Figure 5 displays the location of these components.

The additional lifespan of the Touquoy facility involves no new construction or disturbance to the Touquoy facility or property. The Beaver Dam tailings will be managed in the exhausted Touquoy open pit mine. As originally planned in the approved Touquoy Gold Mine Project Reclamation Plan, the inflow of groundwater, surface flow and precipitation into the pit will naturally create a lake upon closure of the site. Air emissions generated from the Touquoy site associated with the processing of Beaver Dam ore will be limited to emissions from the plant operation during processing. The primary potential effect of the continued use of the Touquoy facility on surface water and groundwater quality results from the use of the exhausted open pit for tailings storage. Five years of data collected from the the Touquoy Gold Project for surface water and groundwater quality and quantity will be available prior to the Beaver Dam tailings being introduced to the exhausted Touquoy pit.

Air, groundwater and surface water quality and quantity will continue to be monitored over the life of the Touquoy facility as part of existing approvals for approved life span of the facility and for the proposed extended life of the Touquoy site associated with processing of Beaver Dam ore. The tailings management facility and waste rock stockpile will continue to be monitored throughout the life of the Touquoy facility as per the approved closure and reclamation plan for the Touquoy Gold Mine; these facilities will not be used as part of the Beaver Dam Mine Project.

2.3 Project Activities

2.3.1 Site Preparation and Construction

2.3.1.1 Beaver Dam Mine Site

Site preparation at the Beaver Dam mine site will begin one year prior to operations commencing, with construction of key infrastructure following shortly thereafter. The following activities will be undertaken to prepare the Beaver Dam mine site for construction activities:

- clearing, grubbing, and grading;
- drilling and rock blasting;
- topsoil, till, and waste rock management; and
- existing settling pond dewatering.

Once site preparation activities have been completed, construction will commence and involve the following activities:

- watercourse and wetland alteration;
- mine site road construction;
- surface infrastructure installation and construction; and
- collection and settling pond construction.

Development of the mine site will cause direct and in-direct impacts to wetlands mostly within the construction phase of the Project. Direct impacts will be associated with clearing, grubbing, infilling and development of the mine and its associated infrastructure. Wetlands located within the mine site footprint are discussed further in Section 6.5 of the EIS.

Increased environmental disturbance is anticipated during initial site preparation, when drilling and blasting is being undertaken in the surface mine, and during the construction of stockpiles, berms, and surface mine roads.

2.3.1.2 Haul Road

Site preparation for the haul road will begin one year prior to operations commencing, with construction of key infrastructure following shortly thereafter. The following activities will be undertaken to prepare the haul road for construction activities:

- clearing, grubbing, and grading; and
- topsoil, till, and waste rock management.

Once site preparation activities have been completed, construction will commence and involve the following activities:

- watercourse and wetland alteration;
- culvert and bridge upgrades and construction; and
- haul road construction and upgrades.

Increased environmental disturbance is anticipated during initial site preparation, construction of new portions of the haul road, and during the replacement/upgrades that will be completed to culverts and bridges.

2.3.1.3 Touquoy Processing and Tailings Management Facility

Minor works to modify the Touquoy processing and tailings management facility will begin before initiation of operation of the Beaver Dam surface mine. This transition phase will likely not exceed two months and the following activities will be undertaken to prepare the processing and tailings management facility to receive Beaver Dam ore:

- ore processing equipment upgrades; and
- tailings line alteration.

In order to accept Beaver Dam ore, a new vibrating feeder and new collection conveyor will be fitted to tie-in to the existing secondary feed conveyor between the Touquoy ROM hopper and secondary crusher. No changes will be made to the remainder of the processing facility.

Tailings from processing Beaver Dam ore will be disposed of by re-routing the tailings line exiting the back end of the processing facility from the Touquoy tailings management facility to the exhausted Touquoy mine. The reclaim water pump and barge, with a re-routed pipeline to the process water tank, will be relocated from the Touquoy tailings management facility to the exhausted Touquoy mine once production of Beaver Dam ore provides sufficient reclaim water accumulation from the tailings slurry. The TMF will not be used in the processing of Beaver Dam ore.

Increased environmental disturbance is anticipated during the re-routing of the tailings line.

2.3.2 Operation and Maintenance

2.3.2.1 Beaver Dam Mine Site

During operation and maintenance of the Beaver Dam mine site the following activities will be undertaken:

- surface mine operation and maintenance
  - drilling and rock blasting;
  - surface mine dewatering;
- ore management;
- waste rock management;
- surface water management;
- petroleum products management; and
- site maintenance and repairs.

Increased environmental disturbance is anticipated during drilling and rock blasting, transportation of ore from the surface mine to the various stockpiles, maintenance activities, and at times of surface water discharge to Cameron Flowage.

2.3.2.2 Haul Road

During operation and maintenance of the haul road the following activities will be undertaken:

- ore transport; and
- haul road maintenance and repairs.

Crushed ore from the Beaver Dam pit will be transported to the Touquoy process plant by truck travelling along upgraded existing roads and the newly constructed portion of the haul road.

Increased environmental disturbance is anticipated during peak transport times (12 to 16 hours per day) and during maintenance activities along the haul road.

2.3.2.3 Touquoy Processing and Tailings Management Facility

During operation and maintenance of the Touquoy processing and tailings management facility the following activities will be undertaken:

- ore processing; and
- tailings management.

Ore Processing

Other than the primary ore crushing, no mineral processing will be undertaken at Beaver Dam. All processing will be completed at the Touquoy facility after the ore from the Touquoy pit has been exhausted.

The Touquoy plant is designed to treat Beaver Dam ore with no modifications other than an increase in the total weight of grinding balls in the ball mill to accommodate the slightly harder ore from the Beaver Dam pit. This will not require any larger equipment.

Tailings Management

There is no requirement for tailings management at Beaver Dam as all mineral processing will be done at the existing Touquoy facility. Tailings generated from this operation will be pumped to the mined-out Touquoy pit for storage and covered with water to create a lake during reclamation. The approved Touquoy Environmental Assessment stated that the pit would be allowed to fill naturally with water over a period of time through precipitation, surface flow and groundwater in-flow. No change to this method is planned following the deposition of Beaver Dam tails, except that the time frame for refilling will be shorter given the decrease in available volume taken by the tailings.

Process water will be recycled from the Touquoy pit and from the Touquoy tailings management facility as required.

There is an existing Industrial Approval for the Touquoy Gold Mine, which has specific environmental mitigation and monitoring requirements. Given that the operational activities for the Beaver Dam Mine Project at the Touquoy site are limited to processing of ore and management of tailings, existing mitigation and monitoring requirements related to atmospheric emissions, surface water and groundwater will be continued for the processing of Beaver Dam ore at the Touquoy facility.

2.3.3 Decommissioning and Reclamation

The purpose of site reclamation is to improve aesthetics and allow the site to return to its pre-development state or to a future planned use, while decreasing the potential for environmental risk.

Site Description at Closure

At closure, the Site will include the following:

- All mine site facilities will have been removed;
- The open pit will be allowed to fill with water to eventually form a lake with a wetland edge habitat;

- The waste rock pile will be capped with topsoil and re-seeded and all disturbed areas will be re-vegetated;
- Mine site roads will remain in place, and ultimately will be returned to the land owner for forestry and recreational use;
- The haul road will be returned to the land owners in an upgraded condition with habitat and wetland improvements;
- Fences will be removed once the majority of closure activities are completed;
- The Touquoy processing and tailings management facility will be reclaimed under a separate plan developed for the Touquoy Project and already approved by regulatory agencies.

Ultimately the land will be returned to conditions similar to its original state as a natural woodland and wetland habitat used for recreation and forestry. The existing conditions at the site have been previously described as being in a disturbed state in many areas and therefore improvements at the site will be realized through the reclamation activities proposed.

Two of the three primary locations affected by the Beaver Dam Mine Project will be included in reclamation activities. The Touquoy processing and tailings management facility will be reclaimed under a separate plan developed for the Touquoy Project. It is anticipated that the Beaver Dam Mine Project will have an Industrial Approval with many similar components as the Touquoy Gold Project Industrial Approval; this will likely include a specific closure and reclamation plan associated with the Beaver Dam Mine Project.

2.4 Accidents and Malfunctions

Accidents and malfunctions have the potential to occur through every phase of the Project. In order to decrease the likelihood of occurrence and level of magnitude should these accidents and malfunctions occur, Atlantic Gold will implement a preventative system approach to environmental protection, and worker health and safety. Contractors will be subject to the same health, safety, and environment policies and procedures, and all personnel (employees and contractors) will receive site specific training to prevent and mitigate workplace accidents and malfunctions. The health, safety, and environment policies and procedures implemented for the Touquoy Project will be extrapolated to the Beaver Dam Mine Project and made site specific where required.

Accidents and malfunctions that have the potential to occur through every phase of the Project are described in the follow subsections, while an analysis of the risks, a determination of their effects, and preliminary emergency response measures for these potential worst-case accidents and malfunctions is included in Section 6.15 of the EIS.

2.4.1 Structural Failures

2.4.1.1 Surface Mine Slope Failure

All phases of the Project have the potential for slope failures within the footprint of the surface mine. During the initial stages of site preparation and construction, slope failures will be limited to overburden; however, as blasting, and ore and non-ore bearing waste rock extraction commences,

bedrock faces have the potential to fail even when properly designed. Based on the current delineation of ore, the surface mine will be excavated through bedrock to an end depth of approximately 170 m below ground surface. Bench heights and bench face angles prescribed by a geotechnical study (O'Bryan et. al., 2015) will be implemented for specific depths and zones of the surface mine. A surface mine slope failure may result in fuel and/or other spills and/or injury or death to site workers.

2.4.1.2 Stockpile Slope Failure

All phases of the Project have the potential for slope failures of the topsoil, till, and waste rock stockpiles. Topsoil and till stockpiles will be stored in single lifts of 10 m and 15 m, respectively, with 1.5:1 active slopes. The waste rock stockpile will be stored in multiple lifts of 10 m with each lift having an active slope of 2:1. Ore stockpiles will be constructed in 15 m lifts with each lift having an active slope of 1.5:1. Slopes will be designed at an angle determined by geotechnical analysis and acceptable safety factors, thereby reducing the likelihood of a slope failure.

2.4.1.3 Settling Pond Failure

All phases of the Project have the potential for a settling pond failure. Surface water run-off from the non-ore bearing waste rock stockpile, mine site roads, topsoil stockpiles, and till stockpiles will flow by gravity, with the aid of berms and channels, to a settling pond located west of the surface mine. This settling pond will also receive water from the surface mine dewatering program. Water will be gradually decanted to Cameron Flowage by gravity via a water diversion structure that runs northeast from the settling pond.

The water diversion structure leading from the collection pond will discharge to a channel that will run down gradient to the northeast and ultimately discharge to Cameron Flowage. The discharge point will be equipped with a concrete flow-control structure.

In the event of a 1 in 100 year precipitation event, which in Nova Scotia is identified as approximately 115 mm in a 24 hour storm, a spillway into the water diversion structure will be used for overflow. In the case of a storm event or infrastructure failure, settling ponds will be monitored regularly.

2.4.1.4 Infrastructure Failure

Portions of all phases of the Project have the potential for infrastructure failure. Infrastructure at the Beaver Dam mine site will be minimal and given the short life of the Project, failure should not occur without being acted upon by extreme natural causes, such as a hurricane or earthquake, or human error.

2.4.2 Accidents

2.4.2.1 Fuel and/or Other Spills

All phases of the Project will involve the use of fuels, as well as equipment maintenance and servicing fluids. Generators and the majority of mobile equipment will utilize diesel fuel, which will be stored on-site in self bunded aboveground storage tanks. A small gasoline storage area may be

included or may be satisfied by local retail outlets. Equipment maintenance and servicing fluids will include hydraulic oils, motor oils, greases, brake and steering fluids, antifreeze, and minor amounts of other maintenance fluids. The construction and operation phases will also utilize diesel fuel and ammonium nitrate as blasting agents. Ammonium nitrate will not be stored on-site.

The source of greatest risk for potential spills and releases of diesel fuel relates to the improper execution of procedures for transfer and handling to and from stationary and mobile tankage. Other sources of potential spills and releases of diesel fuel relate to equipment failures, damage to storage or piping systems, mobile equipment accidents, and mobile refueling truck accidents. Releases of maintenance fluids pose a lesser risk in terms of magnitude, but can still occur due to equipment failures, damage to storage containers, and mobile equipment accidents. A release of these fluids may result in soil, groundwater, and/or surface water contamination that may adversely affect ecological receptors through absorption, and/or ingestion of contaminated media.

2.4.2.2 Unplanned Explosive Events

An unplanned explosive event is limited to the site preparation and construction, and operation and maintenance phases of the Project. Explosives will be supplied by an off-site contractor and there will be no requirement for an on-site magazine.

2.4.2.3 Mobile Equipment Accident

All phases of the Project will have the potential for vehicular accidents to occur. Mobile equipment for the Project includes those outlined in Tables 2.3-1 and 2.3-2 of the EIS. The majority of mobile equipment traffic will be limited to the Beaver Dam mine site where guided traffic patterns, speed limits, right-of-way signage, and training will minimize the risk of vehicular accidents. The remaining mobile equipment will include haul trucks, which will travel from the Beaver Dam surface mine to the Touquoy processing and tailings management facility. Speed limit and Right-of-way signage will be installed and all haul truck operators will receive operator training to minimize the risk of haul truck collisions. All intersections will be designed to NSTIR Standards. A mobile equipment accident may result in fuel and/or other spills, fires, and/or injury or death to site workers and the general public.

2.4.3 Other Malfunctions

2.4.3.1 Forest and/or Site Fires

All phases of the Project will have the potential for forest and/or site fires to occur. A forest fire may occur through human or natural causes, while a site fire may occur due to an equipment failure and/or human error. Forest fires have the potential to affect the Project at the mine site and at the processing and tailings management facility; however, due to a lack of vegetation at the mine site and processing and tailings management facility, it is unlikely that a site fire could spread to and affect the surrounding forest. Forest fires along the haul road have the potential to affect haul road operations and likewise, site fires along the haul road could spread to and affect the surrounding forest.

2.5 Project Schedule

Site preparation and construction for the Beaver Dam Mine Project will begin late in 2021 prior to exhaustion of the Touquoy surface mine so that the ore supply from the Beaver Dam surface mine to the Touquoy processing facility will follow shortly after the mining operations at Touquoy have ceased. Site preparation will begin following the end of the growing season (i.e. post-September 2021).

Year 1 (2021)

Clearing, grubbing, and removal of topsoil and till from the surface mine, till stockpile locations, and waste rock stockpile location, as well as removal of waste rock from the top benches of the surface mine by drilling and blasting will begin one year prior to relocation of the primary crusher from Touquoy. Clearing and grubbing will also occur during this time for the topsoil stockpile locations, the operational facilities location, and along the haul road. Vegetation clearing will be conducted in compliance with nesting bird directives from NSDNR and Environment and Climate Change Canada. Subsequently, stockpiles for topsoil and till will be built, and the initial lift of the waste rock stockpile will be constructed. Surface and groundwater management facilities to include monitoring wells, ditches and berms will also be constructed during this period. The surface mine will be mined down to the 110 bench (bench floor elevation). A berm surrounding the pit will be constructed to act as an access road and a flood berm.

Haul road construction and upgrades between Beaver Dam and Touquoy will be completed in the year prior to Touquoy mine operations ceasing. It is anticipated that material used in the construction and upgrading of the haul roads will be waste rock supplied from the Touquoy site. Haul trucks that will be used in the transportation of ore from Beaver Dam to Touquoy will be acquired early and utilized to transport crushed rock from Touquoy to be used in construction and upgrades for the haul road.

All other development work for the operational facilities construction and commissioning of the support infrastructure at Beaver Dam will be completed in the six months prior to relocation of the primary crusher from Touquoy.

Localized power supply infrastructure, installation of the fuel storage facility, and other supporting infrastructure will be linked to the start of early mining pre-strip operations. During the one year construction phase, flexibility in the schedule may be employed to take advantage of seasonality, etc.

After exhaustion of the Touquoy surface mine and before initiation of operation of the Beaver Dam surface mine, a transition phase not exceeding two months is expected, during which the primary crusher will be relocated from Touquoy and installed at Beaver Dam, the Touquoy processing facility will undergo minor alterations in preparation to receive Beaver Dam ore, and the tailings line will be re-routed to discharge wet tailings from Beaver Dam ore to the exhausted Touquoy mine.

Years 2 to 5 (2022 to 2026)

Operation of the Beaver Dam surface mine is planned to begin late in 2022 and continue through early 2026. Pre-production will last approximately eight months, with full-scale operation lasting three years and four months as outlined in Table 2-1.

The anticipated mining schedule will consist of 24 hours per day, while trucking will consist of 12 to 16 hours per day, and processing will consist of 24 hours per day.

Table 2-1 Beaver Dam Mine Project Production Schedule

Phase Mined (kt)	2022	2023	2024	2025	2026
Beaver Dam South Phase	9,529	9,705	2,341		
Beaver Dam North Pushback	4,606	6,789	9,439	4,116	406

Years 6 to 8 and Beyond (2026-2028+)

Decommissioning of the site will require approximately three to five years after cessation of operations. Two years will be needed to remove equipment and infrastructure , as well as complete re-grading and re-vegetation of the site, after which monitoring will continue until deemed no longer necessary. Monitoring typically continues for two to three years post-reclamation.

The general schedule for development of the MRC Project is provided in Table 2-2.

Table 2-2 Beaver Dam Construction, Operation, and Reclamation Schedule

Event	Timeline
Beaver Dam Construction	Q3/Q4 2021
Beaver Dam Operation	Q3/Q4 2022 to Q1/Q2 2026
Touquoy Partial Reclamation (waste rock stockpile and tailings management facility) and Environmental Monitoring	2023-2026+
Beaver Dam Reclamation and Environmental Monitoring	2026-2028+
Touquoy Complete Reclamation (processing facility, surface mine/beaver dam tailings management facility) and Environmental Monitoring	2026-2028+

A detailed anticipated schedule is provided in the EIS. It is emphasized that implementation of each activity is dependent on successful completion of the former. The schedule provided is considered to be preliminary and may be revised based on site conditions, permitting, or seasonality, etc.

3. Alternative Means of Carrying out the Project

As is required in accordance with Section 19(1)(g) of CEAA 2012, environmental assessments for designated projects must consider alternative means of carrying out the project that are technically and economically feasible, as well as the environmental effects of any such alternatives.

The process for consideration of alternative means is outlined in the CEAA Operational Policy Statement entitled "*Addressing "Purpose of" and "Alternative Means" under the Canadian Environmental Assessment Act, 2012*" and includes the following steps:

- Step 1 – identify technically and economically feasible alternative means;

- Step 2 – list their potential effects on valued components;
- Step 3 – select the approach for the analysis of alternative means; and
- Step 4 – assess the environmental effects of alternative means.

The evaluated alternative means of carrying out the Project are discussed following identification of alternative means. A summary of the assessment of alternative means is provided in Table 2.6-1 in Section 2.6.11 of the EIS.

3.1 Identification of Alternative Means

Alternative means of carrying out the Project are defined as means of similar technical character or methods that are functionally the same. Alternative means 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 Atlantic Gold's scope and control.

As a minimum, the EIS Guidelines require Atlantic Gold to conduct an alternative means analysis for the following Project components:

- mine type;
- ore extraction methods;
- ore processing methods;
- ore processing locations;
- ore transportation;
- energy source;
- project component locations;
- water supply and management; and
- mine waste management facilities.

A qualitative approach primarily utilizing the professional knowledge and judgement of the EA Study Team has been employed for the assessment of alternative means and considers all four steps outlined in Section 2.6 of the EIS.

3.2 The Preferred Approach

Based on the consideration of technical and economic feasibility, environmental effects, and socioeconomic effects, the preferred approach for the Project consists of:

- An open pit gold mine located on the Beaver Dam mine site;
- Ore extraction methods that employ drilling and blasting;
- Ore processing methods that employ gravity and carbon-in-leach processing methodology which represents the most conventional processing option and is the preferred processing option in Canada;

- Processing Beaver Dam ore at the Touquoy processing facility once reserves at Touquoy have been exhausted;
- Transportation of ore from Beaver Dam to Touquoy for processing via a 30.7 km haul road, which will include upgrades to approximately 15.4 km of existing road and approximately 4.0km of new road construction through a greenfield environment;
- The use of two (duty and standby) self-contained diesel powered generators to provide electrical power to the Beaver Dam mine site;
- Project component locations as shown on Figure 1;
- On-site water supply and management, with delivery of potable water; and
- No mine waste management facilities located on the Beaver Dam mine site.

A summary of the review of alternative means to carry out the Project is presented in Table 3-1 for each Project component of activity. This provides justification on the preferred approach for the Project relative to technical feasibility, economic feasibility and environmental and social effects. The VCs considered are noted as applicable under the environmental and social effects.

Table 3-1 Summary of Alternative Means of Undertaking the Project

Project Component or Activity	Alternative Means	Technical Feasibility	Economic Feasibility	Environmental and Social Effects	Preferred Option
Mine Type	Surface Mine	Technically Feasible	Economically Feasible	Environmental effects are associated with the surface mine construction and operation; however, no significant residual environmental effects are anticipated for the Beaver Dam mine site.	Yes
	Underground Mine	Not Technically Feasible considering the configuration of the gold deposit.	Not Economically Feasible	Not assessed	No
Ore Extraction Methods	Blasting	Technically Feasible	Economically Feasible	Environmental effects include noise and dust impacts; however	Yes

Table 3-1 Summary of Alternative Means of Undertaking the Project

Project Component or Activity	Alternative Means	Technical Feasibility	Economic Feasibility	Environmental and Social Effects	Preferred Option
				blasting will be conducted in shorter duration and will be controlled.	
	Rock Breaking	Not Technically Feasible considering the hardness of the ore deposit	Not Economically Feasible based on the hardness of the ore deposit	Environmental effects include continual noise and dust impacts.	No
Ore Processing Methods	Gravity/CIL	Technically Feasible considering it is the preferred processing option in Canada and is used worldwide in almost all major gold mining/processing operations. Well suited to this particular ore	Economically Feasible	Environmental effects are generally similar in both alternatives: the same quantity of sodium cyanide is required in both alternatives, if not more for gravity/flotation.	Yes
	Gravity/Flotation	Not Technically Feasible based on an unorthodox complex multi-stage process for cyanidation or off-site smelting	Not Economically Feasible as it requires a complex multi-stage process or additional off-Site smelting.	Environmental effects are generally similar in both alternatives: the same quantity of sodium cyanide is required in both alternatives, if not more for gravity/flotation. Smelting would require	No

Table 3-1 Summary of Alternative Means of Undertaking the Project

Project Component or Activity	Alternative Means	Technical Feasibility	Economic Feasibility	Environmental and Social Effects	Preferred Option
				transport to an off-site facility.	
Ore Processing Locations	Touquoy	Technically Feasible as the Touquoy facility is already designed to treat Beaver Dam ore with minimal modifications.	Economically Feasible as the infrastructure for processing Beaver Dam ore is already in place. Haul road upgrades will need to be completed but are off-set by the benefits of using the existing processing facility.	Environmental effects for the Touquoy facility have previously been identified. Processing Beaver Dam ore at the Touquoy facility will result in an additional four years of processing beyond the current lifespan of the Touquoy Project and will result in an increase in the cost of production and greenhouse gas emissions due to transporting ore to Touquoy.	Yes
	Beaver Dam	Technically Feasible	Not Economically Feasible as the infrastructure for processing Beaver Dam ore is already in place at the Touquoy facility.	Environmental effects of processing ore at the Beaver Dam mine site are greater in this scenario as a second processing facility and tailings management	No

Table 3-1 Summary of Alternative Means of Undertaking the Project

Project Component or Activity	Alternative Means	Technical Feasibility	Economic Feasibility	Environmental and Social Effects	Preferred Option
				facility would be required to be constructed and operated. Construction of an additional processing and tailings management facility would affect all VCs being considered in the EIS.	
Ore Transportation	Haul Road avoiding Hwy 224 via new construction	Technically Feasible	Economically Feasible	Environmental effects are similar for both alternatives. Construction of 4.0 km of new haul road will cause additional environmental effects than simply upgrading the haul roads; however the new road eliminates travel along Hwy 224 and the passing of Beaver Lake IR 17, which is a benefit for those residents.	Yes

Table 3-1 Summary of Alternative Means of Undertaking the Project

Project Component or Activity	Alternative Means	Technical Feasibility	Economic Feasibility	Environmental and Social Effects	Preferred Option
	Haul Road along Hwy 224	Technically Feasible	Economically Feasible	Environmental effects are similar for both alternatives. Travel along Hwy 224 through the Beaver Lake IR will cause noise and dust issues for residents due to the increased truck traffic.	No
Energy Source	On-site Generators	Technically Feasible	Economically Feasible	Environmental effects will include emissions associated with two diesel fuel-powered generators.	Yes
	Provincial Grid Tie-in	Technically Feasible	Not Economically Feasible as the current power demand is insufficient to justify the construction of a permanent grid tie-in.	Environmental effects would include construction of a right-of-way for electrical lines, including noise and emissions generated during construction and habitat and vegetation loss in the right-of-way.	No

Table 3-1 Summary of Alternative Means of Undertaking the Project

Project Component or Activity	Alternative Means	Technical Feasibility	Economic Feasibility	Environmental and Social Effects	Preferred Option
	Renewable Energy Sources	Technically Feasible	Not Economically Feasible due to short duration of Project	Environmental effects would depend on renewable energy technology used; however, air emissions would be reduced	No
Project Component Locations	As shown on Figure 2.2-1	Technically Feasible	Economically Feasible	Environmental effects will include loss of habitat; however this configuration avoids interference with aquatic habitats.	Yes
	Alternative Locations	Technically Feasible	Not Economically Feasible as this would require the reconfiguration of the components	Environmental effects would be similar in both scenarios; however, the alternative location of the waste rock stockpile could interfere with nearby aquatic habitat. Project components have also been positioned to avoid identified heritage resources.	No

Table 3-1 Summary of Alternative Means of Undertaking the Project

Project Component or Activity	Alternative Means	Technical Feasibility	Economic Feasibility	Environmental and Social Effects	Preferred Option
Water Supply and Management	On-site water supply and management, with delivery of potable water	Technically Feasible	Economically Feasible	Environmental effects will include emissions associated with the transport of potable water to the mine site.	Yes
	Alternative sources of water	Technically Feasible	Not Economically Feasible to transport all water requirements to the mine site.	Environmental effects would include a greater volume of emissions generated during the transport of all water to the mine site.	No
Mine Waste Management Facilities	No on-Site mine waste management facilities	Technically Feasible	Economically Feasible	Environmental effects for the Touquoy facility have previously been identified. Storing Beaver Dam mine waste at the Touquoy facility will result in the generation of mine waste after processing for an additional four years.	Yes
	On-Site mine waste management facilities	Technically Feasible	Not Economically Feasible to transport mine waste from	Environmental effects for transporting Beaver Dam mine waste	No

Table 3-1 Summary of Alternative Means of Undertaking the Project

Project Component or Activity	Alternative Means	Technical Feasibility	Economic Feasibility	Environmental and Social Effects	Preferred Option
			Touquoy back to Beaver Dam after processing.	from the Touquoy Processing facility back to Beaver Dam would result in the in an increase in the cost of production and GHG emissions.	

4. Stakeholder Engagement

Atlantic Gold is committed to stakeholder consultation and engagement as part of its MRC Project. Using key values of openness, transparency, collaboration, and respect, Atlantic Gold has continued to work with the local community, non-governmental organizations (NGOs), regulatory agencies, and interested members of the public for over a decade. As part of the planning and permitting of the Touquoy Gold Mine, the Proponent developed relationships with members of the local community and NGOs, such as the Moose River Gold Mine Museum Society. A Community Liaison Committee (CLC) has been in place since 2011

Both federal and provincial EA legislation requires consultation with the public to recognize concerns about adverse effects of the environment and identification of steps taken by the proponent to address these concerns; therefore, these are specifically identified in the EIS related to Beaver Dam Mine Project. Beyond the regulatory requirements, Atlantic Gold strongly believes that meaningful engagement is crucial to the success of any development. The Proponent is committed to maintaining stakeholder consultation and engagement throughout the life of its MRC Project; these activities extend well beyond the EA process.

4.1 Stakeholder Engagement Activities

A community engagement strategy has been developed by Atlantic Gold for the MRC Project. It sets out the formal engagement activities that Atlantic Gold will undertake throughout all phases of its exploration activities and mining operations in Nova Scotia. This includes the development, operation and reclamation of the MRC Project, which includes the permitted and under construction Touquoy Gold Mine and the proposed Beaver Dam Mine Project. Atlantic Gold will also seek to provide broader awareness to include advanced exploration activities at Cochrane Hill and Fifteen Mile Stream.

A successful community engagement strategy also allows flexibility to allow adaptation to the needs of the community. In 2016, Atlantic Gold developed it strategy for community engagement to coincide with the start of construction of the permitted Touquoy Gold Mine and the development of the EA for the Beaver Dam Mine Project. These elements listed below will be built upon over time as the MRC Project develops:

- Community Liaison Committee;
- Open houses and town hall meetings;
- Presentations and meetings with local community groups;
- Newsletters;
- Signage;
- Website, email and other digital media;
- Media and press releases;
- Meetings with local residents and land owners; and
- Complaints response procedure.

Engagement with federal and provincial regulatory agencies has been ongoing since a regulatory initiation meeting for the Beaver Dam Mine Project was held in October 2014. This initial meeting was intended to present the planned Project and to receive feedback on the regulatory regime and regional expertise. Since the commencement of the federal EA process in December 2015, multiple meetings have been held, including one-on-one meetings or correspondence, larger meetings or workshops, and site visits. A one-day workshop was held on May 13, 2016 for interested provincial and federal regulators. On November 29, 2016, a site visit and tour was held for interested provincial and federal regulators and representatives of the two closest Mi'kmaq communities, Sipekne'katik and Millbrook, and staff of the Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO).

Specific public engagement activities have also occurred to support the EA for the Beaver Dam Mine Project since the federal process was commenced in December 2015. Specifically, this includes community open houses and ongoing two-way information sharing with the CLC.

Four community open houses were held in May 2016; two of these were open to the public while the other two were open to First Nations community members as described under Indigenous Peoples engagement.

The two public open houses were well advertised in the local communities. The dates and locations were as follows:

- May 18, 2016 at Natural Resources Education Centre, 12014 Hwy 224, Middle Musquodoboit
- May 19, 2016 at Sheet Harbour Lions Club, 183 Pool Road, Sheet Harbour

A total of 94 interested community members attended these two open houses. Middle Musquodoboit had a total of 61 attendees with 49 providing name and/or contact information. Sheet Harbour had a total of 33 attendees with 32 providing name and/or contact information. In total, nine

comment forms were completed, two expressed interest in joining the CLC, and many resumes were provided to Atlantic Gold.

The CLC was recently expanded to a nine-member committee and is now more diverse with representation from the surrounding communities for the MRC Project (including the two closest Mi'kmaq communities): Middle Musquodoboit, Millbrook First Nation, Mooseland, Musquodoboit Harbour, Sheet Harbour, Sipekne'katik First Nation, Pleasant Harbour, and Upper Musquodoboit. The volunteer membership acts as an advisory board to Atlantic Gold. The CLC provides a mechanism for information exchange between communities and the company, as well as a forum to share questions, concerns, and input regarding the MRC Project.

Six CLC meetings were held in 2016. Of these, the last two meetings held on October 29, 2016 and December 3, 2016 included the expanded membership of nine.

Due to the preparation of the EA for the Beaver Dam Mine Project, a special meeting on December 3, 2016 was held to focus on the Project. As per the Terms of Reference, the CLC may invite guests who may be interested in topics in forthcoming meetings. The CLC invited representatives from the Eastern Shore Forestry Watch and the Nova Scotia Salmon Association. Presentations were made by staff of Atlantic Gold and the EA Study Team, maps were provided, and a 3D model of the Beaver Dam mine site was used to demonstrate the existing conditions, proposed full mine development (including pit and waste rock pile), and reclamation of the site. Questions and answers were facilitated. Offers to meet with specific members of the CLC and/or NGOs present to provide additional information on the Project were made by Atlantic Gold.

As per the engagement strategy, there are many tools to engage stakeholders, including members of the local community, government regulators, NGOs, land owners and members of the public. As part of submitting the EIS and EARD to respective government authorities, the engagement to date associated with the Beaver Dam Mine Project was documented, including a summary of issues raised and proponent responses. Atlantic Gold has a broad objective to continue to engage the community and will continue to implement its strategy. Relative to the Beaver Dam Mine Project, specific commitments are made by Atlantic Gold in terms of engagement during the next steps in the EA processes, including:

- Sharing key aspects of the EIS with interested NGOs and/or CLC members;
- Holding meetings with interested NGOs; and
- Answering specific questions posed directly to the company by providing additional information where feasible.

As part of the understanding that engagement plans need to be flexible, Atlantic Gold will address and respond to additional stakeholders identified or issues noted as the EA moves forward and into Project development, operation and reclamation.

4.2 Issues Raised by the Public and Proponent Responses

Table 4-1 provides a summary of key issues raised during public consultation and engagement activities relative to the EA of the Beaver Dam Mine Project. For each key issue identified, a

summary of the Proponent response is provided along with reference(s) to sections in the EIS which address the issue.

Table 4-1 Summary of Key Issues Raised During Stakeholder Engagement

Key Issue	Summary of Proponent Response	Primary EIS Reference
Concern about metals leaching from waste rock pile, including arsenic, and acid rock drainage	Leaching of metals is not expected, e.g., arsenic is expected to be within baseline conditions. Acidic runoff is not anticipated to be a concern. Surface water management and monitoring will be in place to identify trends.	Section 6.2.3.4 Bedrock Geology; Section 6.3 Surface Water, including 6.3.7 Mitigation and Monitoring
Concern about effect on water quantity in Cameron Flowage from pit development	Local hydrogeological conditions ensure that groundwater will be maintained to recharge Cameron Flowage. Baseline and ongoing monitoring of surface water and groundwater levels will be in place to identify trends.	Section 6.4.6 Project Activities and Groundwater Quality and Quantity Interactions and Effects
Questions about contingency planning for accidents and malfunctions	Hazards have been identified and assessed based on risk with mitigations and contingency planning in place. Future detailed planning and implementation of the Project will further address potential accidents and malfunctions.	Section 6.15 Accidents and Malfunctions
Concern about wetlands being impacted at mine site and future compensation	Where possible, wetlands have been avoided; otherwise minimization of effects was incorporated into Project planning. Any wetlands altered must have NSE approval and will require compensation.	Section 6.5 Wetlands, including 6.5.7 Mitigation and Monitoring
Questions about addressing species at risk if identified in Project area	Species of conservation interest (SOCI) and species at risk (SAR) have been assessed. Effect is minimal and where a potential Project interaction, mitigation and monitoring plans are identified for priority species, including fish, vascular flora and lichens, terrestrial fauna and birds.	Section 6.10.7 Mitigation and Monitoring for SOCI and SAR.
Concern about effect on habitat from haul road construction	Effects of road construction will be minimized by using existing corridors where possible and improving drainage where damaged culverts exist. Effects and mitigation measures ae specifically identified for ecological VCs, including habitat and flora.	Section 2.2 Haul Roads for Transporting Ore, and key sections for each VC in Section 6 Environmental Effects Assessment.
Concern about volumes of truck traffic in context of	Potential interaction exists with operation of the haul road and the public; the risk	Section 2.3.2.2 Haul Road;

Table 4-1 Summary of Key Issues Raised During Stakeholder Engagement

Key Issue	Summary of Proponent Response	Primary EIS Reference
safety on public roadways and recreational vehicles	of a mobile equipment accident has been assessed as low with mitigations in place including design of Hwy 224 crossing, appropriate signage, and haul truck driver training	Section 6.13.6 Project Activities and Health and Socio-economic Conditions Interactions and Effects; and 6.15.3.7 Mobile Equipment Accident
Request to prefer haul route option that does not travel along Hwy 224	Based comments received on two options during the stakeholder and Mi'kmaq engagement, Atlantic Gold completed a feasibility review of the second option which does not pass by any residences. This was selected and is carried forward in the EA.	Section 2.2.2 Haul Roads for Transporting Ore; Section 2.3.4 Summary of Changes to Project Activities; Section 2.6.6 Ore Transportation
Concern on cyanide use at plant for gold processing	The approved Touquoy Gold Project includes a gravity/CIL processing of the ore using a highly efficient cyanide destruction process. This use of this existing plant will be extended for the processing of ore from Beaver Dam. Mitigations for transportation, handling storage and processing will be incorporated into the extended use of the plant.	Section 2.3 Operations and Maintenance associated with the processing plant; Section 2.6.4 Ore Processing Methods;
Concern on effect of tailings disposal in mined-out Touquoy pit	Use of the approved pit as part of the Touquoy Gold Project allows the existing footprint to be used and eliminates the need to process the tailings at the Beaver Dam mine site. Geological conditions predict minimal effect on the receiving environment; conditions will be monitored and compared with the developing baseline data set for the Touquoy Gold Project.	Section 2.3 Operations and Maintenance associated with tailings management, and key sections for surface water and groundwater in Section 6 Environmental Effects Assessment
Request to be informed on the Project activities	Atlantic Gold is committed to maintaining its CLC for the life of the MRC Project, including Beaver Dam Mine Project. Other aspects of community engagement will continue as per the community engagement strategy.	Section 3.6 Ongoing Community Engagement; Section 6.13.7 Mitigation and Monitoring

Table 4-1 Summary of Key Issues Raised During Stakeholder Engagement

Key Issue	Summary of Proponent Response	Primary EIS Reference
		associated with socio-economic considerations

5. Indigenous Peoples Engagement

Atlantic Gold is committed to meaningful engagement of the Mi'kmaq of Nova Scotia as part of its MRC Project. Engagement began as part of planning and environmental assessment of the Touquoy Gold Mine over a decade ago. This engagement has focused on the Assembly of Nova Scotia Mi'kmaq Chiefs and staff of the KMKNO, as well as the community members, staff and Chief and Council of each of the nearest two Mi'kmaq communities, Millbrook and Sipekne'katik First Nations.

While the government's duty to consult cannot be delegated to proponents, procedural aspects can be delegated. In addition, both the federal and provincial EA processes include requirements for engagement of Indigenous Peoples. The information gathered by the proponent during its engagement with Indigenous Peoples helps to contribute to the Crown's understanding of any potential adverse impacts of the project on potential or established Aboriginal or treaty rights, title and related interests, and the effectiveness of measures proposed to avoid or minimize those impacts.

The Made-in-Nova Scotia Process is the forum for the Mi'kmaq, Nova Scotia, and Canada to resolve issues related to Mi'kmaq treaty rights, Aboriginal rights, including Aboriginal title, and Mi'kmaq governance. The process involves the Mi'kmaq of Nova Scotia as represented by the Assembly of Nova Scotia Mi'kmaq Chiefs and the provincial and federal governments. Further, the Nova Scotia *Environmental Assessment Regulations* include a requirement to identify concerns of Indigenous People about potential adverse effects and steps taken, or proposed to be taken, by the proponent to address concerns, as well as the steps taken to identify these concerns.

The EIS Guidelines (CEA Agency 2016) for Beaver Dam Mine Project's federal EA process give guidance to Atlantic Gold to complete specific aspects of Mi'kmaq engagement. For indigenous groups with potential to be most affected by the Project, it was expected that Atlantic Gold would strive toward developing a productive and constructive relationship based on ongoing dialogue with the groups in order to support information gathering and effects assessment. In addition, federal funding was provided under CEAA 2012 to support Indigenous Peoples participation in the EA; this includes funding awarded to the KMKNO and to Millbrook and Sipekne'katik First Nations.

As part of planning the Beaver Dam Mine Project, including preparation of the EIS, engagement has continued with the Mi'kmaq of Nova Scotia. The specific engagement activities related to Project are identified in the EIS. Beyond the regulatory requirements, Atlantic Gold strongly believes that meaningful and long term engagement of the Mi'kmaq of Nova Scotia is crucial to the success of any development. The Proponent is committed to maintaining Mi'kmaq engagement throughout the

life of its MRC Project; these activities extend well beyond the EA process of the Beaver Dam Mine Project.

5.1 Indigenous Peoples Engagement Activities

An engagement strategy for the Mi'kmaq of Nova Scotia has been developed by Atlantic Gold for the development, operation and reclamation of the MRC Project, which includes the permitted and under construction Touquoy Gold Mine, and the proposed Beaver Dam Mine Project. Like the strategy for community engagement, it sets out the formal engagement activities with the Mi'kmaq of Nova Scotia that Atlantic Gold will undertake throughout all phases of its exploration activities and mining operations in Nova Scotia. Over time, this also may include additional developments based on results of the ongoing advanced exploration activities at Cochrane Hill and Fifteen Mile Stream.

Engagement planning for Indigenous Peoples is specific and unique to the Mi'kmaq of Nova Scotia; however, it aligns with the broader community engagement activities where appropriate. Like the planning for community engagement, the Mi'kmaq engagement plans allow for flexibility to allow adaptation based on feedback from the Mi'kmaq and ongoing development of Atlantic Gold's MRC Project.

Since the commencement of the federal EA process on the Beaver Dam Mine Project in October 2015, engagement has been ongoing with the Mi'kmaq of Nova Scotia. These include aspects specific to the Project including:

- CLC, where two members were appointed by their Chief and Council as representatives of Millbrook First Nation and Sipekne'katik First Nation;
- Open houses, specifically two community open houses occurred in May on lands of Millbrook and Sipekne'katik First Nations prior to the two public open houses;
- Presentations to Chief and Council of Millbrook First Nation and of Sipekne'katik First Nation, as well as the Benefits Committee Chiefs of the Assembly;
- Meetings, information sharing and correspondence with the KMKNO and thirteen Millbrook First Nations of Nova Scotia, as well as the Nova Scotia Native Council for the purpose of good governance;
- Mini employment fairs set up in collaboration with staff of Millbrook and Sipekne'katik First Nations, as well as sharing of employment opportunities with Millbrook and Sipekne'katik First Nations and the KMKNO, with current employment at the under construction Touquoy Gold Project exceeding ten percent;
- Ongoing dialogue on formal agreements in terms of participation and benefits sharing with Millbrook First Nation, Sipekne'katik First Nation and the Assembly;
- Participation of staff of KMKNO and Millbrook and Sipekne'katik First Nations in a site visit and tour of the proposed Beaver Dam Mine Project with provincial and federal regulators on November 29, 2016; and

- Use of many tools for Mi'kmaq engagement that are used for the general community engagement, such as newsletters, signage, website, email and other digital media, media and press releases, meetings with local residents, and a complaints response procedure.

A Mi'kmaq Ecological Knowledge Study (MEKS) was completed by Mainland Mi'kmaq Development Inc. which is an environmental consultancy that is part of Confederacy of Mainland Mi'kmaq (CMM). CMM updated their original MEKS for the Beaver Dam Mine Project to include newer information sources and to include the study area for the revised haul road. The MEKS was completed in accordance with the second edition of the Mi'kmaq Ecological Knowledge Study Protocol developed by the Assembly of Nova Scotia Mi'kmaq Chiefs.

The two Mi'kmaq community open houses were well advertised by staff of each community. In addition, community members were invited to attend the two public open houses if convenient. The dates and locations for Mi'kmaq community open houses were as follows:

- May 16, 2016 at Millbrook Community Hall, 72 Church Rd, Truro
- May 17, 2016 at Saint Kateri Tekakwitha (Church Basement), Indian Brook

A total of 32 interested community members attended these two open houses. Millbrook First Nation had a total of 16 attendees with 9 providing name and/or contact information. Sipekne'katik First Nation had a total of 16 attendees with 14 providing name and/or contact information. In total, four comment forms were completed; many attendees expressed an interest in employment and some provided resumes to Atlantic Gold.

As discussed in Section 4, the CLC was recently expanded to a nine-member committee including representation of the two closest Mi'kmaq communities, Millbrook First Nation and Sipekne'katik First Nation. The volunteer CLC membership acts as an advisory board to Atlantic Gold and provides a mechanism for two-way information exchange between communities and the company. Specific to the Beaver Dam Mine Project, a special meeting was held on December 3, 2016 to focus on the Project. Presentations were made by staff of Atlantic Gold and the EA Study Team, maps were provided, and a 3D model of the Beaver Dam mine site was used to demonstrate the existing conditions, proposed full mine development (including pit and waste rock pile) and reclamation of the site. Questions and answers were facilitated.

As part of submitting the EIS and EARD to respective government authorities, the Mi'kmaq engagement to date associated with the Beaver Dam Mine Project was documented, including a summary of issues raised and proponent responses at the time of EIS submission. Relative to the Beaver Dam Mine Project, specific commitments are made by Atlantic Gold in terms of Mi'kmaq engagement during the next steps in the EA processes, including:

- Offering to share key aspects of the EIS with staff of Millbrook and Sipekne'katik First Nations and the Assembly, including the MEKS;
- Holding meetings with key staff of KMKNO and Millbrook and Sipekne'katik First Nations;
- Offering opportunities for presentations and site visits to Chief and Councils, specifically Millbrook and Sipekne'katik First Nations,

- Having additional community open houses or site visits as deemed appropriate in consultation with staff and/or leadership of Mi'kmaq communities; and
- Answering specific questions posed directly by the Mi'kmaq to the Proponent by providing additional information and/or holding meetings where feasible.

As part of understanding that engagement planning need to be flexible, Atlantic Gold will address and respond to additional questions or concerns identified, or issues noted as the EA moves forward into Project development, operation and reclamation. Atlantic Gold has a broad objective to continue to engage the Mi'kmaq of Nova Scotia and will continue to implement its strategy. It is anticipated the outcomes of ongoing engagement throughout the EA process and beyond will support the Project detailed design in all phases from pre-construction data collection to final reclamation.

Views from Mi'kmaq groups were gathered with respect to both potential environmental effects of the Project and the potential adverse impacts of the Project on potential or established Aboriginal or treaty rights, title and related interests. It is the opinion of the Proponent that Mi'kmaq groups engaged were open to the Project as presented with its mitigation measures and monitoring programs; however, the views of the Mi'kmaq will be further developed as part of the detailed review of this EIS once formally released as part of their participation in the federal and provincial EA processes, including the federal funding allocated to the Mi'kmaq of Nova Scotia represented by the KMKNO and Sipekne'katik and Millbrook First Nations. Comments from the Mi'kmaq of Nova Scotia were considered in the development of the EIS. Refer to Section 4 of the full EIS for additional details regarding the Indigenous Peoples engagement program.

5.2 Issues Raised by Indigenous Peoples and Proponent Responses

Table 5-1 provides a summary of key issues raised during Mi'kmaq engagement activities relative to the EA of the Beaver Dam Mine Project. For each key issue identified, a summary of the Proponent response is provided along with reference(s) to sections in the full EIS which address the issue. Several key issues were specific to the originally proposed haul route along Hwy 224 which passed by the Mi'kmaq community of Beaver Lake; these have been addressed by the revised haul route which no longer passes by Beaver Lake.

This summary table is not intended to be a complete list of all questions and concerns identified in Mi'kmaq engagement activities. As part of the EA process, the feedback received to date from the Mi'kmaq of Nova Scotia is reflected in the development of the EIS including the identification of the VCs and the effects assessment of each.

Many of the issues raised during Mi'kmaq engagement were related to potential effects to the environment and are noted in Table 4-1. Issues are included in Table 5-1 where a concern, question or request was uniquely raised during Mi'kmaq engagement or where it relates specifically to treaty rights, title and related interests. Ongoing engagement will focus on these issues as identified to date, as well as additional concerns or questions that may arise.

Table 5-1 Summary of Key Issues Raised During Mi'kmaq Engagement

Key Issue	Summary of Proponent Response	Primary EIS Reference
Concern about air emissions and noise associated with mining operations and trucking	Air emissions and noise will be minimized with mitigative measures. Monitoring for air quality, including total suspended particulates, will be completed.	Section 6.1.7 Mitigation and Monitoring for Atmospheric Environment
Concern about water quality and quantity and potential effect on fish habitat	Surface water management associated with mining and processing is necessary to minimize effect on receiving water. Monitoring of surface water will be completed to identify any trends to ensure no residual effect on fish habitat.	Section 6.3 Surface Water; Section 6.6.6 Project Activities and Fish and Fish Habitat Interactions and Effects
Concern about effect on groundwater, specifically related to domestic wells at Beaver Lake, from development of pit at Beaver Dam	As the nearest domestic well is over 5km from the mine site, no effect is expected on groundwater quality or quantity at Beaver Lake. A network of monitoring wells will be used to monitor groundwater quality and quantity at the Beaver Dam mine site.	Section 6.4.6 Project Activities and Groundwater Quality and Quantity Interactions and Effects
Questions about plans for reclamation at the Beaver Dam mine site	The mine site facilities will be removed, the pit will naturally fill with water and disturbed surfaces covered with stockpiled topsoil and re-vegetated. The site will be returned to land owner for forestry and recreational use.	Section 2.3.3 Decommissioning and Reclamation
Questions about contingency planning for accidents and malfunctions	Hazards have been identified and assessed based on risk. Mitigative measures and contingency planning will be in place to address potential accidents and malfunctions.	Section 6.15 Accidents and Malfunctions
Concern on habitat loss from Project development, including forest, wetlands, flora and fauna	Disturbance exists on the mine site which will be reclaimed at end of operation. The existing alignment of haul road was used where feasible and practical to minimize footprint. Existing facilities will be used for processing and tailings management. Effect on habitat is minimal.	Section 2.2 Project Location and History, as well as effects assessments in Section 6
Concern about effect of haul truck traffic on birds	There is potential effect on birds due to noise and dust from haul truck traffic as well as potential bird strikes. This effect is limited to operational phase and was assessed to not be significant.	Section 6.9.6 Project Activities and Birds Interactions and Effects
Concern about effect on traditional uses of the Mi'kmaq of Nova Scotia	Traditional uses include hunting, fishing, trapping and gathering medicinal food and plants as per the MEKS completed. Mitigative measures to protect the	Section 6.11.6 Project Activities and Indigenous Peoples

Table 5-1 Summary of Key Issues Raised During Mi'kmaq Engagement

Key Issue	Summary of Proponent Response	Primary EIS Reference
	environment and ongoing engagement will minimize any effect to traditional use and access to resources.	Interactions and Effects; Appendix P Mi'kmaq Ecological Knowledge Study
Request to prefer haul route option that does not travel along Hwy 224	Based comments received on two options during the stakeholder and Mi'kmaq engagement, Atlantic Gold completed a feasibility review of the second option which does not pass by residences, including Beaver Lake IR17. This was selected and is carried forward in the EA.	Section 2.2.2 Haul Roads for Transporting Ore; Section 2.3.4 Summary of Changes to Project Activities; Section 2.6.6 Ore Transportation
Questions about cumulative effects of multiple projects in the region	A cumulative effects assessment was completed for each VC including current use of lands and resources for traditional purposes. Ongoing engagement specific to Atlantic Gold's existing and any future projects will also occur with the Mi'kmaq of Nova Scotia.	Section 8.6 Cumulative Effects Summary; Section 4.7 Ongoing Indigenous Peoples Engagement
Request ongoing engagement of the Mi'kmaq of Nova Scotia	Atlantic Gold is committed to ongoing Mi'kmaq engagement for the life of the MRC Project, including Beaver Dam Mine Project. Other aspects of Mi'kmaq engagement will continue as per the Mi'kmaq engagement strategy with focus on issues identified as part of the EA and additional issues that may arise as the Project develops.	Section 4.7 Ongoing Indigenous Peoples Engagement; Section 6.11.7 Mitigation and Monitoring associated with Indigenous Peoples

6. Summary of Environmental Effects Assessment

This section includes a description of the baseline conditions, a summary of Project interactions and effects, and a brief discussion of residual effects, if any, anticipated for each of the VCs identified in Section 1.3 of this EIS Summary document. Residual effects are considered after mitigation measures have been applied. Additional detail regarding the baseline conditions and anticipated effects between each VC and the Project components are provided in the EIS.

A summary of anticipated interactions between each VC and the Project components is also provided in Tables 6-3, 6-4, and 6-5 in Section 6.14.

A summary of the residual environmental effects and their significance associated with each VC is provided in Table 6-6 in Section 6.14. Detailed mitigation measures and monitoring programs for each VC are discussed in Section 7.

6.1 Atmospheric Environment

The atmospheric environment as a VC is comprised of three main components – air quality and climate change, noise and vibration, and ambient light.

6.1.1 Baseline Program

Preliminary baseline particulate monitoring including total suspended particulates (TSP) and coarse particulate matter (PM_{10}) was conducted following applicable standards and methodologies. Air samples were collected at nine locations near the Beaver Dam mine site and along the haul road and five locations on the Touquoy site.

TSP concentrations ranged from 1.7 to 41.7 µg/m^3. Results for the PM_{10} concentrations ranged from 7.1 to 13.1 µg/m^3. The higher values were obtained at a monitoring station that was located in a recently clear cut area, which may have contributed to higher particulate levels in comparison to the other locations. This area was resampled in 2014. The 2014 results for that area were 4.6 µg/m^3, well below the Nova Scotia Air Quality Standards (NSAQS). For all other sample locations, baseline TSP and PM_{10} concentrations were below the NSAQS.

Ambient air quality in Nova Scotia is monitored using a network of 13 sites operated by NSE and Environment and Climate Change Canada through the National Air Pollution Surveillance (NAPS) Network. There were no exceedances of the NSAQS at the nearest stations for all contaminates. One exceedance of the Canadian Ambient Air Quality Standards (CAAQS) for $PM_{2.5}$ was reported for the Pictou station.

The Project site is located in a relatively undeveloped rural region of Nova Scotia with infrequent industrial operations that would affect air quality or contribute to greenhouse gas (GHG) emissions. As the NAPS monitoring stations are located in areas with local industry, measured concentrations of contaminants would likely be lower at Beaver Dam. Existing GHG emissions would be generated primarily through recreational vehicle usage, local traffic, and limited forestry operations.

To build upon the preliminary baseline sampling of select parameters and review of data collected from nearby NAPS stations that was completed as part of this EIS development, it is recommended that additional baseline sampling be completed closer to the start of Project activities to obtain data that is more representative of baseline conditions in the area at that time. Other activities in the area, such as forestry operations, have the potential to cause changes in air quality over the next five years prior to the start of the Project. Therefore, it is preferred to collect a full set of baseline air quality data (including total suspended particulates, $PM_{2.5}$, PM_{10}, SO_x, VOCs, and NO_x) prior to the start of construction. Data on air emissions will be collected during the operations of the Touquoy facility, which will provide information on the possible effects of the Touquoy project on air quality prior to the processing of Beaver Dam ore.

Sound level measurements, collected at several sample locations near the Beaver Dam mine site boundary, and at one location on the Touquoy site, take into consideration the nearest receptors

and proposed mining equipment operational locations. All measurements, except for Location #1, met NSE's criteria in the Pit and Quarry Guidelines for all time intervals. Sample Location #1 was approximately 3 metres from a hauling road that was in use during the monitoring period contributing to elevated noise level readings. Typical sound sources would include recreational vehicles, traffic on local roadways and contribution from existing forestry operations. The degree to which these sources would influence the existing noise levels would vary depending on the time of day and season.

The Project site is in a remote location. Ambient night time light conditions would be minimal and typical of an undeveloped rural area. The largest artificial light sources in the Project area are from the nearest residences of the Beaver Lake IR17, and the occasional all-terrain vehicle.

6.1.2 Project Activities Interactions and Effects

6.1.2.1 Dust and Particulate Emissions

Dust emissions are the primary atmospheric issue for the Beaver Dam mine site. Air-borne particulate matter will be generated during construction and operations phases of the Project, including trucking of ore. Given that there will be no residential buildings located near the proposed open pit area or along the haul route, increases in suspended particulate matter will not affect residents in that area.

6.1.2.2 Greenhouse Gas Emissions

The primary sources of GHG emissions considered for each phase of the Project are stationary and mobile fuel combustion sources. During the operations phase of the Beaver Dam mine, GHG emissions that would be generated from explosives used in rock blasting was also considered.

GHG emissions from Nova Scotia reported in 2014 were 16,600 kilotonnes of carbon dioxide equivalent units (CO_2e) (ECCC 2016b). Based on the Project GHG assessment, in an average full year of operation of the Project (most GHG-intensive phase), the site would emit 37.13 kilotonnes CO_2e - approximately 0.22% of the reported 2014 GHG total for Nova Scotia. Total GHG emissions from all phases of the Project would represent approximately 1.25% of the provincial one year total.

6.1.2.3 Noise Emissions

Sources of Project-related noise on the haul road may include heavy machinery and truck traffic during the construction and operational phases, as well as blasting during operation. The nearest permanent residential dwelling (over 5 km) is buffered by forest and two topographic ridges. The likelihood of any dwellings in this rural area being occasionally impacted by sound from the mine site is very low. The majority of mining operations will occur in the pit well below ground surface thereby provide excellent noise shielding. The nearest point of the haul road to the Beaver Lake IR 17 is approximately 3 km. The likelihood of the community of Beaver Lake being impacted by sound from the haul road is also very low. Based on the results of a preliminary acoustical model of the mine site and the portion of the haul road near Beaver Lake IR 17, there will be no noise impacts on the Beaver Lake IR 17 due to operations conducted on the mine site or the haul road.

At the Touquoy mine site, the primary source of noise during the processing of Beaver Dam ore will be the crushing of ore, processing plant operation, and service vehicles. Based on an acoustic assessment, all estimated values are below the NSE daytime sound level criteria.

6.1.2.4 Light Levels

Ambient night-time light levels are not anticipated to affect the Beaver Lake IR 17 community. Ore will be hauled to the Touquoy Processing and Tailings Management Facility for approximately 12 to 16 hours per day during the operational phase. Highway truck traffic will not generally be present on the haul road during night-time hours. Effects of lighting at the Touquoy facility are insignificant and will be an extension of approved operation at Touquoy.

6.1.3 Residual Effects and Significance

The predicted residual environmental effects of Project development and operations on the atmospheric environment are assessed to be adverse, but not significant. The overall residual effect of the Project on the atmospheric environment is assessed as not likely to have significant adverse effects after mitigation measures have been implemented. The residual cumulative effects on the atmospheric environment are also considered to be adverse but not significant.

6.2 Geology, Soil, and Sediment Quality

Geology, soil, and sediment as a VC is centered on: the potential for acid rock drainage (ARD) to be produced during exposure of Halifax Group or sulphide–bearing bedrock to oxygen and surface water runoff, and the potential for contamination of soil and sediment from mining activities. ARD is provincially regulated through the *Sulphide Bearing Material Disposal Regulations*.

The Beaver Dam Mine site is in an area of low topographic relief at 140 metres above sea level (masl) with scattered drumlins reaching 165 to 175 masl and Cameron Flowage channeling through a topographic low of 130 masl. Drainage is to the southeast along a number of poorly drained streams, shallow lakes, and wetlands.

6.2.1 Baseline Program

Each sample was analyzed for metals. Arsenic exceeded Canadian Council of Ministers of the Environment (CCME) Probable Effect Level (PEL) at the majority of locations and arsenic, mercury, cadmium, and copper exceeded CCME Interim Sediment Quality Guidelines (ISQG) at select locations.

Arsenic (As), a naturally occurring element in the earth's crust, is found throughout the environment; therefore, in a gold mining area rich in arsenic mineralization (e.g. arsenopyrite), high As concentrations indicate naturally occurring arsenic. Mercury (Hg) occurs in all types of rocks and is present in the atmosphere as metallic mercury vapours and as volatized organic mercury compounds. The Hg detections make further monitoring warranted but there are no indications of historic tailings at the Beaver Dam site and no indications that Hg was used in any of the historic stamp mill or other crude processing of ore.

A sediment quality investigation at the Touquoy site consisted of the collection of ten sediment samples from the site and surrounding area watercourses in January 2007 as part of the EA for the Touquoy Gold Mine. Since this mine construction commenced, surface and groundwater sampling have occurred as per its regulatory approvals.

Analysis of the historical in-situ ore and waste rock for ARD potential was completed at the Beaver Dam Mine site. Results indicated that the majority of the deposit is net acid consuming; however, there are areas that may require specific handling and disposal due to the sulphur content and resulting acid generating potential. The remainder of the samples had net acid consuming potential.

6.2.2 Project Activities Interactions and Effects

In general, limiting sedimentation and erosion from occurring will mitigate these interactions. Geology and soils outside the disturbed area have no potential for impacts. Quality of sediment is a valued part of aquatic habitats and mitigation measures will be implemented to protect sediment from potential impacts related to Project activities. Any potential ARD would interact with downgradient receiving water.

6.2.3 Residual Effects and Significance

Residual effects for geology, soils and sediment are not anticipated. The geology of the site and the soils are currently disturbed in many areas of the site. Sediment has the potential for residual effects, although none are anticipated. The mitigation and monitoring programs have been designed to avoid and monitor the potential long term residual impacts, including any potential ARD. No significant cumulative effects are expected.

6.3 Surface Water Quality and Quantity

Surface water is a VC because aquatic species and terrestrial species rely on an accessible water sources for their survival. Socially and economically, surface water resources are essential to municipal, agricultural, industrial and recreational sectors, among others.

6.3.1 Baseline Program

6.3.1.1 Project Watersheds Location

The Project lies within the West River Sheet Harbour drainage basin occupying an area of roughly 576 km^2, a moderately sized watershed in the Province. The area is characterized by rolling till plains, drumlin fields, extensive rock land, and numerous freshwater lakes, streams, bogs and wetlands, having relatively a low relief, hummocky type terrain. Forests are predominantly coniferous of red and black spruce.

Within the Beaver Dam Mine footprint, four waterbodies: Crusher Lake, Mud Lake, Cameron Flowage, and an unnamed waterbody in the southwest corner of the Project area; were identified through a desktop review of available mapping. Five watercourses were similarly identified at the mine site.

Sixteen (16) mapped watercourses, including two major rivers: West River Sheet Harbour and Morgan River; intersect the haul road footprint. Five smaller waterbodies are mapped west of Lake Alma. During field assessments, however, these five waterbodies were confirmed to be wetland habitat.

Moose River flows along the western border of the Touquoy property. An unnamed tributary to Moose River flows south through the property, between the open pit and tailings management area.

6.3.1.2 Surface Water Quality

Surface water monitoring was conducted at seven locations around the Beaver Dam mine site and 29 locations along the haul road to obtain baseline water quality data. Surface water quality monitoring was conducted at the Touquoy site prior to construction of the Touquoy Project and is ongoing as part of regulatory requirements.

Water quality is characterized as relatively pristine, with little influence from past mining activities, local industry, road salting, or local residents. Some localized influences from road work (culverts, ditching) or forestry use would have occurred historically (suspended solids for example) but these would be localized and subject to short term variations. Portions of the haul road where NSTIR had a role in winter maintenance may have had use of salt and/or sanding.

6.3.1.3 Surface Water Quantity

A water balance for the mine site was calculated to determine the amount of surface water runoff currently created given minimal impermeable surfaces in order to compare it against the amount of water surplus generated from an increase in impermeable surfaces as a result of the Project.

The mine site represents approximately 5% of the contributing drainage area to Cameron Flowage downstream of the Project area. The contributing drainage area to Mud Lake (approximately 165 ha) was divided into two separate drainage areas. The larger of the two encompasses the flow to Mud Lake originating from Crusher Lake and its contributing drainage area (approximately 140 ha). The second drainage area (approximately 25 ha) encompasses the area adjacent to Cameron Flowage that flows north into the southeast corner of Mud Lake.

An initial assessment of the existing haul road identified 23 watercourse crossings: 20 culverts (smaller watercourses) and 3 timber bridges (watercourses 6 to 13 m in width). A large number of the culverts were poorly installed. The overall poor culvert conditions have contributed to localized poor surface water quality conditions and obstructed fish passage.

Two main surface water systems flow through the area of the Touquoy facility. One system flows from Square Lake through Fish River and the other flows from Long Lake and the New Dam Flowage through Moose River. The Square Lake system discharges to Scraggy Lake, located south of the facility.

6.3.2 Project Activities and Surface Water Interactions and Effects

Surface Water Quality

Publicly available surface water quality data and results from field collected samples were used to provide current baseline data. The data was used in the design of the Project infrastructure and will provide a snapshot of conditions for 2016/17. There are potential impacts to surface water quality as a result of the storage of Beaver Dam tailings in the exhausted Touquoy open pit mine but it should be noted that these are restricted to the surface water in the exhausted pit only. The flooded pit will be a lake setting separated physically from the nearby Moose River.

Surface Water Quantity

Development of the mine will result in an artificial and managed regime of surface water movement and runoff at the site. The exposed surfaces at the surface mine and on access roads will lead to increased runoff patterns during rainfall events. The overall change in surface water quantity will be small due to the small size of the pit relative to the overall watershed area and the runoff control measures proposed at the site.

Portions of the haul road will have to be widened to accommodate two-way traffic. However, some deviations in the existing route will be required and new road construction will be completed. This will marginally increase the quantity of surface water runoff within the haul road footprint.

The haul road crosses three watercourses via single lane timber bridges, which will be replaced with single arch modular bridges designed to cause no impediment on water flow and fish passage. Where construction or drainage changes take place, this will facilitate the restoration of the existing drainage conditions and improve fish passage.

The Touquoy facility is currently under construction. No additional surface water quantity effects are anticipated by the processing of the Beaver Dam ore at the Touquoy facility noting that an additional four year period of surface water extraction will be required. All surface water extractions are done through an approvals process administered by NSE.

6.3.3 Residual Effects and Significance

Pollution prevention measures will be employed at site to prevent accidental spills. Runoff from the surface mine workings will flow to sediment retention ponds. The ponds will allow the water to be reused on-site for dust control. Discharges to the environment will occur at defined locations that can be sampled and tested to ensure the applicable discharge standards are achieved. The predicted residual adverse impacts on surface water are not expected to be significant.

Stripping of vegetation and soils from the operational areas is expected to increase the mean annual runoff discharged from the site. Much of this will flow towards Cameron Flowage/Killag River as is currently the case. Given this, the impacts on nearby surface water resources and associated downstream aquatic ecosystems are not considered to be significant. Diversion of flows into perimeter ditches and sedimentation ponds will reduce flows. The impacts of any changes will be felt slowly as the mine development proceeds. Given that these potential changes in surface flow to Cameron Flowage are relatively minor and short term for mining operations, the impacts of these effects are not considered to be significant.

Changes to surface water quantity are not anticipated at the Touquoy facility as a result of the processing of Beaver Dam ore. The deposition of Beaver Dam tailings into the exhausted Touquoy open pit mine could potentially impact the quality of the water in the shallow lake that will be created in the open pit; however, the flooded pit will be separated physically from the nearby Moose River.

The overall residual effect of the Project on surface water is assessed as not significant after mitigation measures have been implemented. The residual cumulative effects are also considered to be not significant.

6.4 Groundwater Quality and Quantity

Groundwater quality and quantity as a VC is centered on its potential ecological value in recharging surface water. From a hydrological and hydrogeological perspective, the potential disconnection between bedrock aquifers and surface water in the area may limit groundwater recharging or being recharged by surface water and wetlands. In a mine dewatering scenario, groundwater may experience draw down and could subsequently adversely affect surface water quantity in Cameron Flowage.

Groundwater quality and quantity also has a socio-economic importance due to its potential to provide potable water through drilled and dug wells. The nearest domestic well is approximately 5.5 km southwest of the Beaver Dam mine site.

6.4.1 Baseline Program

The site is located in a rural, sparsely populated area of Halifax County. The nearest domestic well is 5.5 km southwest from and up-gradient of the site (residence along Hwy 224). Domestic wells are a mix of drilled and dug wells. 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 Beaver Lake IR 17 is located approximately 5 km south of the mine site and 3 km from the nearest point of the haul road. Domestic wells located along Hwy 224 are a mix of drilled and dug wells based on a review of the NS Well Log Database. Drilled wells are often over 60 m deep, are typically fed by one or two sets of discrete water-bearing fractures and have relatively low yields, typically 5 to 10 litre per minute. Static groundwater levels range from 3 m to 12 m below ground.

The site hydrogeology consists of a 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 amongst the smaller bedrock fracture systems is likely poor to moderate, and the main zones that are capable of storing and transmitting relatively large amounts of groundwater are the larger scale faults. The water table is close to the surface across the mine site, reflecting flat lying terrain, low permeability bedrock and the excess of annual rainfall over evaporation. The bedrock sequence and part of the overlying tills will be saturated with groundwater under ambient conditions.

The historic and recent data from the site provided a complete picture of the physical hydrogeology of the site as well as possible interactions that were examined as part of the groundwater VC. Modeling was not completed as the primary outcome of the work indicated that some interaction

would occur and that a focus on determination of the interaction with wetlands and surface water (Cameron Flowage) was needed in this VC assessment.

A series of geotechnical/hydrogeological drill holes were sampled at the Touquoy site for groundwater quality in 2006. Samples were analyzed for general chemistry and metals at this time. Since 2016, groundwater monitoring has been ongoing at the Touquoy site as per regulatory requirements (32 pairs of wells). Results indicate that the groundwater is slightly basic with an elevated hardness. 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. Given that the geology at Beaver Dam is similar to that at the Touquoy site, it is anticipated that similar hydrogeological conditions across the entire Project area.

The 2015 Peter Clifton & Associates Ltd. report indicates that groundwater occurs at shallow depths at the Beaver Dam Mine site. Cameron Flowage is likely an area of groundwater discharge. Groundwater can be expected to seep into an open pit developed at the Beaver Dam site through the surficial glacial till deposits, and through fractures and structures in the bedrock. As dewatering progresses and groundwater levels in the vicinity of the open pit are lowered, some surface water bodies which are presently groundwater discharge areas may become areas of groundwater recharge.

Jacques Whitford and Associates reported that during site work completed in the 1980s, most of the diamond drill holes had static groundwater levels with 0.3 m of ground surface. Drill holes that penetrated the Mud Lake Faults zone were often flowing, albeit at very low rates (less than 5 L/min). This indicates an area where bedrock groundwater is discharging upward into the overlying wetland systems. The same observation was made by GHD during field work completed to outline the surface water-groundwater interaction, which included the installation of sand points at select locations where groundwater discharge was suspected, to outline the groundwater-surface water relationships at the site.

6.4.2 Project Activities and Groundwater Quality and Quantity Interactions and Effects

Groundwater and surface water at the site interact in many areas with the main control being topography. Areas of recharge are typically the higher areas and areas of discharge being in the lower areas. Evidence of groundwater discharge to the surface water systems are abundant and mainly appear in the form of seeps and wetlands. The site has features that create these abundant interactions such as high precipitation (1.4 metres per year), shallow bedrock that is relatively impermeable, permeable soil and till units and undulating topography. Effects will be short term and limited to the local area of the mine site.

There are potential impacts to groundwater quality as a result of the storage of Beaver Dam tailings in the exhausted Touquoy open pit mine. These potential impacts would be minor in nature and consist of groundwater quality changes within a short radius of the flooded pit. The potential changes are associated with the chemistry of the surface water due to tailings storage. At the Touquoy facility, surface water contribution to groundwater would be very limited given the nature of the till and the relative impermeability of the bedrock.

Groundwater quantity will not be affected by the processing of the Beaver Dam ore at the Touquoy facility.

6.4.3 Residual Effects and Significance

The predicted residual environmental effects of Project development and production on groundwater are assessed to be adverse, but not significant. The overall residual effect of the Project on groundwater is assessed as not significant after mitigation measures have been implemented. The predicted residual cumulative effects on groundwater are also assessed to be adverse, but not significant. Affects to groundwater supplies used for domestic purposes are not anticipated due to distance from site activities.

6.5 Wetlands

Wetlands were selected as a valued component due to their ecological value in providing habitat for aquatic species and rare plants, the importance of wetlands in the daily lives of terrestrial species, their capacity to store water, managing downstream flooding, improving water quality, and the recharge/discharge of groundwater aquifers.

6.5.1 Baseline Program

Mapped wetland areas were identified from the NSDNR Wetland Inventory Database, the Nova Scotia Topographic Database, the Nova Scotia Wet Areas Mapping (WAM) database, and the Wetland of Special Significance (WSS) GIS predictive layer. Field surveys were completed in 2015 and 2016.

Sixty-three wetlands were identified within the mine footprint and 116 wetlands were identified along the haul road footprint for a total of 179 freshwater wetlands. The wetland types, approximate sizes within the Project area, and tertiary watershed locations are described in the full EIS.

A review of the NSE predictive WSS layer identified two WSS within portions of the Project area, Wetland 29 and Wetland 64. Wetland 29 is classified as a predicted WSS by NSE due to the presence of multiple observations of Boreal Felt Lichen (*Erioderma pedicellatum)* (listed as Endangered by SARA/COSEWIC/NSESA) in 2013 (pers.comm. Charles Sangster, NSE). Wetland 64, which exists along the proposed haul road, is identified as a predicted WSS by NSE due to the observations of possible breeding/nesting by an Olive-sided Flycatcher (OSFL) in 2009 (pers.comm. Charles Sangster, NSE). Although suitable breeding habitat for the OSFL is present within WL64, none were observed at the breeding bird survey point during surveys completed during appropriate breeding periods (i.e. June 13 and 25, 2016). The nearest occurrence of the OSFL identified during the 2016 field program is approximately 1.7 km to the northeast of WL64.

Boreal Felt Lichen was confirmed by MEL during field surveys within Wetland 29. However, its location is beyond the footprint of the proposed Project and as such, impacts to it are not expected as a result of the Project.

In addition to WL29, fifteen additional wetlands had a bird SAR observed within or directly adjacent to the wetland (30m) during field surveys. Of the four SAR birds identified in wetlands, the Barn

Swallow and the Chimney Swift do not utilize wetland habitat for breeding purposes, although they do use wetlands for foraging habitat, specifically water components where insects are present.

6.5.2 Project Activities and Wetlands Interactions and Effects

6.5.2.1 Wetland Impacts

Development of the mine and haul road will cause direct and indirect impacts to wetlands, primarily during the construction phase of the Project. Direct impacts will be associated with clearing, grubbing, infilling, and development of the mine and its associated infrastructure. Across the entire PA, a total of 35 wetlands are expected to be completely altered to support Project development, and 79 wetlands are expected to require partial alteration to support Project infrastructure and development. Indirect impacts are a byproduct of direct impacts associated with the construction activities, as well as potential indirect impacts to wetlands from mine operations (dewatering, blasting, and accidents). The wetland identified as a WSS will not be effected by the Project. No effect to wetlands will occur at the Touquoy Gold Mine as no increase in footprint is proposed beyond the approved construction now underway and no indirect effects are expected through proposed Project operations.

6.5.2.2 Impacts to Groundwater Recharge

The Project area is dominated by surface flow and groundwater discharge wetlands as a result of underlying impermeable geological conditions. Isolated wetlands scattered throughout the mine and haul road sites are likely to provide groundwater recharge functions; however, due to their small size and limited source of water (precipitation and surface runoff), alteration of these wetlands is not expected to impact groundwater recharge at the landscape level.

Wetland alteration associated with the Project is not expected to alter groundwater recharge capacity. Conversely, due to the anticipated alteration footprint on discharge wetlands, surface water flows from headwater positions toward lower lying receiving wetlands (e.g., surrounding Crusher and Mud Lakes and Cameron Flowage) are expected to be altered. Diversion channels, settling pools, and other Project infrastructure will be constructed to manage potential surface water imbalances and/or reductions in drainage toward lower lying receptor wetlands.

6.5.2.3 Wetland Avoidance

Due to the location in which the proposed activity can be performed (the location of the gold ore is fixed by geology), the extent to which the proposed Project location can be varied to avoid impact to wetland habitat is limited.

The preliminary haul road design has been based on following the existing footprint of the Beaver Dam Mines Road and the Moose River Cross Road to reduce overall wetland impact and habitat fragmentation. Wetland avoidance is a key consideration during planning and engineering of new sections of road, to the extent possible.

6.5.3 Residual Effects and Significance

The predicted residual environmental effects of Project development and production on wetlands are assessed to be adverse, but not significant. The overall residual effect of the Project on wetlands is assessed as not significant after mitigation measures have been implemented. No significant cumulative effects to wetlands are expected.

6.6 Fish and Fish Habitat

Fish and fish habitat may be affected, either directly or indirectly, by proposed Project activities.

6.6.1 Baseline Program

6.6.1.1 Fish Habitat Assessment

The potential for each watercourse and wetland to support fish and fish habitat was evaluated across the Project area. A desktop evaluation for priority fish species revealed that no priority species were documented within 5 km of the Project area. No location sensitive species of fish have been identified within 5 km of the mine footprint or the haul road Project area. Priority fish species identified as having an elevated potential to be located within the Project area include *Anguilla rostrata* (American eel), *Salmo salari* (Atlantic salmon), *Culaea inconstans* (Brook Stickleback), *Osmerus mordax* (Landlocked Rainbow smelt), and *Rhinichthys atratulus* (Blacknose dace).

Atlantic salmon (southern uplands population) were not observed within the Project area, but are expected to potentially utilize areas within the Project area. These habitat descriptions are also relevant for Brook trout, which was observed in the Project area.

American Eel was observed within the Project area. Potential American Eel habitat was found to be within 30 tributary watercourses to the three confirmed Eel-bearing watercourses. All remaining watercourses within the Beaver Dam Mine Project are believed to be potentially accessible to the American Eel, even if habitat provision in those watercourses is low.

6.6.1.2 Electrofishing and Fish Collection

A detailed fish habitat survey was also completed at each 100 m length electrofishing sites. Within the eight electrofishing locations in the mine footprint, a total of 44 individual fish were captured at five watercourse locations. Within the seven electrofishing locations in the haul road Project area, a total of 53 individual fish were captured at four watercourse locations.

The focus of fish collection efforts was within two waterbodies within the mine footprint (Crusher Lake and Cameron Flowage). As no lakes or other larger waterbodies are present within the haul road footprint, no significant fish collection effort was completed in the haul road portion of the Project area.

A total of eight individual fish of two species were captured during netting at Crusher Lake Site A. A total of six individual fish of two species were captured during netting at Crusher Lake Site B. No species of commercial, aboriginal, or recreational interest (CAR) or species at risk (SAR) / species of conservation interest (SOCI) were captured during fish collection efforts in Crusher Lake. Brook

Trout were identified just north of Crusher Lake in Watercourse (WC) 5, and are expected to be present in Crusher Lake, based on direct connectivity of WC5 to Crusher Lake.

A total of 15 individual fish of four species were captured during the surveys within Cameron Flowage Site A. A total of 12 individual fish of two species were captured during the surveys within Cameron Flowage Site B. Two CAR species were captured in Cameron Flowage: Yellow Perch and White sucker. Neither of these species was identified during electrofishing surveys within the mine footprint Project area. Presence of Yellow perch and White sucker within Cameron Flowage indicates that these species may also be present within WL59 (no fishing efforts were completed within this open water marsh), WC12, and WL56 (where open water is present). No SAR/SOCI species were identified during fish collection in Cameron Flowage.

Limited water depth and lack of deeper pools in watercourses within the haul road Project area limited fish collection opportunities. Where minnow traps were deployed, only one Brook trout was captured in Watercourse V (tributary to Lake Alma). Brook trout was also captured during electrofishing surveys in this same watercourse, along with the American eel.

6.6.1.3 Characterization of Fish Populations

Fish population characterization was completed through the two-pass depletion population estimate and the catch per unit of effort (CPUE). CAR species identified within the Project area include Brook trout, White sucker, Yellow perch, Smallmouth bass, and American eel. SAR/SOCI fish species identified include the American Eel and the Blacknose Dace. The Atlantic salmon (southern uplands population) was not observed during electrofishing or fish collection surveys, but is also potentially present within the Project area. Atlantic salmon is confirmed to be in surrounding watercourses (Killag River and West River Sheet Harbour).

Benthic macroinvertebrate sampling was completed using the national standardized Canadian Aquatic Biomonitoring Network protocol. Overall abundance and taxon richness of benthic organisms within Project area watercourses were low to moderate.

6.6.2 Project Activities and Fish and Fish Habitat Interactions and Effects

Development of the mine will cause direct impacts to fish and fish habitat mostly during the construction phase of the Project. Continuing impacts to fish and fish habitat are possible during operations of the mine due to on-going dewatering efforts within the open pit, and potential siltation and release of substances to downstream receiving surface water systems adjacent to the mine infrastructure.

Construction of the haul road may cause impacts to fish and fish habitat, mostly during the construction phase of the Project. Positive direct impacts to fish and fish habitat are also expected where current culverts that are hung or crushed can be either replaced or removed and fish passage and habitat re-established.

Areas have been estimated conservatively in the EIS for maximum area of fish and fish habitat impacted by construction of mine site and haul road infrastructure. The requirement of a Fisheries Act Authorization will be determined during future permitting stages of this Project. During

permitting, detailed design will focus on reduction of impact to fisheries resources as much as is possible

As the flooded pit will be a lake that is physically disconnected from other surface water bodies, such as Moose River, direct or indirect effects to fish or fish habitat are not anticipated at the Touquoy Gold Mine.

6.6.3 Residual Effects and Significance

The predicted residual environmental effects of Project development and production on fish and fish habitat are assessed to be adverse, but not significant. The overall residual effect of the Project on fish and fish habitat is assessed as not significant after mitigation measures have been implemented. The predicted residual cumulative effects on fish and fish habitat are assessed to be adverse, but not significant.

6.7 Habitat and Flora

Flora species and communities, and the fauna species which rely upon these communities, may be altered, either directly or indirectly, by proposed Project activities.

6.7.1 Baseline Program

A detailed desktop study to examine potential for presence of and effects on SAR within the vicinity of the Project area was completed. A priority species list was compiled to identify potential SAR and SOCI for each taxonomic group which may be using the Project area and surrounding lands. Additional data from the Atlantic Canada Conservation Data Centre (ACCDC) and the NS Museum of Natural History, including the NSDNR Significant Species and Habitats database, the Maritime Butterfly Atlas, and Odanata Central were reviewed based on these findings. Habitat assessments were completed in October 2014, May 2015 and May 2016.

Overall, current and historic land use throughout the Project area has resulted in a patchwork of mature, immature, regenerating, and disturbed tree stands. The Project area contains a diversity of habitat types and landscape features, but has experienced a considerable amount of disturbance and habitat fragmentation as a result of historic mine operations and current and historic timber harvesting practices.

A total of 294 species of vascular plants were identified - five of these are considered priority species. The diversity of species is moderate to high, especially considering the low fertility of soils within the Project area; however, this is attributed to the range of habitat types encountered, from natural aquatic systems, a variety of wetland types, and both intact and disturbed upland habitats. The vegetation species observed are largely native species, with relatively low diversity and abundance of roadside exotic or invasive species.

Common lichen species observed opportunistically during rare lichen surveys were recorded. Twenty species were recorded within the lichen study area, which included the mine site, haul road, and surrounding areas. Of these species, seven are listed as SAR or SOCI.

6.7.2 Project Activities and Habitat and Flora Interactions and Effects

Development of the mine footprint and haul road upgrades and construction will result in direct impacts to vascular and non-vascular individuals and to flora communities at the full or partial forest stand level in aquatic, wetland, and upland habitats. As such, many of the effects specific to wetland habitat will directly relate to effects on flora. The majority of direct mortality to flora will occur during site construction. No effect on habitat and flora is expected to occur at the Touquoy Gold Mine as no increase in footprint is proposed beyond the approved construction now underway and no indirect effects are expected through proposed Project operations.

Project activities have the ability to indirectly affect flora throughout the Project, particularly during the construction phase. Indirect impacts could include altered hydrology as a result of activity in close proximity to wetland habitat; erosion and sedimentation from Project activities; dust accumulation on vegetation smothering and stressing plants; accidental spills involving deposition of a deleterious substance, including fuel oil, lubricants, or engine oil; and impoundment of up-gradient wetlands if inadvertent dams are built as part of the mine development (roads can act as dams if not constructed properly to allow water to flow through them)..

Movement of equipment can result in deposition of dust on vegetation within close proximity of roads when conditions are dry. This affects flora through the deposition of dust on leaves, which temporarily reduces evapotranspiration and photosynthesis. Over time this may reduce overall growth rates. Similarly, winter maintenance of haul roads and mine site roads can affect plant growth adjacent to roads by placement of sand or stockpiling of snow. Road salt will not be used, thereby reducing potential impact to vegetation.

Additional indirect impacts to native plant communities include the potential for introduction of invasive species due to increased traffic levels.

6.7.3 Residual Effects and Significance

The predicted residual environmental effects of project development and operations on habitat and flora are assessed to be adverse, but not significant. The overall residual effect of the Project on habitat and flora is assessed as not significant after mitigation measures have been implemented. Historical and current land use (forestry and mineral exploration) with the Project area has undeniably negatively affected the local habitats in ways that have affected the local distribution and abundance of several species of flora.

6.8 Terrestrial Fauna

Terrestrial fauna, and the habitat upon which they rely, may be altered either directly or indirectly by proposed Project activities.

6.8.1 Baseline Program

Data on various fauna species was collected during targeted field surveys and incidental observations. Targeted surveys included bats, mainland moose, and wood turtle surveys. Incidental observations were recorded for all other fauna species.

Mainland moose have been recorded within 4.7 km of the mine footprint, and within 14.1 km of the haul road (ACCDC). Mainland moose tracks were observed within the mine footprint Project area in May 2015 in disturbed roadside habitat north of wetland 56. Moose tracks were also observed incidentally in two locations just outside the mine footprint Project area to the northwest in September 2015.

According to the ACCDC reports, no known bat hibernaculae are present within 5 km of the haul road or mine footprint Project area. Abandoned mine openings (AMOs) potentially provide bat hibernacula. Of the twenty AMOs evaluated at the site, all were either in-filled, contained a concrete cap blocking access, or were flooded, with the exception of one. This AMO, known as the J.H. Austin Main Shaft (BED-1-003), was determined to be inaccessible to bats.

Herpetofaunal species were inventoried within the Project area through targeted searches of appropriate habitats and through incidental observations. Observed species included eastern American toad, eastern smooth green snake, red-spotted newt, red-backed salamander, spring peeper, bullfrog, green frog, northern leopard frog, wood frog, and maritime garter snake. Though not observed, it is likely that other common herpetile species use habitat within the Project area, at least periodically.

The snapping turtle (*Chelydra serpentina,* Species at Risk Act (SARA) Special Concern, NS Endangered Species Act (NSESA) Vulnerable, S3) was not observed within the mine footprint Project area. It was, however, observed within the vicinity of the Project area and along the current road to the Touquoy mine site within the haul road Project area. Suitable habitat for the snapping turtle was also observed within the Project area. Incidental sightings of fauna were recorded during all field programs throughout the Project area during all seasons. Aside from mainland moose tracks and a sighting of a snapping turtle, no priority fauna species or signs thereof were observed. Given the mobility of fauna species, the absence of observation does not confirm absence of the species within the Project area.

6.8.2 Project Activities and Fauna Interactions and Effects

Development of the mine infrastructure will cause direct impacts to habitat used by terrestrial fauna, including upland forested habitat and wetlands. This will occur mostly within the construction phase of the Project. Project activities are likely to result in increased habitat fragmentation and a decrease in habitat quality for those species which rely on interior forest conditions, where intact interior forest remains. This is based on increased activity and sensory disturbance, along with increased physical fragmentation. Increase in physical fragmentation is expected to be low, based on the current high level of disturbed habitat as discussed.

Sensory disturbance to terrestrial fauna would result from construction, rock blasting, and overall increased traffic along the haul road during operations. Overall, project activities will likely cause a change in usage of the Project area by wildlife, with some species tending to avoid the area, while others may be attracted to the increased activity, including opportunistic species such as coyotes, raccoons, skunks, or black bears.

Changes to ambient noise levels and the presence of periodic vibrations from blasting have the potential to adversely affect fauna and birds by influencing migration and behavioral patterns.

Direct mortality of fauna species could result from Project activities, particularly due to the increase in traffic during construction and operation of the facility. Indirect mortality could result from exposure to contaminants or spills from unplanned incidents. The increased level of traffic poses an increased risk to wildlife collisions, particularly along the haul road, where the speed limit is proposed to be 70 km/hr. The risk of collisions within the mine footprint will be lower, as the speed limit will be reduced to 50 km/hr.

The level of new fragmentation associated with the mine footprint Project area is anticipated to be moderate, given the current level of disturbance.

The majority of the proposed haul road follows an existing road corridor, thereby limiting new habitat fragmentation. The construction of the new section of the haul road will decrease the habitat quality for those species that rely on interior forest.

No effect on terrestrial fauna is expected to occur at the Touquoy Gold Mine as no increase in footprint is proposed beyond the approved construction now underway and no indirect effects are expected through proposed Project operations.

6.8.3 Residual Effects and Significance

The predicted residual environmental effects of Project development and production on terrestrial fauna are assessed to be adverse, but not significant. The overall residual effect of the Project on terrestrial fauna is assessed as not significant after mitigation measures have been implemented. Historical and current land use in the region has likely affected the local habitats in ways that have affected the local distribution and abundance of several species of fauna.

6.9 Birds

Bird habitat may be altered or lost as a result of direct or indirect disturbances from the Project. Migratory birds and SAR are protected under federal legislation by the Migratory Birds Convention Act (MBCA) (Government of Canada, 1994) and the Species at Risk Act (Government of Canada, 2002).

6.9.1 Baseline Program

A background review of potential avian species that could occur within the Project area was completed. Avian baseline monitoring programs, including Fall migration, Spring migration, breeding bird, nocturnal owl, and common nighthawk surveys were completed within the Project area (Table 6-1).

Table 6-1 Summary of bird observations for each monitoring period

Season	Total # of Individuals	Total # of Species	Included in Analysis	Incidentals: not included in Analysis	Species observed only incidentally
Fall 2014	832	47	414	418	American Black Duck, Canada Goose, Common Loon, Great Horned Owl,

Table 6-1 Summary of bird observations for each monitoring period

Season	Total # of Individuals	Total # of Species	Included in Analysis	Incidentals: not included in Analysis	Species observed only incidentally
					Pine Siskin, Purple Finch, Red Crossbill, Rusty Blackbird
Spring 2015	887	63	563	324	Common Raven, Wood Duck, Common Merganser, American Crow
Breeding 2015	422	52	330	92	Canada Goose, Northern Parula, Olive-sided Flycatcher
Spring 2016	2274	73	1707	567	American Crow, Barn Swallow, Common Goldeneye, Common Loon, Red Crossbill, Mourning Dove, Northern Waterthrush, Pine Siskin, Ring-necked Pheasant
Breeding 2016	1778	68	1545	233	Northern Harrier, Common Loon, Eastern Wood Pewee, Olive-sided Flycatcher.

A total of 25 priority species were observed either during dedicated survey periods or incidentally. Avian diversity was relatively higher along the haul road Project area than within the mine footprint Project area. This is likely attributable to the fact that the mine footprint Project area is more extensively disturbed and fragmented as a result of historic mine operations and current and historic timber harvesting practices. Overall, avian diversity and abundance was moderate, and fell within expectations for the habitats available, and for forests located in Halifax County.

6.9.2 Project Activities and Birds Interactions and Effects

Mine site preparation may cause temporary and medium-term loss of habitat for birds and may cause disturbance or displacement of species. The widening of existing roads may cause a permanent loss of habitat for birds, and construction of new roads may affect habitat use by birds. Habitat fragmentation may alter habitat suitability for those species which rely on interior forest conditions. Within the haul road Project area, this change in habitat is expected to be permanent.

Lights on the mine site may cause disturbance or displacement of species, while attracting other species, or may cause general behavioral changes (DaSilva, Valcu and Kempenaers, 2015). For those species which may be attracted to lights (i.e. insectivores), lights may increase potential for direct mortality of these species or may increase habitat suitability by supplementing their source of prey.

Increased truck and vehicular traffic will increase noise levels, which may displace and/or disturb birds. Heavy machinery operation during open pit development, road construction, and construction of mine infrastructure for crushing and hauling will increase dust emissions, which may affect

surrounding vegetation and, consequently, birds (Farmer, 1993). Blasting and drilling of in-situ rock during open pit mining will increase dust emissions, which may affect surrounding vegetation and, consequently, birds (Farmer, 1993).

There is the potential for migratory bird mortality during clearing activities. Birds (particularly injured or fledgling) may get trapped in the open pit or collide with other project infrastructure (crushers or trucks), which could lead to death or injury. Vehicle activity and heavy machinery operation may cause bird injury or mortality.

No effect on birds is expected to occur at the Touquoy Gold Mine. As water quality in the shallow lake is not anticipated to be affected by the deposition of Beaver Dam tailings, there is no potential pathway to affect migratory birds which may land in the water.

6.9.3 Residual Effects and Significance

The predicted residual environmental effects of the Project on birds and bird habitat are assessed to be adverse, but not significant. The overall residual effect of the Project on birds and bird habitat is assessed as not significant after mitigation measures have been implemented. Historical and current land use in the region has likely affected the local habitats in ways that have affected the local distribution and abundance of several species of birds.

6.10 Species of Conservation Interest and Species at Risk

Species at risk (SAR) are protected under federal or provincial endangered species legislation. Species of conservation Interest (SOCI) represent species whose populations are either currently or potentially threatened by natural or anthropogenic factors.

6.10.1 Baseline Program

6.10.1.1 Priority Fish Species

The desktop evaluation for priority fish species revealed that no priority species were documented within 5 km of the Project area (ACCDC). No location sensitive species of fish have been identified within 5 km of the mine footprint or the haul road Project area.

No fish SAR were observed within the Project area. Two priority species of fish were identified during field surveys, and a third species (Atlantic salmon) is expected to be present within the Project Area. No other fish SAR or SOCI were observed, and none are expected based on habitat, species distribution and survey effort completed within the Project area.

6.10.1.2 Priority Vascular Flora Species

The desktop evaluation for priority species of vascular flora revealed that none were identified within 5 km of the Project Area (ACCDC). NSDNR has classified several species as ‘location sensitive’, meaning their exact locations cannot be provided to proponents in ACCDC reports. Black Ash (*Fraxinus nigra*), a location sensitive vascular flora species, was not documented within 5 km of the Project Area.

A total of 294 species of vascular flora have been identified in field assessments. No SAR vascular plant species were observed. Five plants are priority species (SOCI), based on provincial status ranks (S3 and S3S4). These SOCI identified within the Project area are outlined in Table 6-2.

Table 6-2 SAR and SOCI vascular flora species observed within the Project Area

Scientific name	Common name	COSEWIC, SARA, NSESA	S-Rank	Habitat on Project Area
Carex wiegandii	Wiegand's Sedge	-	S3	Observed in three locations all within the mine footprint Project area. Within Wetlands 12 and 33, and in one upland location between Wetlands 48 and 13.
Goodyera repens	Lesser Rattlesnake Plantain	-	S3	Observed in one location on the upland margin of Wetland 29, within the mine footprint Project area.
Listera australis	Southern Twayblade	-	S3	Observed in Wetlands 80, 115, 127, 129, 135, 137, 147, and north of 136 all within the haul road Project area. Twayblade was typically observed in clumps of 1-5 individuals.
Polypodium appalachianum	Appalachian Polypody	-	S3	Observed immediately adjacent to Wetland 137 growing on a boulder within the haul road Project area.
Vaccinium corymbosum	Highbush Blueberry	-	S3S4	Observed in one location within Wetland 157 within the haul road Project area.

Three additional species were identified as having elevated potential to be located within the Project area based on habitat preference and known distribution. These species are Redroot (*Lachnanthes caroliniana*, SARA & COSEWIC Special concern, NSESA Vulnerable), Spotted Pondweed (*Potamogeton pulcher*, NSESA Vulnerable) and Black Ash (*Fraxinus nigra*, NSESA Threatened). The preferred habitats for each of these species were focused on during all vegetation, habitat and wetland delineation surveys. None of these species were identified within the Project area.

6.10.1.3 Priority Lichen Species

The desktop evaluation for priority species of lichens revealed that Boreal Felt lichen has been documented within 5 km of the Project Area (ACCDC). The Boreal Felt lichen (*Erioderma pedicellatum*) is listed as Endangered by COSEWIC, SARA and NSESA, and ranked S1S2 by the ACCDC. NSDNR has not determined any lichen species to be 'location sensitive'. No lichen species were documented in the report provided by the NS Museum of Natural History.

In total, six priority lichen species were observed during lichen surveys (3 SAR and 3 SOCI). Of the 3 SAR identified, two are located within the Project area. Blue Felt lichen was observed in the mine

footprint and haul road Project area and in the broader lichen survey area, while Frosted Glass Whiskers was identified within the mine footprint Project area. Boreal Felt Lichen was identified in the lichen survey area, but not within the haul road or mine footprint Project area.

6.10.1.4 Priority Terrestrial Mammal Species

Mainland Moose (*Alces americanus)* have been documented within 5 km of the Project Area (ACCDC). Three records were available for Moose within 5 km of the mine footprint Project area, while the Mainland Moose was not documented within 5 km of the haul road Project area. Mainland Moose are listed as endangered under the NSESA, and is provincially ranked S1. Two sets of Mainland Moose tracks were observed incidentally to the northwest of the mine footprint Project area, outside of the Project area in September 2014. One set of moose tracks were observed within the mine footprint Project area in May 2015 during a targeted moose survey. No other moose signs were observed during targeted moose track surveys or pellet group inventory surveys completed within the Project area.

NSDNR has determined that bat hibernacula sites are location sensitive. No bat hibernaculae were documented within 5 km of the Project area (ACCDC). No known critical habitat (hibernacula) is located in the vicinity of the Project area.

Snapping Turtle habitat is present within the Project area, and Snapping Turtles have been incidentally observed along roads in the vicinity of the Project area. It is expected that they use habitat within the Project area, at least periodically.

6.10.1.5 Priority Herpetofauna Species

A desktop evaluation for amphibian and reptile priority species revealed that no priority herpetile species have been documented within 5 km of the mine footprint and haul road Project area by the ACCDC. No amphibians or reptiles were documented within the vicinity of the Project area by the NS Museum of Natural History.

Targeted surveys for Wood Turtles within the mine footprint Project area did not reveal any sightings of Wood Turtles or suitable nesting habitat. No opportunistic observations of Wood Turtles or suitable nesting habitat were documented during any wetland or watercourse surveys throughout the entirety of the Project area. Snapping Turtles have been observed opportunistically along roadsides outside, but within close proximity, of the Project area, but not during surveys within the Project area.

6.10.1.6 Priority Invertebrates

The desktop evaluation for priority species of invertebrate fauna revealed that none were identified within 5 km of the Project area by ACCDC reports. NSDNR has not identified any invertebrate species as ‘location sensitive’ species, and no invertebrate species were listed as being documented within the vicinity of the Project area by the NS Museum of Natural History. The Maritime Butterfly Atlas was reviewed (Squares 20NQ18, 20NQ28 and 20NQ29) for observations of priority Lepidopterans. A single record of a Monarch Butterfly was documented within Square 20NQ29. It is possible that it uses the mine footprint Project area, at least periodically, such as during migration.

No priority invertebrate species were identified through sampling for benthic invertebrates.

The desktop review of damselflies and dragonflies through Odonata Central did not confirm presence of any priority species in the vicinity of the Project area nor were any priority species observed during surveys completed within the Project area.

No other targeted surveys were completed for invertebrates; however no opportunistic observations of priority invertebrate species were recorded. No other priority invertebrate species were identified during the desktop review.

6.10.1.7 Priority Birds

A desktop review for priority species revealed that 33 priority bird species were identified as having the potential to occur within the mine footprint and haul road Project area based on habitat availability and geographic distribution. Eighteen species have been documented within 5 km of the Project area by ACCDC.

The Peregrine Falcon (*anatum/tundrius* pop.*)* is considered a location sensitive species; however, it has not been documented within 5 km of the Project Area in either of the ACCDC reports.

A report provided by the NS Museum of Natural History reported nesting records or probable nesting records for 16 priority species within the vicinity of the Project Area.

Twenty-five priority species were identified within the Project area, of which 17 are SOCI and eight are SAR. A total of 555 individual priority birds were observed throughout the field programs. All bird SAR that had been anticipated to be within the Project area were observed. Five SOCI were observed that were not anticipated to be within the Project area. Nineteen priority species that were anticipated to be observed within the Project area were not observed throughout the various surveys or incidentally inside the season in which they are determined to be priority species. Given the mobility of bird species, the absence of observation does not confirm absence of the species within the Project area.

6.10.2 Project Activities and Species of Conservation Interest and Species at Risk Interactions and Effects

Project interactions and mitigation and monitoring for each broad taxonomic group are outlined in previous chapters. These mitigation measures are appropriate and should be applied for all SAR and SOCI within the same taxonomic group.

6.10.3 Residual Effects and Significance

Based on avoidance, mitigation measures, and monitoring, the residual effects anticipated for each priority species are summarized in sections 6.6.3, 6.7.3, 6.8.3, and 6.9.3 of this Summary; residual effects are not expected to be significant. The Project is not expected to have significant cumulative effects. However, the alteration of the disturbance of habitats throughout the region from historic and current land use is likely to have affected the local distribution and abundance of various species.

6.11 Indigenous Peoples

Effects of changes to the environment on Indigenous Peoples is pursuant to the *Canadian Environmental Assessment Act* 2012 including assessment of: health and socio-economic conditions; physical and cultural heritage, including any structure, site or thing that is historical, archaeological, paleontological or architectural significance; and current use of lands and resources for traditional purposes.

Under Nova Scotia's Environmental Assessment Regulations, there is a requirement to identify concerns of Indigenous Peoples about potential adverse effects and clarify the steps taken or proposed to be taken by the proponent to address concerns.

The Crown has a duty to consult with Indigenous Peoples which is achieved under the Made-in-Nova Scotia Process. The Made-in-Nova Scotia Process is the forum for the Mi'kmaq, Nova Scotia and Canada to resolve issues related to Mi'kmaq treaty rights, Aboriginal rights, including Aboriginal title, and Mi'kmaq governance. Aspects of consultation may be delegated to proponents though the legal duty to consult remains with the Crown.

The information collected during the Mi'kmaq engagement by Atlantic Gold to support the EIS development is expected to be used by the federal and provincial governments in the decision-making process.

6.11.1 Baseline Conditions

The Mi'kmaq are the founding people of Nova Scotia and remain the predominant Indigenous Peoples within the Province. Nova Scotia has thirteen Mi'kmaq First Nations with a total registered population of 16,259 as of 2015, including both on- and off-reserve populations. The Assembly of Nova Scotia Mi'kmaq Chiefs represents eleven of the communities as Millbrook and Sipekne'katik First Nations each left the Assembly in 2016.

The two closest Mi'kmaq communities are Millbrook and Sipekne'katik First Nations with registered total populations of 1787 and 2495 respectively. About 5.5km from the Beaver Dam Mine site is the community of Beaver Lake (about 50ha in size) which is part of Millbrook First Nation and has an estimated on-reserve population of 22 with a total of five homes and four small cottages. The Millbrook community of Sheet Harbour has about 75 members living on reserve with nine homes, two trailers, a community hall, and convenience store with a gas station.

Based on the proximity of the Project site to watercourses and fish habitat, it is likely that the Mi'kmaq settled in the area. Traditional use of the land in Nova Scotia involved permanent and semi-permanent settlements. Semi-permanent settlements include summer villages which were often chosen near navigable watercourses and headwaters of rivers with spawning habitat potential, as well as smaller rivers flowing into a system of lakes.

While no ceremonial activities were identified, current uses of land and resources for traditional purposes were identified in the MEKS study area including:

- Hunting and fishing of trout, eel, bear, rabbit, deer, porcupine, partridge, coyote, mink, muskrat, weasels, raccoon, fox, otter and beaver:

- Gathering of wild fruit, berries, water, food plant, specialty wood, logs, feathers, quills.

Potential burial sites were recorded within the MEKS study area on the western side of the Beaver Dam Mine Road but not within the Project area. Habitation in the MEKS study area was documented to be via anchored boat, travel route, and overnight site.

The Touquoy site was previously subjected to an MEKS in November 2005 as part of the EA of the Touquoy Gold Mine. No changes are planned to the Project footprint at the Touquoy site.

6.11.2 Project Activities and their Potential Effects on the Mi'kmaq of Nova Scotia

Many of the potential Project interactions with the Mi'kmaq of Nova Scotia are via pathways of VCs that have been previously assessed as part of this EIS. This includes pathways for potential adverse effects to surface water, groundwater, wetlands, fish and fish habitat, habitat and flora, birds, fauna, species at risk or of special concern, and human health; therefore, there are potential pathways to affect health and socio-economic considerations and current use of land and resources for traditional purposes. These VCs have been assessed separately for interactions with Project activities, as well as accidents and malfunctions.

In terms of the potential interaction related to current use for traditional purposes, health and socio-economic considerations, and heritage given the proximity of the community of Beaver Lake which is part of Millbrook First Nation located approximately 5 km south of the Beaver Dam mine site, further information is included in the EIS Section 6.11.6.

Specific to health and socio-economic conditions, physical and cultural heritage, and current use of lands and resources for traditional purposes, the following adverse potential effects on the Mi'kmaq of Nova Scotia were specifically assessed:

- Construction activities associated with mine site and haul road resulting in direct effect on archaeological resources and burial site;
- Construction activities associated with mine site and haul road resulting in direct loss of plant specimens of significance to the Mi'kmaq; and
- Construction activities associated with mine site and haul road resulting in direct loss of habitat including wetlands.

No effect is predicted on human health and socio-economic considerations for Beaver Lake IR 17 due to changes to groundwater or air quality, noise or lighting due to distance to the mine site and haul route. The change to the proposed ore haul route to avoid passing by Beaver Lake IR17 on Hwy 224 reduced the direct effects on Beaver Lake during Project operation.

No effect on Indigenous Peoples is expected to occur at the Touquoy Gold Mine as no increase in footprint is proposed beyond the approved construction now underway and no indirect effects are expected through proposed Project operations.

6.11.3 Residual Effects and Significance

The predicted residual environmental effects of the Project activities on the Mi'kmaq of Nova Scotia are not considered significant after mitigation measures have been implemented. The ongoing development of benefit agreement(s) with the Mi'kmaq is expected maximize positive effects associated with the Project. There are no significant adverse cumulative environmental effects anticipated on the Mi'kmaq of Nova Scotia.

6.12 Physical and Cultural Heritage

Physical and cultural heritage are provincially regulated through the *Special Places Act*, which supports the preservation, regulation, and study of archaeological, historical, paleontological sites, and remains deemed to be important parts of Nova Scotia's natural or cultural heritage.

Given the proximity of the haul road and the mine site to the Beaver Lake IR 17, these areas were identified as having high potential for pre-European contact natural and cultural resources. In addition, the Beaver Dam mine site area has been subject to extensive exploration and mining activity since gold was first discovered in 1868. These activities have left behind 20 abandoned mine openings and several other areas with high potential for post-European contact natural and cultural resources.

6.12.1 Baseline Program

Archaeological screening and reconnaissance programs were conducted at the Beaver Dam mine site and the along the haul road.

Archaeological screening has identified that the land within the study area was historically part of the greater Mi'kmaq territory known as *Eskikewa'kik,* meaning 'skin dressers territory'. Based on the environmental setting and Indigenous land use, as well as the Property's long history of industrial use, the Beaver Dam mine site was identified to exhibit high potential for encountering Pre-contact and historic Native archaeological resources and high potential for encountering historic Euro-Canadian archaeological resources

Archaeological reconnaissance determined that previously identified features had been destroyed by mining activities undertaken in the 1980s. One historic feature was identified within the study area. No archaeological features or areas of archaeological potential were identified within any of the other study areas, either during the background or field reconnaissance.

Based on the recommendations of the archaeological reconnaissance, the alignment of mine site and the haul road, including the proposed new section of road, was cleared of any requirement for further archaeological investigation.

The Touquoy site was previously subjected to archaeological reconnaissance in November 2006. The results of the study indicated that there is a low archaeological potential ascribed to the area.

6.12.2 Project Activities and Physical and Cultural Heritage Interactions and Effects

There is low potential for the Project to interact with identified heritage resources that have been associated with historic mining at or near the Project site. The current plan is to avoid the areas identified. If areas of heritage resources are to be impacted, further work will be undertaken to document these resources. The potential for heritage resources to be impacted exists primarily during the construction phase of the Project, including at the mine site and the haul road; no effects will occur at Touquoy as the site is now under construction as per existing approvals.

There is no potential for the disturbance of cultural or physical heritage resources during the operational and reclamation phases of the Project.

6.12.3 Residual Effects and Significance

The predicted residual environmental effects of Project development and production on physical or cultural heritage resources are assessed to be adverse, but not significant. The overall residual effect of the Project on physical or cultural heritage resources is assessed as not significant after mitigation measures have been implemented.

6.13 Human Health and Socio-economic Considerations

Human health from the perspective of a site worker and the general public is provincially regulated via many legislative avenues within the *Occupational Health and Safety Act* and *Environment Act*. There may be potential for the Project to affect human health through indirect exposure to potential contamination via pathways such as the atmospheric environment, surface water quality and quantity, groundwater quality and quantity, and flora, fauna, fish, and bird consumption; these VCs are assessed separately.

Issues regarding recreation, traffic, worker health and safety, land use, and indirect effect of other VCs on the community's use of the Project area are of consideration as part of this VC.

6.13.1 Baseline Conditions

All phases of the Project will provide employment opportunities for local residents and Indigenous Peoples, as well as provide tax revenue for the municipal, provincial, and federal levels of government. Indirect employment will be generated by the Project through the use of external contractors and suppliers. Tax revenue in the millions of dollars per year will be generated through corporate income taxes paid by Atlantic Gold, as well as its contractors and suppliers.

The presence of unauthorized cabins and hunting blinds on private land is a good indicator that the area is used for hunting and fishing activity. The area is open to several seasons of hunting that include deer, bear, snowshoe hare, ruffed grouse and ring-necked pheasant. Recreational fishing occurs in areas near the Project site.

The Snow Mobile Association of Nova Scotia trail system stretches 3,500 km connecting twenty local snowmobile clubs across Nova Scotia. Discussions are underway with local associations, including the Lake Charlotte ATV Association. The network of logging roads in this part of the

Halifax Regional Municipality (HRM) could be used by local residents as trails to access recreational activities.

6.13.2 Project Activities and Human Health and Socio-economic Conditions Interactions and Effects

Positive socio-economic impacts are associated with the Project, including long-term employment gain and/or sustained activity within the area. All phases of the Project will provide employment opportunities for local residents and Indigenous Peoples, as well as provide tax revenue for the municipal, provincial, and federal levels of government. Indirect employment will be generated by the Project through the use of external contractors and suppliers.

The construction of a new portion of road and upgrades to existing roads will provide local residents and recreational users improved access to the interior areas of the region. This will extend beyond the life of the Project.

There is low potential for the Project to cause adverse health and socio-economic conditions. The potential does exist for a mobile equipment accident along the haul road. Haul trucks will travel daily from the Beaver Dam mine site to the Touquoy processing and tailings management facility. A haul truck accident may result in fuel and/or other spills, fires, and/or injury or death to site workers and the general public. The haul road will be dual lane and designed to facilitate the safe passage of two-way truck traffic at 70 km/h. Speed limit and right-of-way signage will be installed and all haul truck operators will receive operator training to minimize the risk of haul truck collisions. Discussions with NSTIR will identify additional mitigation measures that may be required, in particular at the Hwy 224 crossing.

6.13.3 Residual Effects and Significance

There are no significant adverse environmental effects anticipated on health and socio-economic considerations once mitigation measures are applied. Positive impacts are anticipated in the form of direct and indirect employment, economic development and tax revenues for municipal, provincial, and federal governments. Additionally, improvements to local roads will be completed as part of the Project, which will provide improved access to the region's interior. There are no significant adverse cumulative environmental effects anticipated on health and socio-economic considerations once mitigation measures are applied.

6.14 Summary of Project Interactions and Residual Effects

6.14.1 Project Interactions and Effects

Direct interactions between the Project and VCs are often obvious based on a good understanding of Project activities and the baseline physical, biophysical, and socio-economic conditions of the Project area. Indirect interactions require an active pathway between Project activities and the VCs that they are affecting. A pathway provides a link between a Project component or activity and VC, and facilitates the interaction and potential effect.

Tables 6-3, 6-4, and 6-5 present the Project activities for each Project area and the potential direct and indirect VC interactions. These potential interactions formed the approach to the assessment

and resulting determination of residual effects and significance once mitigation measures were applied. An indication of a potential interaction does not imply that a direct, indirect or residual effect will exist.

6.14.2 Residual Effects

Residual effects are effects to VCs that are predicted to remain even after the implementation of mitigation measures. In order to identify if residual effects are significant or not, consideration of the magnitude, geographical extent, duration, frequency, reversibility, and ecological and social context was required. Table 6-6 presents a summary of the residual environmental effects for each VC, and their associated significance. The proposed mitigation measures and monitoring programs are summarized in Section 7.

Table 6-3 Potential Valued Components Interactions with Project Activities at Beaver Dam Mine Site

	Physical Valued Components				Biophysical Valued Components						Socio-economic Valued Components		
	Atmospheric Environment	Geology, Soil, and Sediment Quality	Groundwater Quality and Quantity	Surface Water Quality and Quantity	Wetlands	Fish and Fish Habitat	Habitat and Flora	Terrestrial Fauna	Birds	SAR	Indigenous Peoples	Physical and Cultural Heritage	Human Health and Socio-economic Conditions
Site Preparation and Construction													
Clearing, Grubbing, and Grading	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Drilling and Rock Blasting	☑	☑	☑	☑	☑	☑		☑	☑	☑	☑	☑	☑
Topsoil, Till, and Waste Rock Management	☑	☑		☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Existing Settling Pond Dewatering	☑	☑	☑	☑	☑	☑	☑		☑	☑	☑		
Watercourse and Wetland Alteration	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Mine Site Road Construction, including lighting	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Surface Infrastructure Installation and Construction, including lighting	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Collection and Settling Pond Construction, including lighting	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Environmental Monitoring		☑	☑	☑	☑	☑		☑		☑	☑		
General Waste Management	☑	☑		☑	☑	☑	☑		☑	☑			
Operation and Maintenance													
Drilling and Rock Blasting	☑	☑	☑	☑	☑	☑		☑	☑	☑	☑		☑
Surface Mine Dewatering		☑	☑	☑	☑	☑	☑		☑	☑	☑		
Ore Management	☑	☑	☑	☑	☑	☑		☑	☑	☑	☑		
Waste Rock Management	☑	☑	☑	☑	☑	☑		☑	☑	☑	☑		
Surface Water Management		☑	☑	☑	☑	☑		☑	☑	☑	☑		☑
Petroleum Products Management	☑	☑	☑	☑	☑	☑	☑			☑	☑		☑
Site Maintenance and Repairs, including lighting	☑			☑					☑				☑

Table 6-3 Potential Valued Components Interactions with Project Activities at Beaver Dam Mine Site

	Physical Valued Components				Biophysical Valued Components						Socio-economic Valued Components		
	Atmospheric Environment	Geology, Soil, and Sediment Quality	Groundwater Quality and Quantity	Surface Water Quality and Quantity	Wetlands	Fish and Fish Habitat	Habitat and Flora	Terrestrial Fauna	Birds	SAR	Indigenous Peoples	Physical and Cultural Heritage	Human Health and Socio-economic Conditions
Environmental Monitoring	☑	☑	☑	☑	☑	☑	☑	☑		☑	☑		☑
General Waste Management	☑	☑		☑	☑	☑	☑	☑	☑	☑			
Decommissioning and Reclamation													
Infrastructure Demolition	☑	☑		☑					☑				☑
Site Reclamation	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑		☑
Environmental Monitoring	☑	☑	☑	☑	☑	☑	☑	☑		☑	☑		☑
General Waste Management		☑		☑	☑	☑	☑	☑	☑	☑			☑
Accidents and Malfunctions													
Fuel and/or other Spills	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑		☑
Fire	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑		☑
Slope Failure	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑		☑	☑
Collection/Settling Pond Failure		☑	☑	☑	☑	☑	☑	☑	☑	☑	☑		☑
Unplanned Explosive Event	☑	☑		☑	☑	☑	☑	☑	☑	☑	☑		☑
Mobile Equipment Accident	☑	☑	☑	☑	☑	☑	☑	☑			☑	☑	☑

Table 6-4 Potential Valued Components Interactions with Project Activities along Haul Road

	Physical Valued Components				Biophysical Valued Components						Socio-economic Valued Components		
	Atmospheric Environment	Geology, Soil, Sediment Quality	Groundwater Quality and Quantity	Surface Water Quality and Quantity	Wetlands	Fish and Fish Habitat	Habitat and Flora	Terrestrial Fauna	Birds	SAR	Indigenous Peoples	Physical and Cultural Heritage	Human Health and Socio-economic Conditions
Site Preparation and Construction													
Clearing, Grubbing, and Grading	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Drilling and Rock Blasting	☑	☑	☑	☑	☑	☑		☑	☑	☑	☑	☑	☑
Topsoil, Till, and Waste Rock Management	☑	☑		☑	☑	☑		☑	☑	☑	☑	☑	☑
Watercourse and Wetland Alteration	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Culvert and Bridge Upgrades and Construction/Removal	☑	☑		☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Haul Road Construction and Upgrades	☑	☑		☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Environmental Monitoring	☑	☑	☑	☑	☑	☑	☑	☑		☑	☑		☑
General Waste Management		☑		☑	☑	☑	☑	☑	☑	☑			

Table 6-4 Potential Valued Components Interactions with Project Activities along Haul Road

	Physical Valued Components				Biophysical Valued Components						Socio-economic Valued Components		
	Atmospheric Environment	Geology, Soil, Sediment Quality	Groundwater Quality and Quantity	Surface Water Quality and Quantity	Wetlands	Fish and Fish Habitat	Habitat and Flora	Terrestrial Fauna	Birds	SAR	Indigenous Peoples	Physical and Cultural Heritage	Human Health and Socio-economic Conditions
Operation and Maintenance													
Ore Transport	☑	☑	☑	☑				☑			☑		☑
Road Lighting	☑								☑		☑		
Haul Road Maintenance and Repairs	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑		☑
Environmental Monitoring	☑	☑	☑	☑	☑	☑	☑	☑		☑	☑		☑
Decommissioning and Reclamation													
N/A – Decommissioning and Reclamation of the Haul Road is not expected.													
Accidents and Malfunctions													
Fuel and/or other Spills	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑		☑
Fire	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑		☑
Haul Truck Accident	☑	☑	☑	☑	☑	☑	☑	☑			☑		☑

Table 6-5 Potential Valued Components Interactions with Project Activities at Touquoy Processing and Tailings Management Facility

	Physical Valued Components				Biophysical Valued Components							Socio-economic Valued Components	
	Atmospheric Environment	Geology, Soil, and Sediment Quality	Groundwater Quality and Quantity	Surface Water Quality and Quantity	Wetlands	Fish and Fish Habitat	Habitat and Flora	Terrestrial Fauna	Birds	SAR	Indigenous Peoples	Physical and Cultural Heritage	Human Health and Socio-economic Conditions
Site Preparation and Construction													
Ore Processing Equipment Upgrades													
Tailings Line Alteration				☑									
Environmental Monitoring													
General Waste Management													
Operation and Maintenance													
Lighting of Facility and Mine Site Roads	☑								☑				
Ore Management and Processing	☑		☑	☑									
Tailings Management			☑	☑		☑			☑	☑			
Environmental Monitoring	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑		☑
General Waste Management			☑	☑	☑	☑	☑	☑	☑	☑			
Decommissioning and Reclamation													
Environmental Monitoring	☑	☑	☑	☑	☑	☑	☑	☑		☑	☑		☑
Accidents and Malfunctions													
Fuel and/or other Spills	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑		☑
Fire	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑		☑
Mobile Equipment Accident	☑	☑	☑	☑	☑	☑	☑	☑			☑		☑

Table 6-6 Summary of Residual Effects and Associated Significance for each VC

Valued Component Affected	Potential Effects of the Project on the Environment	Residual Effect	Significance of Residual Effect
Atmospheric Environment			
Air Quality	Dust emissions generated during the construction and operations phases of the Project, due to overburden removal, blasting, rock crushing, truck traffic, material loading, wind erosion of material storage piles, construction of mine site roads and haul roads, and operation of other heavy machinery	Disturbance	Not Significant
Greenhouse Gas Emissions	Greenhouse gas emissions generated during the construction, operations, and decommissioning phases	Disturbance	Not Significant
Noise	Noise generated on the mine site and the haul road during the construction and operations phases and extended operation at the Touquoy site	Disturbance	Not Significant
Night-time Light Levels	Night-time light levels generated on the mine site and the haul road during the operations phase and extended operation at the Touquoy site	Attraction and Disorientation (birds) None (other)	Not Significant
Geology, Soil, and Sediment			
Soil	Not Applicable	None	Not Applicable
Sediment Quality	Effects on sediment quality due to erosion, or effects on sediment quality downstream of the Project due to activities occurring on the mine site and haul road.	Disturbance	Not Significant
Surface Water Quality & Quantity			
Surface Water Quality	Changes to surface water quality as a result of Project activities, including construction, operations, and decommissioning.	Disturbance Habitat loss	Not Significant
Surface Water Quantity	Direct and indirect surface water body alteration due to infilling, draining, flooding, altering function, and altering groundwater recharge capacity on the mine site and the haul road	Habitat Loss Disturbance	Not Significant

Table 6-6 Summary of Residual Effects and Associated Significance for each VC

Valued Component Affected	Potential Effects of the Project on the Environment	Residual Effect	Significance of Residual Effect
Groundwater Quality & Quantity			
Groundwater Quality at Beaver Dam	Effects on groundwater quality due to change in chemistry or reduced infiltration due to disturbance	Disturbance	Not Significant
Groundwater Quality at Touquoy	Effects on groundwater quality due to the storage of Beaver Dam tailings in the expended pit at the Touquoy facility	Disturbance	Not Significant
Groundwater Recharge / Discharge	Hydrological effects on recharge/discharge due to construction, water body alteration and dewatering, and operations.	Disturbance	Not Significant
Potable water wells at Beaver Lake	Effects on groundwater quality or quantity from the mining activities on the potable water supply at Beaver Lake IR17	None	Not applicable
Wetlands			
Wetland Habitat	Progressive loss of wetland habitat due to construction of the mine site and haul road	Disturbance Habitat Loss	Not Significant
Wetland Hydrology	Hydrological changes due to direct and indirect wetland alteration, and haul road construction	Disturbance	Not Significant
Fish and Fish Habitat			
Fish Habitat	Fish habitat loss/alteration due to construction activities	Habitat Loss Disturbance	Not Significant
	Disturbance to fish habitat due to construction and operation of the mine site and haul road, including increased sediment, impacts to water quality from dust, introduction of invasive species, and wetland alteration	Habitat Loss Disturbance	Not Significant
Habitat and Flora			
Habitat and Flora	Habitat loss or damage due to construction and operation of the mine site and haul road, including increased sediment, clearing and grubbing, and wetland alteration	Habitat Loss Disturbance	Not Significant

Table 6-6 Summary of Residual Effects and Associated Significance for each VC

Valued Component Affected	Potential Effects of the Project on the Environment	Residual Effect	Significance of Residual Effect
Terrestrial Fauna			
Terrestrial Fauna Habitat	Habitat loss or damage due to construction and operation of the mine site and haul road, including increased sediment, clearing and grubbing, and wetland alteration	Habitat Loss Disturbance Direct Mortality	Not Significant
Terrestrial Fauna Mortality	Increased truck traffic on the haul road and on the mine site	Disturbance Direct Mortality	Not Significant
Birds			
Bird Habitat	Disturbance of bird habitat due to construction and operation of the mine site and haul road, including clearing and grubbing, heavy machinery operation, vehicle operation, construction of infrastructure and the haul road, open pit lighting, and blasting	Disturbance Habitat Loss Attraction and disorientation Mortality	Not Significant
SOCI & SAR			
Priority Fish Species	Disturbance to fish habitat due to construction and operation of the mine site and haul road, including increased sediment, impacts to water quality from dust, introduction of invasives, and wetland alteration	Habitat Loss Disturbance	Not Significant
Priority Vascular Flora and Lichens	Habitat loss or damage due to construction and operation of the mine site and haul road, including increased sediment, clearing and grubbing, and wetland alteration	Habitat Loss Disturbance	Not Significant
Priority Terrestrial Fauna	Disturbance of wildlife habitat due to construction and operation of the mine site and haul road, including clearing and grubbing, heavy machinery operation, vehicle operation, construction of infrastructure and the haul road, open pit lighting, and blasting	Disturbance Direct Mortality	Not Significant
Priority Birds	Disturbance of bird habitat due to construction and operation of the mine site and haul road, including clearing and grubbing, heavy machinery operation, vehicle operation, construction of infrastructure and the haul road, open pit lighting, and blasting	Disturbance Habitat Loss Attraction and disorientation Mortality	Not Significant

Table 6-6 Summary of Residual Effects and Associated Significance for each VC

Valued Component Affected	Potential Effects of the Project on the Environment	Residual Effect	Significance of Residual Effect
Indigenous Peoples			
Physical and Cultural Heritage	Direct effect on archaeological resources or burial site which is not in Project area	None	Not applicable
Traditional uses	Loss of plant specimens of significance to the Mi'kmaq for medicinal, food, beverage or art and craft purposes	Disturbance	Not Significant
Traditional uses	Loss of habitat including wetlands and other habitat supporting current use of land and resources for traditional uses	Habitat Loss	Not Significant
Economic opportunities	Benefits to the Mi'kmaq including employment opportunities, economic development, and capacity building	Economic benefits	Not Significant
Physical and Cultural Heritage			
Physical and Cultural Heritage Resources	Damage to cultural/physical heritage resources during the construction phase	None	Not Applicable
Human Health & Socio-Economics			
Recreational Activities	Restriction of recreational activities within the Project area during construction and operation of the mine site	Disturbance	Not Significant
Employment	Direct and indirect employment opportunities throughout the construction, operation, and decommissioning phases	Creation of employment opportunities	Not Significant
Traffic	Increased traffic along the haul road, including the potential for a mobile equipment accident	Disturbance	Not Significant

7. Mitigation and Monitoring Measures

Monitoring programs and mitigation measures will occur throughout all phases of the Project. Monitoring programs will proceed to gather pre-construction data for selected VCs or begin at construction or operational Project phases. These data will be used to refine mitigation measures and monitoring programs for all Project phases.

Monitoring programs will continue throughout the life of the Project to verify baseline conditions and to determine the effects of the Project on the surrounding environment relative to predictions made in the environmental effects assessment.

Table 7-1 outlines mitigation measures and monitoring programs that will be undertaken to reduce or eliminate potential adverse effects. Details regarding proposed mitigation and monitoring programs are provided in the EIS.

There may be additional requirements identified in approvals which are not specified in Table 7-1, such as the Industrial Approval for which an application would be made to the Province of Nova Scotia. In addition, wetland and watercourse alteration approvals would be required. Any additional monitoring requirements of these approvals will be determined in consultation with regulatory agencies, such as NSE and Environment and Climate Change Canada under the requirement for Environmental Effects Monitoring (EEM) under the Metal Mining Effluent Regulations, as well as any other federal or provincial regulatory requirements.

Table 7-1 Summary of Mitigation and Monitoring Measures

Valued Component Affected	Mitigation and Compensation Measures	Monitoring Program
Atmospheric Environment		
Air Quality	Minimize dust through: • Wet suppression controls on unpaved surfaces; • Maintaining hardened surfaces where practical; • Speed reduction on the mine site to keep dust levels to a minimum; • Air quality monitoring including dust and ambient-air monitoring, as required at select baseline sampling locations; • Slopes will be designed at an angle determined by geotechnical analysis and acceptable safety factors, to reduce the likelihood of a slope failure; • Construction of a berm surrounding the surface mine, and berms and channels surrounding stockpiles to direct surface water to water diversion channels, minimizing the risk of causing unstable slopes; • Stabilized slopes will be maintained on the waste rock stockpile following completion of operations; • The crushed ore stockpile at Touquoy will be covered to minimize wind and rain erosion; and • Haul trucks will be covered to minimize dust during transportation between the mine site and the Touquoy facility.	• Complete baseline ambient air quality monitoring at select baseline sampling locations prior to the start of construction. • Air quality monitoring including dust as required at select baseline sampling locations as per the Proponent's EPP and by regulators. Typical frequencies for this monitoring would be expected to follow NAPS locations or variations outlined in the EA or subsequent approvals. • Additional TSP monitoring may be required based on observations of dust generated once mine operations begin. An audit program of the same sampling sites originally chosen for the baseline monitoring will be implemented. Additional sites may be required beyond those used in baseline and sampling at a frequency of no less than annually. • A daily inspection of pit slopes by qualified personnel and an independent consultant to review slopes on a quarterly basis.

Table 7-1 Summary of Mitigation and Monitoring Measures

Valued Component Affected	Mitigation and Compensation Measures	Monitoring Program
Greenhouse Gas Emissions	Minimize GHG emissions: • Limited engine idling where possible • Implementing fuel efficiencies where possible • Regular maintenance on equipment • Mitigation measures previously described in the IA for the Touquoy facility	• Review of emissions on an annual basis and seek to use best available practices that evolve over time.
Noise	Minimize noise through: • Regular maintenance of equipment • Highway truck traffic will not generally be present on the haul road during night-time hours.	• Complete baseline noise monitoring at select locations on the mine site and along the haul road prior to the start of construction • Noise monitoring program will be undertaken, including blasting noise monitoring and periodic noise level monitoring at the property boundaries. Additional monitoring may be required as directed by regulators with typical frequency being on an annual basis to confirm baseline or if complaints or issues are raised by the public or regulators. • Noise monitoring would be completed at nearest residence for each blasting event, as required by the conditions of any approval and as is typically the practice in Nova Scotia.
Night-time Light Levels	Minimize light pollution through: • Install downward-facing lights on site infrastructure and haul roads. • Wherever possible, install motion-sensing lights to ensure lights are not turned on when they are not necessary.	• Review of practices relative to mine site and haul road operation on an annual basis for BAPs including illumination

Table 7-1 Summary of Mitigation and Monitoring Measures

Valued Component Affected	Mitigation and Compensation Measures	Monitoring Program
	• Only use direct and focused light when needed for worker safety. • Maintain haul road operation to 12-16 hours per day (i.e.highway truck traffic will not generally be present on the haul road during night-time hours.	
Geology, Soils, and Sediment		
Soil	Soils are being moved on site but reused for reclamation to greatest extent possible so no net loss or need for mitigation.	• Not applicable
Sediment Quality	• Sediment and erosion control measures; • Design of settling ponds and outflow structures to minimize out flow velocities.	• Annual sampling at select baseline sediment locations • The MMER program would involve more detailed sediment sampling to determine final EEM program components, locations, frequency and sampling.
Bedrock	• Results of baseline sampling at the mine site indicate that the majority of the deposit is net acid consuming; ARD is not expected to be a concern.	• During construction and operations, regular testing of rock will be conducted for acid generating potential at a rate to be determined by NSE, anticipated to be no less than 1 sample per 100,000 tonnes of rock generated.
Surface Water Quality and Quantity		
Surface Water Quality	• Sedimentation ponds will be utilized to reduce suspended solids from surface runoff and pit water. Treated water will be allowed to discharge to the environment; • All surface water discharges from sedimentation ponds to the natural environment will be sampled as per requirements	• The MMER program would involve more detailed surface water sampling as well as site effluent sampling to determine final EEM program components, locations, frequency and parameters to be sampled

Table 7-1 Summary of Mitigation and Monitoring Measures

Valued Component Affected	Mitigation and Compensation Measures	Monitoring Program
	listed in industrial operating approvals and MMER to ensure water quality conforms to applicable guidelines; • Stockpiles will employ perimeter ditches to direct water to ponds. Topographic controls will ensure that overflow from extreme weather conditions, should it occur, will be directed to a spillway into the water diversion structure; • Development of an erosion and sediment control plan and a stormwater management plan; • Diesel fuel will be stored in double-walled, aboveground storage tanks with perimeter impact protection located on a concrete pad; • Fuel storage and transfer areas will be designed to limit areas of fuel transfer and will be located a minimum of 30 m from wetlands and watercourse locations. Spill response kits will be accessible in areas of fuel transfer. A petroleum management plan will be developed; • Development of an emergency response and spill contingency plan; and • Development of a Wetland Compensation Plan that includes a monitoring program for Project area and adjacent wetlands will be developed in collaboration with NSE and the Mi'kmaq of Nova Scotia.	for as well as possible species involved in the EEM. • Surface water quality monitoring at select baseline sampling locations on the mine site and the haul road to compare data to applicable guidelines and baseline data. This is anticipated to be conducted monthly for general chemistry and metals throughout the construction, operations, and decommissioning phases. • Annual review of program and need for revisions based on baseline data comparison and discussions with regulators. • Monitored discharge guided by a Surface Water Monitoring Plan and regulatory requirements. • Inspection and Monitoring Plan that includes hydrologic flow analysis. • Emergency Spill Response Training, Annual updates. • Weekly inspections of diesel fuel supply and barriers. • Ongoing monitoring will continue at the Touquoy facility, as per regulatory requirements, which began in 2016. This program will be reviewed by regulators and

Table 7-1 Summary of Mitigation and Monitoring Measures

Valued Component Affected	Mitigation and Compensation Measures	Monitoring Program
		any appropriate changes to the monitoring program due to the processing of Beaver Dam ore will be implemented. Surface water, groundwater, and wetlands monitoring data to be reviewed annually for potential interactions and revisions to program(s) if warranted.
Groundwater Quality		
Groundwater Quality	• Sediment and erosion control • Project design includes use of pit dewatering water and collected surface water instead of groundwater for dust control. No other on-site water use except for small domestic purposes expected.	• Installation of near and far networks of multi-depth monitor wells (6 to 8 locations for each of the near and far networks are anticipated) within and outside the disturbed footprint during the construction and operation phases. Select far-network monitoring wells will be installed and monitored for no less than one year prior to construction. Select wells will also continue to be monitored during the decommissioning and reclamation of the project site. Water level and chemistry monitoring program to be proposed. It is anticipated that water levels will be collected monthly and chemistry samples will be collected quarterly for the duration of the monitoring program.

Table 7-1 Summary of Mitigation and Monitoring Measures

Valued Component Affected	Mitigation and Compensation Measures	Monitoring Program
		• The frequency and location of groundwater monitoring will be described in greater detail in the EPP following consultation with regulatory agencies and will be outlined in the IA application. • Surface water, groundwater, and wetlands monitoring data will be reviewed annually for potential interactions and revisions to program(s) if warranted. • Ongoing monitoring will continue at the Touquoy facility, as per regulatory requirements, which began in 2016. This program will be reviewed by regulators and any appropriate changes to the monitoring program due to the processing of Beaver Dam ore will be implemented.
Wetlands		
Wetland Habitat	• Wetland awareness with construction staff and personnel; • Sediment and erosion control; • Vegetation management in or near wetlands (i.e., to limit clearing, clearing by cutting, no herbicides, etc.); • Water management to maintain pre-construction hydrological flows; • Wetland avoidance and permitting, including engaging in the wetland alteration application process;	• Baseline hydrological conditions prior to construction activities. • Baseline vegetative conditions will be evaluated and compared with post construction conditions. • Water quality will be monitored in down-gradient aquatics receptors to ensure that

Table 7-1 Summary of Mitigation and Monitoring Measures

Valued Component Affected	Mitigation and Compensation Measures	Monitoring Program
	• Limit driving and use of machinery in wetland habitat, where reasonable; • Reclamation during decommissioning, including maintenance or removal of water management structures as required, and implementation of erosion measures; • Fuel storage and transfer areas will be designed to limit areas of fuel transfer and will be located a minimum of 30 m from wetlands and watercourse locations. Spill response kits will be accessible in areas of fuel transfer. A petroleum management plan will be developed; • Spill control and emergency planning; • Development of a wetland monitoring plan; and • Development of a Wetland Compensation Plan that includes a monitoring program for Project area and adjacent wetlands will be developed in collaboration with NSE and the Mi'kmaq of Nova Scotia.	up-gradient activities are not compromising water quality conditions. • General observations during the construction and post construction phases. • A final wetland monitoring plan will be developed in conjunction with wetland alteration permitting. • Surface water, groundwater, and wetlands monitoring data to be reviewed annually for potential interactions and revisions to program(s) if warranted.
Fish and Fish Habitat		
Fish Habitat	• Sediment and erosion control; • Vegetation management in or near wetlands (i.e., to limit clearing, clearing by cutting, etc.); • Engage wetland and watercourse permitting processes such that any loss of fish habitat will be addressed in these alteration applications; • Fish habitat awareness and avoidance where possible; • Consider support of existing fish habitat restoration activities with local organizations, such as Nova Scotia Salmon Association;	• Complete baseline monitoring measurements and observations prior to surface water alteration activities taking place. • Regular monitoring during the construction phase to ensure protective measures are being implemented at schedule and location as by Proponent's EPP, anticipating daily for construction near sensitive areas or following a rain event,

Table 7-1 Summary of Mitigation and Monitoring Measures

Valued Component Affected	Mitigation and Compensation Measures	Monitoring Program
	• Maintenance of pre-construction hydrological flows into and out of down-stream surface water habitats to the extent possible; • Recommended timing windows will be adhered to for potential direct loss of fish and fish habitat (to limit loss of eggs and juveniles) as directed by DFO; • Reclamation during decommissioning; • Limit driving and use of machinery within wetland and watercourse habitat where practical; • Fuel storage and transfer areas will be designed to limit areas of fuel transfer and will be located a minimum of 30 m from wetlands and watercourse locations. Spill response kits will be accessible in areas of fuel transfer. A petroleum management plan will be developed; and • Spill control and planning.	and weekly for operations and as appropriate for reclamation and post-reclamation periods. • Regular monitoring of fish habitat in wetlands and watercourses to evaluate their condition and integrity post decommissioning phase. • A fish and fish habitat monitoring program will be developed. The frequency and location of fish and fish habitat monitoring will be described in greater detail in the EEM following consultation with regulatory agencies related to wetland and watercourse alteration permits and local conservation organizations.
Habitat and Flora		
Habitat and Flora	• Intact forest stands and wetlands will be avoided wherever possible in favor of previously disturbed areas; • Where natural, intact habitat cannot be avoided, minimization of total project footprint will be considered; • Erosion and sediment control planning; • Monitoring dust conditions and when normal precipitation levels are not enough to suppress fugitive dust, water trucks can be used to suppress dust;	• Baseline monitoring measurements and observations prior to wetland alteration activities. • Construction monitoring to ensure protective measures are being implemented. • Ensure limits of work are maintained to avoid unnecessary habitat loss.

Table 7-1 Summary of Mitigation and Monitoring Measures

Valued Component Affected	Mitigation and Compensation Measures	Monitoring Program
	• Winter road maintenance will include conventional snow clearing and deposition of sand for traction control where necessary. Road salt will not be used; • Haul trucks will be equipped with spill kits and instructed on their use and spill prevention and appropriate site personnel will be trained in spill isolation, containment, and recovery; • A wetland alteration application will be submitted to request an authorization to alter wetland habitat. Loss of function will be addressed in this wetland alteration application; and, • Compensation for permanent loss of wetland function will be completed through wetland restoration activities to support no net loss of wetland function, subject to NSE approval.	• Monitoring of remedial activities to evaluate their success in establishing habitat for wild species, and monitoring wetlands for condition and integrity may be necessary post decommissioning phase.
Terrestrial Fauna		
Terrestrial Fauna Habitat	• Intact forest stands and wetlands will be avoided wherever possible in favor of previously disturbed areas; • Where natural, intact habitat cannot be avoided, minimization of total project footprint will be considered during planning; • Habitat fragmentation will be reduced by limiting the area of new roads, favoring upgrading of existing roads where possible as per proposed Project design; • Site infrastructure will be fenced where practical and deemed necessary to reduce interactions between project infrastructure and wildlife;	• Complete regular construction monitoring to ensure protective measures are being implemented. • Ensure limits of work are maintained to avoid unnecessary habitat loss. • Monitoring of remedial activities to evaluate their success in establishing habitat for wild species, and monitoring wetlands for condition and integrity may be necessary post decommissioning phase.

Table 7-1 Summary of Mitigation and Monitoring Measures

Valued Component Affected	Mitigation and Compensation Measures	Monitoring Program
	• A speed limit of 50 km/hr within the mine footprint and 70km/hr along the haul road will be implemented to reduce likelihood of collisions with fauna; • An unvegetated buffer along roadsides will be maintained, where possible; • Clearing and construction will be limited within wetlands that could support snapping turtles during winter hibernation period; • Culverts installed within wetlands and watercourses will provide an alternative crossing location to amphibians and reptiles, thereby reducing direct mortality of species attempting to cross a road; • Watering of roads during dry conditions; • Waste management to reduce attracting opportunistic wildlife species; • Erosion and sediment control planning; • A wetland alteration application will be submitted. Loss of function and habitat for species reliant on wetland habitat will be addressed in this wetland alteration application; • Compensation for permanent loss of wetland function will be completed through wetland restoration activities to support no net loss of wetland function, subject to NSE approval; • Water management, spill control and vegetation management (i.e., no use of herbicides); and	

Table 7-1 Summary of Mitigation and Monitoring Measures

Valued Component Affected	Mitigation and Compensation Measures	Monitoring Program
	• Ensure all development related activity is located within areas where biophysical field evaluations have been completed and approvals/written authorizations are in place as required.	
Birds		
Bird Habitat	• Bird awareness and management, including avoiding clearing of trees during the breeding season for migratory birds, discouraging ground-nesting or burrow-nesting species, and applying a buffer zone around any identified nests for specified species; • Reduce impact of light pollution on birds by minimizing on-site lighting while still allowing for safe operation, and by installing lighting which faces the ground; • Maintain speed limits on mine roads (max. 50 km/hr within mine footprint, 70 km/hr along haul road). Reduce speed limit and install signage where specific wildlife concerns have been identified; • Noise controlled by attenuation, vertical separation, and equipment design; • Dust control where there are increased dust emissions; • Compensate for lost wetland functions that support migratory birds as part of the wetland compensation plan; and • Notify Environment and Climate Change Canada within 24 hours in the event of the mortality or injury of ten or more	• Conduct a pre-construction survey of known raptor nests in the Project area during breeding season; • Verify the effectiveness of mitigation measures related to light for a minimum of two years and implement adaptive measures; • Monitor known nests around stockpiles and exposed areas to verify the effectiveness of the buffer until the nests are inactive; and • Conduct routine inspections, anticipating daily observations by operators for mortality or injured birds near site operations, and inspections by qualified avian experts if high level of mortality or injury noted or to remove any trapped or injured birds.

Table 7-1 Summary of Mitigation and Monitoring Measures

Valued Component Affected	Mitigation and Compensation Measures	Monitoring Program
	migratory birds in a single event or in the event of the mortality or injury of a migratory bird species at risk.	
SOCI and SAR		
Priority Fish Species	• Standard mitigation for fish and fish habitat as detailed above; • Work with organizations to form partnerships to allow for data sharing; • Adherence to of all watercourse alteration terms and conditions pf approvals including those which support priority fish species; • Fish rescue will be completed prior to commencement of mine development as required and in consultation with DFO; • All culverts will be installed in accordance with the NSE standards to ensure fish passage through new culverts, and by upgrading or removing improperly installed culverts, where possible; and, • The location of all watercourses known to support priority species will be communicated to site personnel along with recommended mitigation measures.	• Standard monitoring programs proposed for fish and fish habitat. • A monitoring program will be developed to measure post construction water quality and quantity in the Killag River, where the potential effect of the project on surface water and priority fish species is the highest. • Monitoring will likely occur at the baseline sampling location on the West River Sheet Harbour and additional locations if directed by regulators.
Priority Vascular Flora and Lichens	• Standard mitigation measures for wetlands and habitat and flora; • SOCI awareness will be communicated to all personnel; • Priority species that are located within the direct footprint of the mine infrastructure or haul road, where deemed	• Standard monitoring programs proposed for habitat and flora.

Table 7-1 Summary of Mitigation and Monitoring Measures

Valued Component Affected	Mitigation and Compensation Measures	Monitoring Program
	reasonable and appropriate in consultation with regulatory authorities, will be transplanted to nearby suitable habitat; and, • A lichen monitoring program for lichen SAR identified in close proximity to the Project area will be established.	
Priority Terrestrial Fauna	• Standard mitigation for terrestrial fauna; • A moose management and monitoring program will be implemented in collaboration with the Mi'kmaq of Nova Scotia; • Implementing a buffer on aquatic habitat deemed suitable for snapping turtles, wherever possible; • Culverts will be installed in wetlands and watercourses under provincial permits as required; • Wetland and watercourse alterations; • Implement signage on the haul road during operations adjacent to major stream crossings or waterbodies; and • Dust suppression.	• Standard monitoring programs proposed for terrestrial fauna. • A moose monitoring plan will be implemented including repeated winter track surveys and pellet group inventories, with consideration to partnering with the Mi'kmaq to study moose in a broader context. • Wildlife observation reporting to appropriate site personnel.
Priority Birds	• Standard mitigation for birds; • Communicate regulations related to nesting birds to all site personnel. If nesting behaviour of any bird is observed, site personnel are to report this activity; and, • To limit attraction of Common Nighthawk to the Project area, the amount of exposed soil should be limited during nesting	• Standard monitoring programs proposed for birds; • Verify the effectiveness of mitigation measures related to light for a minimum of two years;

Table 7-1 Summary of Mitigation and Monitoring Measures

Valued Component Affected	Mitigation and Compensation Measures	Monitoring Program
	season, favouring to cover or revegetate soil wherever possible.	• Monitor known nests around stockpiles and exposed areas to verify the effectiveness of the buffer until the nests are inactive.
Indigenous Peoples		
	• In the event that Mi'kmaq archaeological deposits are encountered during construction or operation of the Project, all work should be halted and immediate contact should be made with the Nova Scotia Museum and the Mi'kmaq of Nova Scotia.	• Monitoring of activities to ensure mitigation measures are undertaken to prevent irreversible damage to Mi'kmaq archaeological resources and burial site which is outside of Project area.
	• Continuation of the engagement of the Mi'kmaq of Nova Scotia including: representatives from the two nearest Mi'kmaq communities on the CLC; participation in the Project including key aspects of environmental monitoring and wetland compensation, and any targeted engagement of residents of Beaver Lake based on approach agreed with Chief and Council and staff of Millbrook First Nation.	• Review of Mi'kmaq input on specific actions and implementation where agreed on with Mi'kmaq of Nova Scotia.
	• Share Project benefits with the Mi'kmaq of Nova Scotia via negotiated benefits agreement(s).	• Monitoring of any future benefit agreement(s) as defined in the specific agreement, e.g., quarterly meetings of the implementation committee.
Physical and Cultural Heritage		
Physical and Cultural Heritage Resources	• Shovel testing shall be conducted around the possible cookhouse or a buffer be put in place around the feature to protect it from mining activities;	• Ensure mitigation measures are undertaken to prevent damage to identified features.

Table 7-1 Summary of Mitigation and Monitoring Measures

Valued Component Affected	Mitigation and Compensation Measures	Monitoring Program
	• Intensified reconnaissance if development will occur within 100 metres of Crusher Lake; • If any development is to occur specifically around the historic features identified during the reconnaissance, intensified research and archaeological shovel testing should be conducted; • Any further changes in the layout of the mine and facilities be evaluated; and • In the event that archaeological deposits or human remains are encountered, the Coordinator of Special Places, Nova Scotia Communities, Culture, & Heritage Department must be contacted.	
Human Health and Socio-Economics		
Recreational Activities	• Restriction of recreational activities within the spatial boundaries of the Project. Notification will be provided by signage; • Liaison with any local recreation groups, such as ATV associations.	Not applicable
Traffic	• Equipment maintenance; • Limiting haul truck operational hours to 12 to 16 hours per day; and	Not applicable

Table 7-1 Summary of Mitigation and Monitoring Measures

Valued Component Affected	Mitigation and Compensation Measures	Monitoring Program
	• Reduce risks of an accident through operator training, proper signage at intersections and along the haul road, and discussions with NSTIR	

8. Closing

The Beaver Dam Mine Project proposed by Atlantic Gold will operate as a satellite surface mine with an approximate ore extraction rate of 2 million tonnes per year. The Beaver Dam Mine Project is part of the MRC Project which also includes the existing and fully permitted Touquoy Gold Project in nearby Moose River Gold Mines, Nova Scotia.

Processing of ore from the Beaver Dam gold deposit at the existing plant at Moose River will begin upon completion of mining from the Touquoy gold deposit. The Beaver Dam Mine Project is anticipated to begin construction in 2021, come into production in 2022, cease operations in 2026 and then be reclaimed. Reclamation would occur at the Beaver Dam Mine site following cessation of production and at the Touquoy facilities associated with ore processing and tailings management from processing Beaver Dam ore.

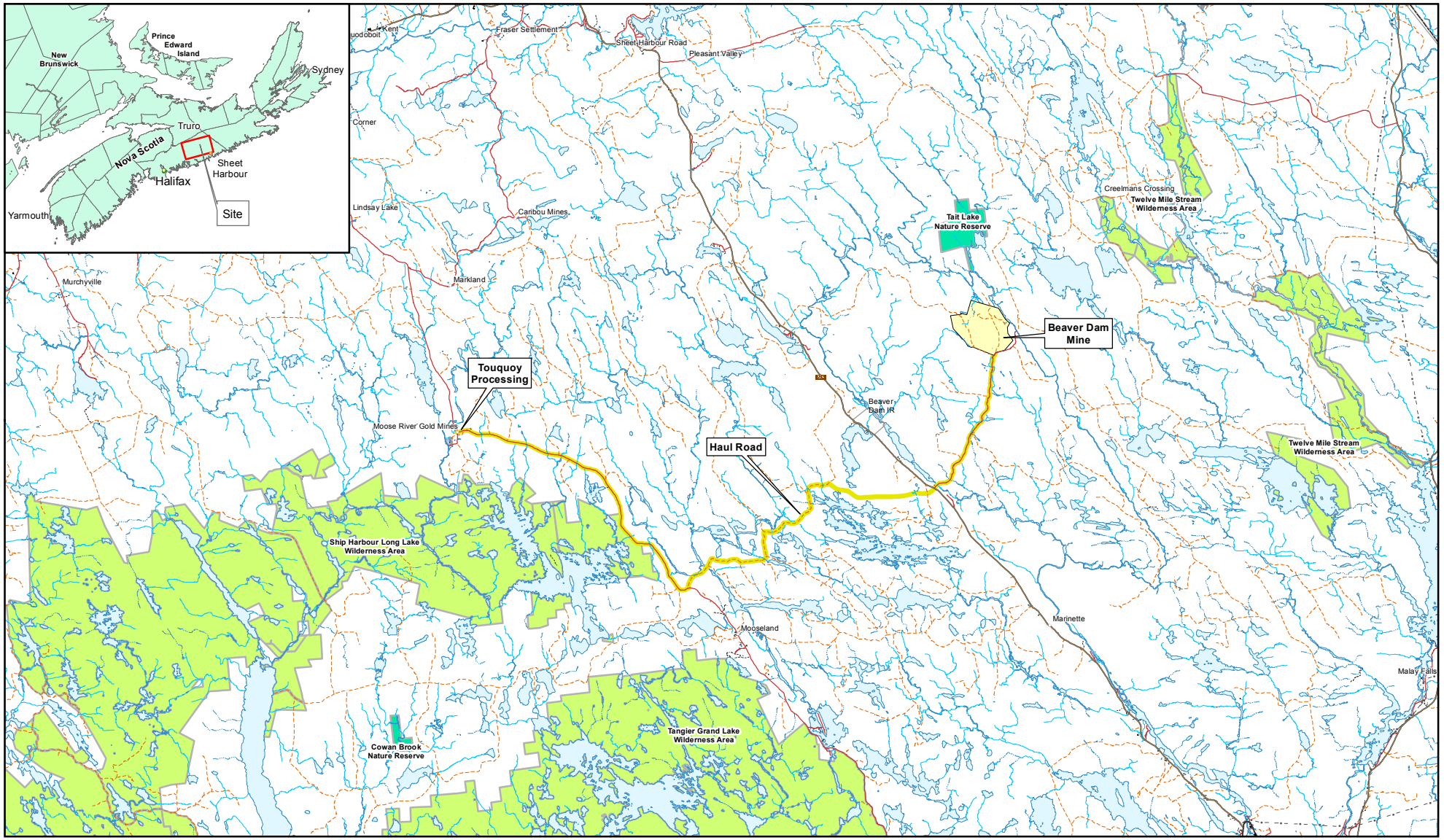
Atlantic Gold has recognized that the quantity and unusual style of gold mineralization at the Beaver Dam mine site will support a commercially viable surface mining operation with on-site crushing and off-site processing of ore.

Atlantic Gold wishes to develop this resource in line with all applicable regulatory requirements and recognizes the significant benefits to the local economy, the Province of Nova Scotia, the Mi'kmaq of Nova Scotia, and the company in completing this Project. Atlantic Gold has designed a project that is in line with the intent of NSDNR for efficient use of mineral resources and to "*promote the concepts of environmental responsibility and sustainable development, stewardship of the mineral resource sector, and integrated resource planning.*"

All phases of the Project will provide employment opportunities for local residents and Indigenous Peoples, as well as provide tax revenue for the municipal, provincial, and federal levels of government. It is anticipated that additional labour force will be required during construction and a smaller, but still significant, labour force will be required during operation. Indirect employment will be generated by the Project through the use of external contractors and suppliers. Tax revenue in the millions of dollars per year will be generated through corporate income taxes paid by Atlantic Gold, as well as its contractors and suppliers.

As described throughout the EIS and this Summary document, Project-environment interactions are expected to occur throughout the life of the Project during the construction, operations, and decommissioning phases. These interactions are expected, manageable and are typical of environmental impacts associated with quarry and mineral extraction projects in the region.

Given the considerations identified above and based on baseline studies completed for each of the identified VCs, the Project is not expected to result in any significant residual adverse environmental effects once mitigation measures have been applied. Monitoring programs will continue throughout the life of the Project to verify the effects of the Project on the surrounding environment relative to predictions made in the environmental effects assessment. The Proponent is committed to implementing the planned mitigative measures and monitoring programs, as well as ongoing stakeholder and Mi'kmaq engagement as outlined in this submission.



Source: Service Nova Scotia

0 2,000 4,000 6,000

Metres

Coordinate System:
NAD 1983 CSRS UTM Zone 20N

N

GHD

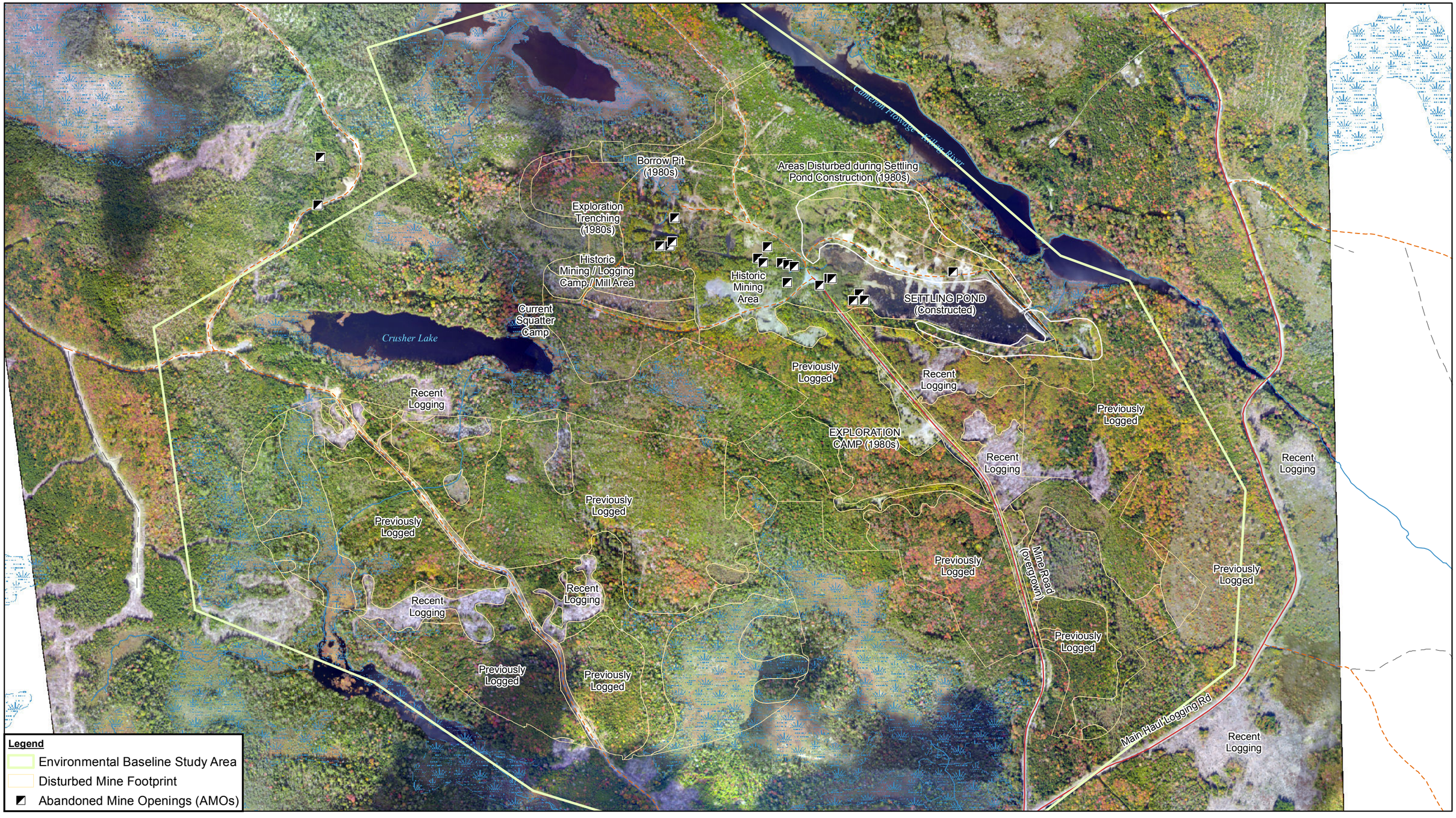
ATLANTIC GOLD CORPORATION
MARINETTE, HALIFAX CO., NOVA SCOTIA
ENVIRONMENTAL IMPACT STATEMENT

BEAVER DAM MINE
PROJECT LOCATION

088664 (005)
Feb 17, 2017

FIGURE 1

GIS File: I:\GIS_DATA\Projects\6-chars\08----\088---\088664 Atlantic BD\088664(005)\088664(005)GIS-DA001.mxd



Source: Atlantic Gold, Service Nova Scotia, NS Natural Resources, NS Environment

0 80 160 240
Metres

Coordinate System:
NAD 1983 CSRS UTM Zone 20N

N

GHD

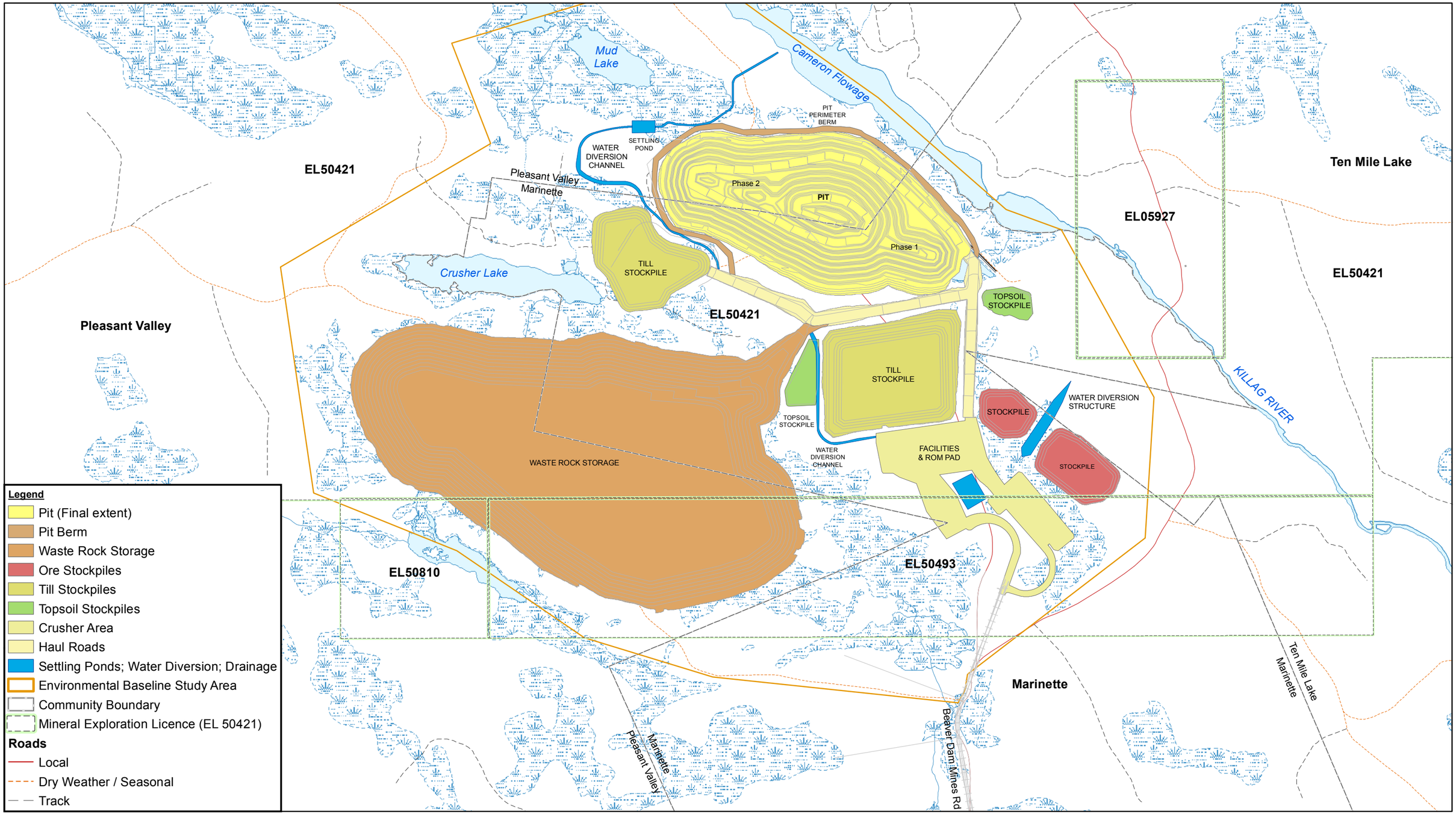
ATLANTIC GOLD CORPORATION
MARINETTE, HALIFAX CO., NOVA SCOTIA
ENVIRONMENTAL IMPACT STATEMENT

BEAVER DAM MINE
EXISTING CONDITIONS

088664 (005)
Feb 16, 2017

FIGURE 2

GIS File: I:\GIS_DATA\Projects\6-chars\08----\088---\088664 Atlantic BD\088664(005)\088664(005)GIS-DA002.mxd



Legend

- Pit (Final extent)
- Pit Berm
- Waste Rock Storage
- Ore Stockpiles
- Till Stockpiles
- Topsoil Stockpiles
- Crusher Area
- Haul Roads
- Settling Ponds; Water Diversion; Drainage
- Environmental Baseline Study Area
- Community Boundary
- Mineral Exploration Licence (EL 50421)

Roads

- Local
- Dry Weather / Seasonal
- Track

Source: Atlantic Gold, Service Nova Scotia, NS Natural Resources, NS Environment

0 100 200 300
Metres

Coordinate System:
NAD 1983 CSRS UTM Zone 20N

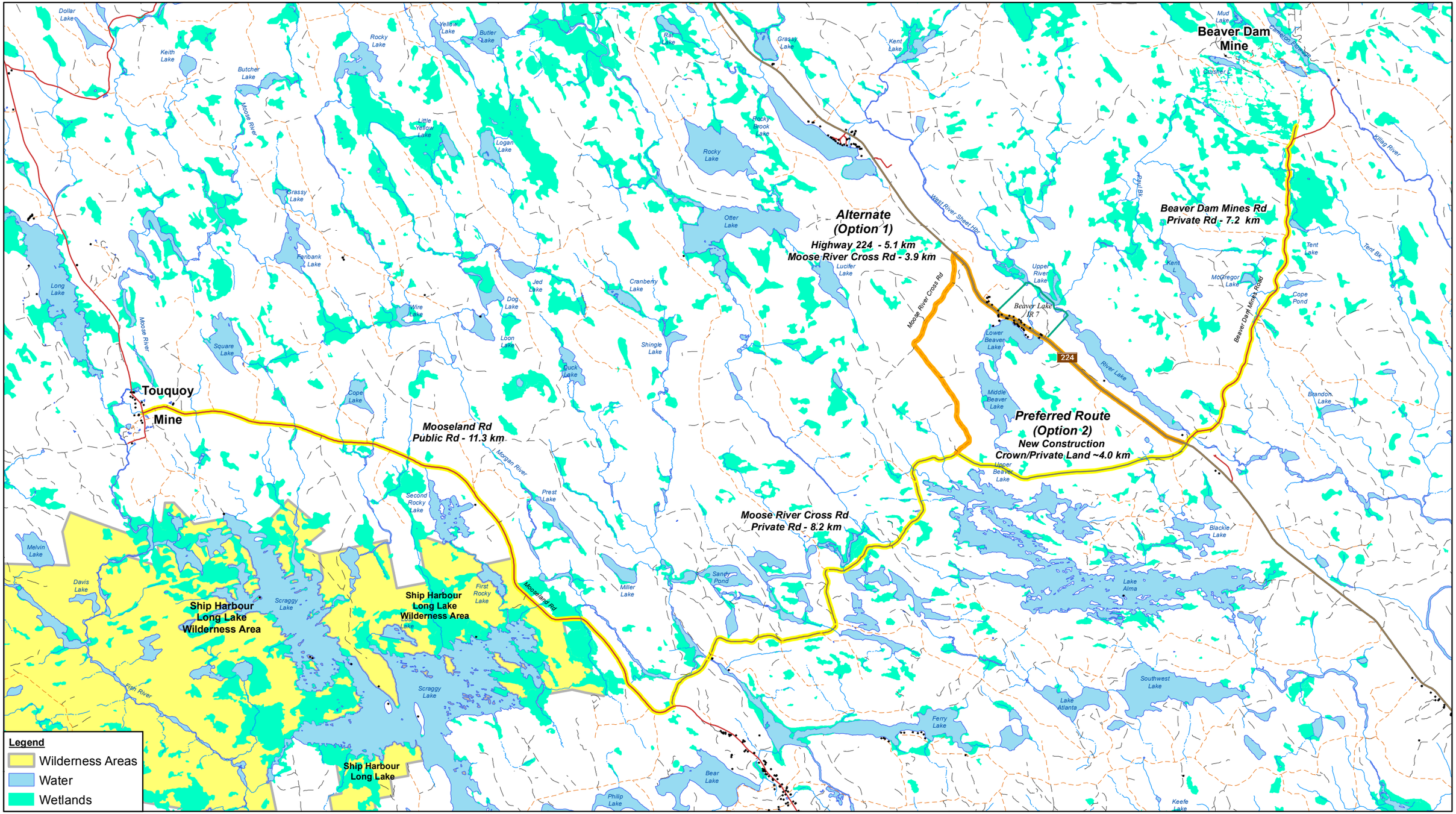
ATLANTIC GOLD CORPORATION
MARINETTE, HALIFAX CO., NOVA SCOTIA
ENVIRONMENTAL IMPACT STATEMENT

BEAVER DAM
GENERAL MINE ARRANGEMENT

088664 (005)
Feb 17, 2017

FIGURE 3

GIS File: I:\GIS_DATA\Projects\6-chars\08----\088---\088664 Atlantic BD\088664(005)\088664(005)GIS-DA003.mxd



Source: Service Nova Scotia (Water, Wetlands, Roads), NS Environment (Protected Areas), Atlantic Gold (Route)

0 600 1,200 1,800
Meters

Coordinate System:
NAD 1983 CSRS UTM Zone 20N

N

GHD

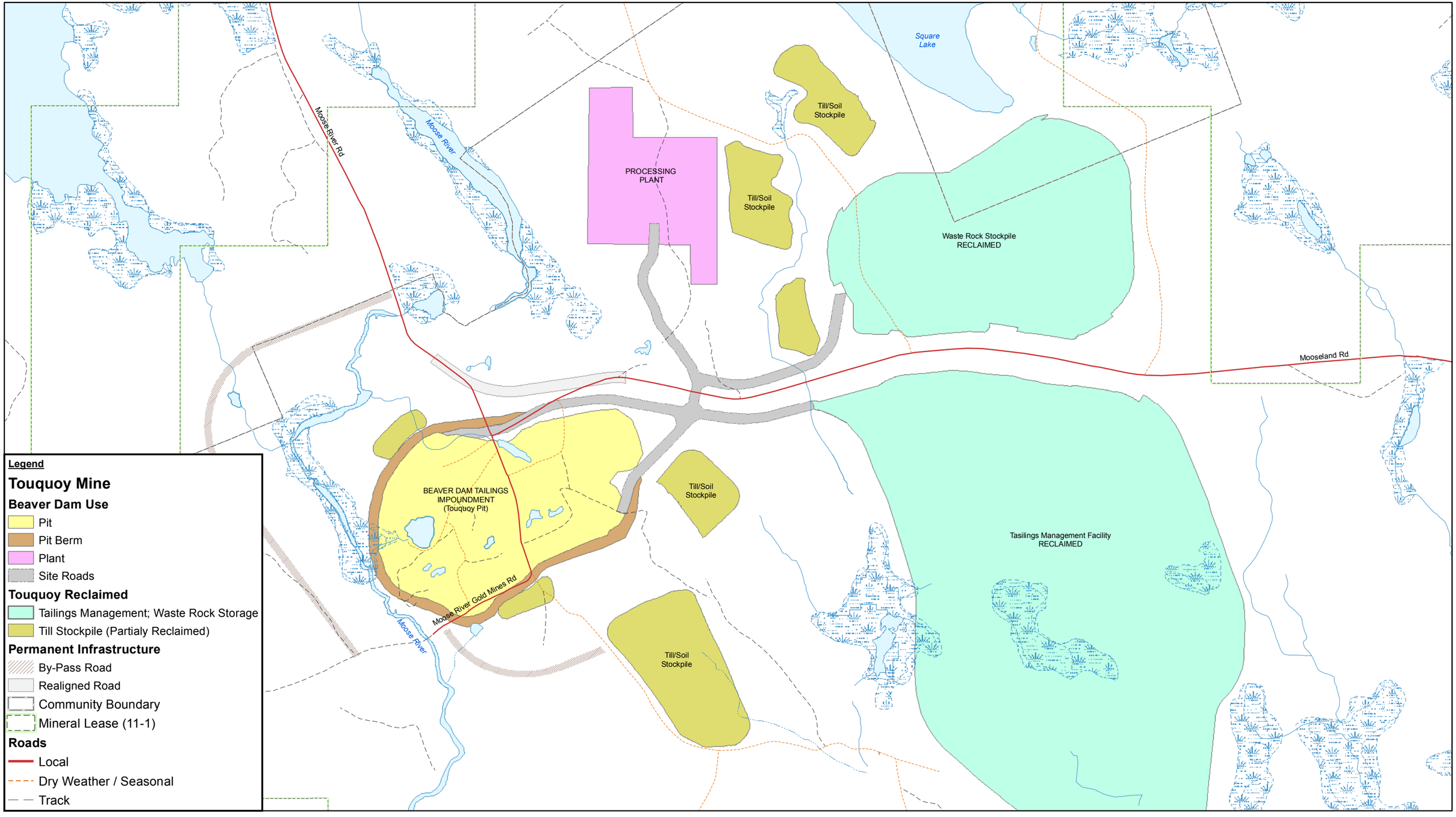
ATLANTIC GOLD CORPORATION
MARINETTE, HALIFAX CO., NOVA SCOTIA
ENVIRONMENTAL IMPACT STATEMENT

HAUL ROAD ROUTE WITH ALTERNATES

088664 (005)
Mar 26, 2017

FIGURE 4

GIS File: I:\GIS_DATA\Projects\6-chars\08----\088---\088664 Atlantic BD\088664(005)\088664(005)GIS-DA004.mxd



Source: Atlantic Gold, Service Nova Scotia, NS Natural Resources, NS Environment

0 100 200 300
Metres

Coordinate System:
NAD 1983 CSRS UTM Zone 20N

N

GHD

ATLANTIC GOLD CORPORATION
MARINETTE, HALIFAX CO., NOVA SCOTIA
ENVIRONMENTAL IMPACT STATEMENT

TOUQUOY MINE - GENERAL ARRANGEMENT FOR BEAVER DAM ORE PROCESSING

088664 (005)
Feb 21, 2017

FIGURE 5

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