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Reclamation Plan

Touquoy Gold Project - Reclamation Plan

Final Report

November 30, 2020

Prepared for:
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1.0 INTRODUCTION

1.1 PURPOSE

This reclamation plan (the Plan) has been prepared to provide details of the proposed activities at the Touquoy Gold Project (The Project) including progressive reclamation, final closure, and post-closure monitoring. This plan is a revision to an earlier submission dated October 2, 2019 (Rev.3). The current document has been restructured to include an introduction of the facility and operating status followed by a description of the planned reclamation activities.

This Plan is to be updated a minimum of every three years or 6 months prior to the planned end of mining as the final closure plan. The Plan will also be updated following major changes to the project and reclamation measures.

1.2 OWNERSHIP

Atlantic Mining NS Inc. (AMNS), a wholly owned subsidiary of St. Barbara Ltd., is the Project owner and has property ownership/lease rights for the Project.

1.3 PLAN CONTRIBUTORS

Contributors to this Plan are provided in Table 1-1.

Table 1-1 Contributors to the Plan

Company Name	Contact	Area of Responsibility
Stantec Consulting Ltd (Stantec)	Jeff Gilchrist, P.Eng.	Author
	Reid Smith, M.A.Sc., P.Geo.	Author
	Paul Deering, P.Eng., P.Geo.	Senior review and release of document.
AMNS	Melissa Nicholson, Environmental Superintendent.	Owner review, revisions, and approval.
	James Millard, Manager Environment and Community	
	Scot Klingmann, Mine Manager	

1.4 REGULATORY REQUIREMENTS

This Plan is submitted in accordance with Condition 24b.i) of the current Industrial Approval ((IA) 2012-084244-08) (dated November 4, 2020) and the requirements presented in the Nova Scotia Mineral Resources Act.

1.5 PROJECT LOCATION

The Touquoy Gold Project is located in Moose River Gold Mines in Halifax County, Nova Scotia. The site is approximately 65 km northeast of Halifax, NS, as shown on Drawing 1, Appendix A. Access to the site is available from public roads. A site plan showing site layout is presented on Drawing 2, Appendix A.

Mineral rights to the Touquoy Property are wholly owned by AMNS and consist of one mineral lease (MLE11-1) comprising 49 claims and covering 793 hectares (ha), and one adjoining Exploration License (EL10377) comprising 64 claims and covering 1036 ha.

1.6 PROJECT ENVIRONMENT

The project is located within the Eastern Drumlins ecodistrict, a further subdivision of the Eastern ecoregion of Nova Scotia. The ecodistrict is characterized by drumlin fields with generally north-south oriented drumlins. The area has relatively low relief with frequent drumlins and numerous lakes, ponds, streams, and wetlands. The project catchment areas drain mainly to the Moose River and its tributaries with the southern area of the property draining to Scraggy Lake. The runoff from the site infrastructure areas has been altered and is managed and controlled by means of collection ditches and ponds with collected water being discharged to Scraggy Lake. Fish River drains Square Lake to Scraggy Lake and both lakes are part of the Fish River Watershed that flows west and then south into Lake Charlotte, eventually draining to Ship Harbour.

1.6.1 Site Geology

Geologically, the Touquoy deposit is found in the Meguma Group sediments of Nova Scotia. These are defined as a series of greywacke and argillite sedimentary rocks underlying approximately half of the province of Nova Scotia. Two main lithological units occur at the Touquoy Project: argillite and greywacke. Varying degrees of interbedding occur within these two units. Minor quartz veining is also present in the Touquoy deposit. Unlike most gold deposits in the Meguma Terrane, gold mineralization at Touquoy is found disseminated throughout the sediments and is not confined to quartz veins.

1.6.2 Climate

Environment Canada's Middle Musquodoboit climate station (Station ID 8203535, in operation between 1961-2011), located approximately 20 km northwest of the mine site, was used to characterize the climatic conditions at the mine site. The climate normal precipitation is approximately 1357.7 mm, consisting of an average rainfall of 1,188.3 mm and average snowfall of 172.2 cm. Average annual evaporation is 515 mm for the mine site based on average lake evaporation at Environment Canada's Truro climate station. A site meteorological station was installed in 2020 and is currently collecting site specific meteorological data.

1.7 PROJECT SUMMARY

The Touquoy Mine is an open pit gold mine, currently milling an average of 7,500 tpd. The original estimated life-of-mine (LOM) was five years, based on a 9.3 Mt mineable reserve with potential to lengthen the life of mine through ongoing mineral exploration activities at the Touquoy site as well as on the nearby mineral claims if approvals are received (Beaver Dam, Fifteen Mile Stream, Cochrane Hill). There is also a considerable volume of potential medium and low grade ore stored at the site in the Waste Rock Storage Area (WRSA) that could be potentially processed at the site depending on economic conditions and the status of its environmental approvals.

Ore is mined from the nearby Touquoy pit and delivered to the mill for processing. Processing involves size reduction of the ore by crushing and grinding and recovery of the contained gold by mechanical and chemical processes. Recovery entails gravity concentration, carbon-in-leach (CIL), elution and carbon regeneration, electro-winning and smelting, and cyanide destruction. The mill provides cyanide destruction through a detox circuit using the INCO/Air SO2 process followed by arsenic reduction by precipitation using ferric sulphate prior to discharge to the TMF. Tailings from the mill are pumped via pipeline to the Tailings Management Facility (TMF). Water associated with the Touquoy tailings is recycled for use in processing.

The TMF includes a tailings pond, polishing pond, a constructed wetland, and associated facilities. The tailings pond manages the tailings discharge slurry, water retained in the tailings' voids, historical tailings cells and runoff from the contributing TMF catchment. Mine contact water from the mill site, open pit, and waste rock storage facility is also directed to the TMF. Collection ditches along the east, west, and north of the tailings pond are designed to collect shallow seepage from the tailings pond and pump it back into the tailings pond.

Effluent from the tailings pond is treated at the effluent treatment plant (ETP) followed by filtration through geobags to reduce metals and solids prior to release into the polishing pond, which allows additional retention time. Discharge of treated effluent from the polishing pond is controlled via the final discharge point (FDP) control structure. Effluent flows through the FDP to a constructed wetland downstream which provides a final polishing step prior to release to the natural environment (Scraggy Lake). Drawing 2, appended, shows the various components which are further described in subsequent sections.

During the development of the site, materials such as topsoil and overburden have been stockpiled at various locations as shown on Drawing 2. These materials are to be used for reclamation.

The Project is currently in the operations phase with the Project being commissioned (first tailings processed) on October 11, 2017. AMNS is committed to developing and operating the project in accordance with the regulations of the Nova Scotia Department Energy and Mines (NSDEM), Nova Scotia Department of Environment (NSE), and other applicable regulatory and industry requirements.

1.7.1 History

As part of the 2011 application for a Mineral Lease, Conestoga-Rovers & Associates (CRA), on behalf of AMNS, submitted a Preliminary Reclamation Plan (CRA 2011). The May 2011 Reclamation Plan was accepted by NSDEM with conditions as stated in the letter from AMNS (DDV Gold Ltd.) on July 20, 2011 (Atlantic 2011).

In 2012, an application for Industrial Approval (IA) and supporting documentation was prepared by Conestoga-Rovers & Associates (CRA) (CRA 2012) and submitted to NSE on behalf of AMNS. The application was based on the feasibility level design completed by Golder Associates Ltd. (Golder) in 2007 and revised in 2010. The 2011 Preliminary Reclamation plan (CRA 2011) was submitted as part of the IA Application. The IA application was approved on March 24, 2014, under Approval No. 2012-084244.

Following receipt of the initial IA in March 2014, an update to the project feasibility level design was completed in July 2015 by Stantec (Stantec, July 7, 2015) to include updates to the mine development plan primarily relating to design changes for the TMF. The design was finalized, and drawings issued for construction in 2016 by Stantec.

The current approved design was submitted to NSE in October 2016. Following this submittal, an application for IA Amendment was prepared by Stantec (Stantec 2016) and submitted to NSE on November 25, 2016. An updated IA was issued by NSE, dated February 24, 2017, Approval No. 2012-084244-02. The following presents a list of the Industrial Approval revisions since February 2017:

- Industrial Approval 2012-084244-03, April 24, 2017;
- Industrial Approval 2012-084244-04, July 11, 2018;
- Industrial Approval 2012-084244-05, July 19, 2018;
- Industrial Approval 2012-084244-06, April 9, 2020;
- Industrial Approval 2012-084244-08, November 4, 2020 (Note: -07 not issued to AMNS)

1.8 POTENTIAL EXPANSIONS

AMNS is currently applying to permit the expansion of the Waste Rock Storage Area (WRSA) and TMF in December 2020 with expected approvals to be received in 2021. Once the IA amendments are approved, it is anticipated that the Plan will be revised to account for the expanded infrastructure.

In addition to the WRSA and TMF expansions noted above, use of the Touquoy project area and some of its facilities is being contemplated as part of other proposed future projects that are currently under federal and provincial environmental assessment. These projects include the Beaver Dam Mine Project, Fifteen Mile Stream Gold Project, and the Cochrane Hill Gold Project. Once the above referenced projects are approved, subsequent updates to the Plan would be required to reflect the changes to the Touquoy project area.

The Plan provided, herein, does not include details of the proposed expansion or future projects, nor does it account for additional scope or costing that would be impacted by modifications to the existing permits. The Plan for the site would need to be updated to account for these expansions if and when approved.

1.9 PROJECT COMPONENTS

The main Project components have been separated into four sections based on the areas of the site and are detailed in the following subsections. The site components are shown on Drawing 2 with additional drawings showing details of each area in Drawings 3 to 8.

1.9.1 Mill Site and Admin Area

The Mill Site and Admin Area are located to the northwest area of the site as shown on Drawing 2. Drawing 3 shows additional details of the Mill Site and Admin Area. This area contains most of the buildings at the site. Major components include:

- Administration Building;
- Mining Office / Warehouse;
- Truck shop/Warehouse buildings;
- Reagent Building;
- Laboratory;
- Mill Building;
- CIL/Detox Tanks;
- Goldroom;
- Mill Office and changerooms
- Crusher Structure and Conveyor;
- Ore Reclaim Tunnel;
- Stormwater Retention Pond;
- Various Trailers; and
- Septic and Propane Tanks.

In addition to the above infrastructure, the haul road from the pit and the run of mine (ROM) stockpile is in this area. There is also an overburden stockpile to the east of the mill. Disturbed areas of the mill site are generally gravel covered for vehicle access and laydown areas.

The Mill Site and Admin Area is situated on a clay drumlin. Surface water runoff from the mill site and ROM pad is directed to the HDPE lined stormwater retention pond adjacent to the mill. Excess water in the pond is either pumped to the TMF or used as additional process water in the mill.

1.9.2 Open Pit

The Open Pit is located to the southwest of the site as shown on Drawing 2. Drawing 4 shows additional details of the Open Pit area under its current layout with a surface area of approximately 268,000 m^2. Final pit geometry will remain within the limits outlined in the permits governing operation of the mine and the final pit geometry will be updated for the final closure plan.

The pit design has two ramps and multiple benches. Typical pit cross sections are shown on Drawing 4 and include 0.84H:1.0V rock faces with 20 m vertical bench intervals, a 7 m setback at the top of the pit followed by a 2.6H:1.0V slope in overburden above the rock and a 2 m barrier berm around the perimeter of the pit. Stability analysis of the open pit slopes was completed by Peter O'Bryan & Associates. The rock slopes as per the design are considered stable in the long term and are being monitored for stability during development through ongoing visual inspection and survey monuments.

The pit is actively dewatered during operation with the water from the pit pumped to the TMF.

The following additional site components are located near the pit:

- Pit Look-off
- Haul and access roads
- Clay Borrow Source
- Scraggy Lake Overburden Stockpile (to the south)

1.9.3 Waste Rock Storage Area (WRSA)

Waste rock is generated during open pit development and used during operations for grading and construction of embankments and other infrastructure. Waste rock not used for site development is stored permanently in the WRSA to be reclaimed at closure.

The WRSA is located to the northeast of the site as shown on Drawing 2. The WRSA footprint is approximately 36 hectares. Drawing 5 shows the WRSA footprint, drainage ditch layout and typical sections.

The WRSA consists of the waste rock pile and associated drainage ditches and collection ponds. The WRSA contains waste rock as well as low to medium grade ore which may be processed later depending on economic conditions. The materials are separated within the pile as shown on Drawing 5. Construction of the waste rock stockpile consists of benches 10 m in height with approximate 15 m horizontal benches between each lift during construction. During placement, waste rock is end-dumped at angle of repose of the waste rock. As construction proceeds to a higher lift, the preceding lift will be progressively recontoured during operations to a closure slope of 2.7H:1V, with benches left between each lift to allow a final overall slope from toe to crest of 3.0H:1V. The bench widths in some areas will vary between 3 to 4 m as shown on Drawing 5 Cross sections showing planned construction of the WRSA are presented on Drawing 5.

Slope stability analysis of the WRSA was completed by Golder Associates Ltd. (Golder, 2020). The slope stability report recommended that the pile could be constructed to elevation 170 m using the geometry above and satisfy the stability requirements. There is an area on the southeast of the WRSA that requires a 20 m bench at elevation 150 m to meet the design requirements. In accordance with the Golder recommendations, further construction to the final design elevation of 190 m may proceed based on monitoring and surveillance results during construction to elevation 170 m. Stability analysis will be completed by a professional engineer and provided to NSE/DEM prior to exceeding elevation 170 m.

The drainage ditches direct runoff and shallow seepage from the waste rock pile to collection ponds which are currently pumped to the TMF. Operational geochemical source terms were generated for the WRSA and accounted for in the groundwater model discussed in Section 1.9.4.2.

1.9.4 Tailings Management Facility

The Touquoy TMF is situated in the southeast section of the site as shown on Drawing 2. Additional details are provided on Drawing 6, 7 and 8. The TMF is comprised of a tailings pond, a polishing pond, a constructed wetland, and associated facilities described herein.

The key structures and equipment that comprise the TMF are:

- Tailings pond and tailings pond dam;
- Seepage collection ditches and ponds;
- Historic tailings cells;
- Arsenic impacted soil pile;
- TMF Quarry;
- Polishing pond and polishing pond dam;
- Polishing pond dam spillway;
- Decant barge and reclaim pipelines;
- Tailings delivery and distribution system (pumps and pipelines);
- ETP and geobags;
- Engineered wetland; and
- Access roads.

The tailings pond is enclosed by an approximately 3,600 metre long tailings dam. The dam is being constructed using the downstream raise method, with an upstream sloping clay till core, waste rock shell and associated filters and riprap. The polishing pond was constructed using similar materials and methods. The downstream slopes of the tailings pond and polishing pond dams are 1.8H:1.0V and the upstream slopes are 2.5H:1.0V.

As noted above, the tailings pond is designed to contain the tailings discharge slurry, water retained in the tailings' pore space, historical tailings cells and runoff from the contributing TMF catchment. Mine contact water from the mill site, open pit, and waste rock storage facility is also directed to the TMF. The tailings pond simultaneously acts to settle fine sediments and to promote natural cyanide (CN) degradation during the ice-free seasons (AMNS 2020). Seepage collection ditches along the east, west, and north edges of the tailings pond collect surface runoff and shallow seepage which is then pumped back into the tailings pond.

As part of the IA for the Project, tailings from historical mining at the site (referred to as 'historical tailings') were deposited in two separate Historical Tailings Cells within the northeast portion of the tailings pond. The cells were constructed and are currently overlain by recent Run-of-Mine (ROM) tailings, and are therefore not discussed further, herein. Arsenic contaminated soil is also managed within the northwest portion of the TMF.

A quarry operation (Shown on Drawing 2) was permitted and developed within the tailings pond to source rockfill for the dam construction. The quarry operation was completed and is now filled with tailings, therefore is not discussed further herein and is not shown on final reclamation drawings.

The tailings pond retains ponded water during operation for use as reclaim water in the milling process. A decant barge is positioned in the southwestern corner of the TMF that pumps reclaim water to the mill. Excess water is pumped from the tailings pond to the ETP which provides metals removal, solids removal and pH control. Following treatment, the effluent is pumped to geobags to provide additional solids and metal capture prior to release to the polishing pond. The polishing pond is located downstream of the tailings pond and provides additional water retention time prior to discharge. Discharge of treated effluent from the polishing pond is controlled via the final discharge point (FDP) control structure. The polishing pond has an emergency spillway to prevent overtopping during storm events. Effluent flows through the FDP to a constructed wetland downstream which provides a final polishing step prior to release to the natural environment (Scraggy Lake).

The wetland pond berm is approximately 2 m in height and runs along the length of the constructed wetland. It has a nominal clay core at center with rockfill material on both upstream and downstream sides. Water drains through coarse rockfill at the top of the berm to maintain water level within the wetland and has an emergency spillway to prevent overtopping during storm events. Components of the TMF are shown on Drawings 2, 8, 9 and 10.

1.9.4.1 Tailings Chemistry

Based on the testing completed on ROM tailings during operation by AMNS, portions of the tailings produced at the site are potentially acid generating (PAG). The percentage of PAG tailings has fluctuated over time and has ranged from 9% (pre-2019) to 50% (2019) to 31% (to June 2020). Lorax Environmental (Lorax) concluded that based on the nature of the tailings slurry being well-mixed and the partial subaqueous deposition that the risk for ARD development in the TMF is relatively low considering the percent PAG noted above (Lorax 2020A, 2020C).

1.9.4.2 Water Quality

Previous predictions for TMF seepage water quality were generated by Stantec as part of the 2016 IA-Amendment Application (Stantec 2016) using chemistry from supernatant produced during bench scale metallurgical testing prior to production mining. Lorax (2020B) completed lab testing and analysis on ROM tailings including interactions with the different foundation and dam materials at the site and updated the seepage source terms from the TMF (Lorax 2020C)

Using the updated source terms for seepage water quality, Minnow Environmental Inc. (Minnow), completed water quality modelling in the surface water environments downstream of the TMF, specifically in Scraggy Lake and Watercourse No. 4 for relevant parameters and key indicators. The modelling was calibrated to match the observed water quality in Scraggy Lake and was used to predict the future concentrations of the parameters modelled. The modelled parameters are predicted to remain below Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater) (CWGQ-FAL;

Canadian Council of Ministers of the Environment 2020), except for aluminum, arsenic, cadmium, and iron that naturally occur at levels greater than the CWGQ-FAL according to site baseline data (Minnow 2020).

2.0 OVERVIEW OF CLOSURE FRAMEWORK

The goal of reclamation is to return the physical, chemical, and biological qualities of the land and water regimes disturbed by the project to a state that is safe, stable, and compatible with the surrounding landscape and final land use.

The final land use of the Crown lands will require the landowner's (Nova Scotia Crown Lands) approval and the acceptance by Nova Scotia Department of Lands and Forestry (NSLF), Nova Scotia Environment (NSE) and the Nova Scotia Department of Energy and Mines (NSDEM). As outlined in the 2011 Preliminary Reclamation Plan, initial land use activities identified by stakeholders for the post-mining landscape included outdoor recreation and commercial forestry. Continued engagement and dialogue with the public regarding the mine's operational and closure planning is completed via the Community Liaison Committee (CLC) (Section 7) and also in ongoing engagement with the Mi'kmaq of Nova Scotia and the public at large. It is anticipated that based on the results of this ongoing engagement, that the final land use concepts during post-closure will continue to evolve. It should be noted that future land use will need to comply with some restrictions related to minimizing disturbance and maintaining the structural integrity of some of the closure measures. A brief description of the current closure vision for each major mine component is included in Table 2-1 below.

Specific objectives, criteria, planned reclamation activities and performance monitoring to achieve the closure goals are also outlined. Sections 3, 4 and 5 provide a more detailed description of the closure activities, progressive reclamation opportunities and planned research studies, and post-closure monitoring.

Table 2-1 Overview of Closure Objectives/Criteria, Reclamation Activities, Performance Monitoring and Planned Research Studies.

Mine Component	Closure Vision	Closure Objective	Closure Criteria	Primary Reclamation Activity	Post-Closure Inspection/Monitoring	Notable Uncertainty/Research
Mill Site and Admin Area	The Mill Site will have all buildings, equipment, and related items removed, and the area will be revegetated. The area will be safe for the public to use for outdoor recreation (e.g. hiking, trails, etc.).	Physical Stability	Buildings and equipment removed. Soil capping and revegetation treatments demonstrate early succession has been successful. No signs of significant erosion or sloughing prior to revegetation cover establishment.	Buildings demolished and removed from site. Equipment and other infrastructure removed from site. Surfaces graded and seeding/planting to allow drainage and prevent erosion.	Periodic inspections by a professional engineer will be completed.	No major uncertainties.
		Chemical Stability	Confirmatory soil sampling and ESA (as required) have been completed and results accepted by NSE. Runoff water quality is suitable for discharge to surrounding area.	Removal of impacted soils (if required) as recommended by the confirmatory soil sampling program and/or ESA.	Confirmatory soil sampling and ESA (as required) have been completed. Surface water quality monitoring completed in adjacent watercourses.	
		Land Use [1]	Wildlife and the public can travel across the area safely.	Following building removal, area is graded, soil cover placed and revegetated.	Vegetation and soil monitoring will be completed.	
Open Pit and Spillway	The Open Pit will flood, and overflow will discharge to Moose River via an engineered spillway. The shoreline will be designed with shallow grading at the predicted water level to allow safe egress for wildlife, and a shallow water zone that can provide riparian and wetland habitat. The existing mine ramp at the northeast shoreline will be maintained to allow safe access to the pit lake. (e.g., boat launch site). The presence of self-sustaining fish populations is not intended and will be limited. The riparian zone and shallow water may provide habitat for avifauna, amphibians, and other species.	Physical Stability	Final conditions of the open pit walls, overburden slopes and spillway (once constructed) are confirmed to be within approved design constraints by a professional engineer. No visual indications of significant deformation and degradation is observed during a final inspection by a professional engineer.	Annual geotechnical inspections will be completed during the mine's operation to manage pit wall stability prior to final closure. The overburden bench and barrier berm materials will be re-sloped.	Periodic inspections by a professional engineer will be completed.	No major uncertainties.
		Chemical Stability	Water quality in the Pit Lake demonstrates a stable and/or decreasing trend and meets approved criteria. Decant elevation is suitable for discharge to Moose River.	Dewatering will cease at the end of mining and the pit will be allowed to flood, eventually discharging via spillway to Moose River. No treatment of this water is expected to be required prior to discharge.	Pit water quality and water levels will be monitored during flooding, and after discharge to Moose River via spillway.	Pit flooding timelines and the Pit Lake water quality are uncertain. These processes will be assessed as part of ongoing monitoring and updated predictions completed prior to closure and during flooding.
		Land Use [1]	Safe access and egress options are available where practical to the Pit Lake once flooding is complete. Shallow water zones (< 5 m deep) are created along the Pit Lake perimeter where practical.to provide options for ecosystem restoration design.	Retreat blasting and benching and waste rock deposition is completed to allow construction of a shallow water zone where practical along the Pit perimeter. Final Pit slopes and shoreline are approved by a professional engineer.	Periodic inspections by a professional engineer will be completed.	The post-closure aquatic habitat quality and quantity is uncertain. As predictions for post-closure pit lake water quality are refined, options for riparian and littoral zone habitat enhancement will be considered for various flora and fauna.

Table 2-1 Overview of Closure Objectives/Criteria, Reclamation Activities, Performance Monitoring and Planned Research Studies.

Mine Component	Closure Vision	Closure Objective	Closure Criteria	Primary Reclamation Activity	Post-Closure Inspection/Monitoring	Notable Uncertainty/Research
TMF	The tailings pond will be capped with a dry cover, and the polishing pond and wetland will be developed as wetland features. The area will be revegetated, likely resembling a grass/shrub land and/or open meadow condition.	Physical Stability	Performance monitoring/inspection results indicate structures are stable and performing as intended.	Design and construction of the TMF dam closure side slopes and the tailings pond dry cover with adequate surface grading and drainage plan. Geotechnical stability analysis has been completed as part of the detailed design of embankments. Design is approved by a professional engineer.	Periodic inspections by a professional engineer will be completed.	The dry cover design material types and layer thickness are uncertain at present. Site specific studies are ongoing to advance the design.
		Chemical Stability	Water quality of runoff and seepage discharging from the TMF to WC-4 and Scraggy Lake demonstrates a stable and/or decreasing trend and meets approved criteria.	Construction of the tailings pond dry cover to reduce water-tailings interaction and allow runoff and seepage to enter the surrounding environment post-closure.	Surface water and groundwater monitoring will be completed through operations and following the construction of the tailings pond cover.	Water quantity and quality of the runoff and seepage discharge from the TMF are uncertain. These processes will be assessed as part of the dry cover design studies and ongoing modelling efforts.
		Land Use [1]	The dry cover design will prioritize a physically and chemically stable landform, this may restrict the extent of land-use activities and vegetation cover options.	Design and construction of a dry cover overlying the tailings. The polishing pond and wetland have been shaped to promote continued wetland re-establishment across both areas.	Periodic inspections by a professional engineer will be completed.	The dry cover design material types and layer thicknesses are uncertain at this time. Site specific laboratory and field studies are ongoing to advance the design. Hydrology studies and modelling will be required to design the water management structures at the polishing pond and wetland for post-closure conditions.
Waste Rock Storage Area	The WRSA will consist of benched outer slopes and be revegetated, likely resembling a grass/shrub land and/or open meadow condition.	Physical Stability	Inspection and monitoring results indicate structures are stable and performing as intended. Soil cover is stabilized by means of a sustainable vegetative cover. Acceptable rates of erosion are observed, soil/vegetation cover is not adversely affecting the surrounding environment.	Design and construction of the WRSA within the approved design. Geotechnical stability analysis to be updated as required as part of the detailed design. Detailed design is signed by a professional engineer. The WRSA will be re-sloped progressively during mining, the final lift will be completed at closure. A soil cover is placed and revegetated to reduce erosion concerns to acceptable levels. Detailed design includes surface grading and drainage structures that will prevent erosion.	Periodic inspections by a professional engineer and vegetation specialist will be completed.	Desktop studies are planned to complete numerical simulations for runoff on the existing WRSA shape and identify any areas of erosion concern. Revegetation trials will be completed to confirm effective methods for establishing a vegetated cover.
		Chemical Stability	Water quality of runoff and seepage discharging from WRSA to perimeter ditches and WC-4 demonstrates a stable and/or decreasing trend and meets approved criteria.	Deposition of waste rock will occur as designed. Construction of a revegetated soil cover, properly graded, will reduce infiltration rates and water-rock interactions.	Surface water and groundwater monitoring will be completed through operations and following final sloping and soil cover placement.	Water quantity and quality of the runoff and seepage discharge from the WRSA are uncertain. These processes will be assessed as part of ongoing monitoring and updated predictions prior to closure.
		Land Use [1]	Wildlife travel and forage, and public use for safe outdoor recreation activities (e.g. hiking) that can be conducted across the WRSA.	Construction of a revegetated soil cover at the WRSA surface.	Periodic inspections by a professional engineer and vegetation specialist will be completed.	No major uncertainties.

Table 2-1 Overview of Closure Objectives/Criteria, Reclamation Activities, Performance Monitoring and Planned Research Studies.

Mine Component	Closure Vision	Closure Objective	Closure Criteria	Primary Reclamation Activity	Post-Closure Inspection/Monitoring	Notable Uncertainty/Research
Site Wide Revegetation	The various disturbed areas will have a soil cover placed and be revegetated to promote a mix of habitats suitable for the post-mining landscape (e.g. grassland/open meadow, shrubland, forest). The composition of habitats may be unique relative to surrounding area due to the changed landforms.	Physical Stability/ Land Use [1]	Soil cover and revegetation treatments demonstrate early succession has been successful. Soil cover quality does not pose an elevated risk to humans and wildlife compared to surrounding areas.	Salvaged material stockpiling and management during operations. Revegetation trial plots will be completed to assess practical post-mining ecosystems possible and determine effective treatment applications prior to final closure. A soil cover and seeding/planting treatments will be applied to all disturbed sites as designed in the Final Plan.	Vegetation and soil monitoring.	The suitability of Scraggy Lake Stockpile materials is uncertain. Research is proposed to further assess soil properties and evaluate soil using a site-specific risk-based approach. Revegetation studies and field trials will be completed to asses practical post-mining ecosystems at each of the mine areas.

Note:

1. Additional land uses may be identified through ongoing engagement efforts with the CLC, the general public, and the Mi'kmaq of Nova Scotia. Final approval of land uses requires the approval of NS Crown Lands, and acceptance by NSE, DEM, and NSLF

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3.0 FINAL RECLAMATION

The following section outlines the details of the reclamation activities for the site to meet the closure goals and objectives outlined herein. Depending on the area of the site this will include but is not limited to demolition and removal of site infrastructure, grading and re-sloping of earthen structures, vegetation, and long-term water management.

The following sections are separated into various main components of the site. The activities described herein are based on the mine design information provided and best practice reclamation strategies available at the time of writing this report.

3.1 MILL SITE AND ADMIN AREA

The reclamation of the Mill Site and Admin Area generally consists of removal of buildings and other infrastructure, grading and revegetation. The final layout is shown on Drawing 3.

The buildings will be removed during the first year of reclamation and either demolished, sold or re-used at other sites. Fuel, reagents, hazardous materials, chemicals etc. will be removed from structures prior to demolishing or removed from site. The wood-frame structures will be dismantled, with reusable parts being salvaged for recycling or re-use. The steel-frame and fabric-covered structures can be dismantled and removed from site. Trailer/mobile office units will be hauled from site. Conveyor and crushing infrastructure will be dismantled and removed from site. Septic tanks will be removed from site and disposed of at an approved facility.

Concrete foundation and slabs will be broken up into pieces with a maximum size of 0.5 m, any protruding reinforcing steel removed, and provided with a minimum of 0.5 m of cover using overburden soils.

The Stormwater Retention Pond will be drained, geomembrane removed, backfilled with overburden material, and vegetated.

Following the removal of buildings and burial of foundations, the Mill Site and Admin Area will be covered in salvaged overburden and topsoil, graded to encourage drainage, and prevent pooling, and revegetated (see Sections 3.6 and 4.0, and Drawing 3).

The Ore Reclaim Tunnel will be excavated, and the corrugated steel plates removed. Site fencing will be removed when all closure activities are completed, and the fences are no longer required.

Petroleum products and waste will be removed from site at closure. Unused fuel will be returned to the supplier or disposed through a recognized waste management company. The contents of all fuel tanks will be pumped out by the fuel distributor or a waste management contractor. The petroleum and propane tanks owned by the suppliers will be removed form site by the supplier at the time of reclamation.

Reagents and other chemicals used in the mining/milling process remaining on site will be returned to the supplier or disposed of offsite at an approved facility.

Explosives onsite are currently managed by contractors and will be removed from site once no longer required. Infrastructure associated with explosive storage will be removed following removal of explosives.

3.2 OPEN PIT

At closure, the open pit will be allowed to flood naturally over time with a combination of groundwater inflow, direct precipitation, and surface run-off to create a permanent lake with a shallow shoreline and a spillway to Moose River. Access to the pit will be maintained by existing ramps to allow safe access during pit flooding and post-closure phases. It is proposed to maintain the pit lookoff for public interest and use. The closure activities for the pit consists of the following:

- Retreat blasting to create a 5.0H:1V shoreline 2.0 m below and 1.0 m above the estimated final pit water level of 108.0 m. Material to be pushed into the pit onto the elevation 100.0 m bench to create additional shallow shoreline where possible. Areas where modifying the pit geometry would interfere with the 70 m buffer from Moose River will not be modified for closure.
- Maintain the pit ramps with the addition of safety berms.
- Provide vegetative cover on the 1.0 m of shoreline above the final water elevation (refer to Sections 3.6 and 4.0 for proposed revegetation).
- Grading exposed overburden to final slopes of 2.6H:1V
- Constructing a 2 m high barrier berm with 3.0H:1V slopes around the perimeter of the pit
- Constructing a spillway and conveyance channel to Moose River with an invert of 108.0 m.

The pit configuration for closure is shown on Drawings 5 and 6, including plan view and typical cross sections. It is anticipated to maintain the design ramps for closure with the addition of safety berms for safe vehicular access to the pit lake during pit flooding and for post-closure monitoring.

The pit slopes have been designed for long term stability and all final slopes will be approved by geotechnical engineer prior to final closure to confirm that minimum factors of safety in the long term are achieved.

3.2.1 Pit Flooding

The pit will fill naturally at closure by precipitation, surface runoff and groundwater inflow. Surplus water in the open pit will discharge via a constructed spillway/conveyance channel to Moose River, subject to meeting regulatory discharge criteria. The spillway and conveyance channel will be sized to accommodate an inflow design flood in accordance with the Canadian Dam Association (CDA) guidelines. The preliminary spillway invert design is set at elevation 108 m, approximately 2 m below the lowest open pit elevation to prevent overtopping.

Based on modelling, the open pit will flood to its ultimate water level in approximately 18 years post-closure if allowed to recharge naturally under climate normal conditions.

The potential for decreasing the time to fill the open pit and therefore accelerate the closure of the site was presented in the Preliminary Reclamation Plan (CRA 2011). Conceptually, excess runoff (i.e., spring freshet) available from the Moose River could be diverted towards the open pit. The evaluation determined an average annual excess of 8.2 million cubic metres (Mm^3) could be available from the Moose River to divert to the open pit for this purpose. If a portion of this additional runoff is diverted, the flooding time of the open pit could be accelerated. To advance this concept, it is suggested that the following steps be considered:

- Conduct a screening of potential water source locations based on environmental constraints such as hydrology, groundwater, water balance, water quality, fisheries impact, etc., as well as land access and tenure constraints.
- A short list of preferred options may be identified, and costs estimated.
- Based on the above work, a preferred final option would then be identified, and a detailed cost benefits analysis completed for further discussion with regulators and stakeholders.

3.2.2 Water Quality

Water quality pumped from the open pit has been monitored since 2017. The water in this pit is mildly alkaline with pH ranging 7.5 to 8.1, and slightly to moderately hard (hardness ranging from 140 to 420 mg/L). Elevated concentrations of dissolved arsenic have been observed, which is consistent with baseline groundwater quality at the site. Some total metals are noted to exceed the CWQG-FAL, which appears to be tied to suspended solids; however, the associated dissolved concentrations are below the CWQG-FAL.

The pit water quality is predicted to be within regulatory discharge criteria prior to discharge, including total metals, based on the settlement of sediment within the pit as it slowly fills with water. Based on background water quality in Moose River, and the mixing of groundwater inflow and precipitation, the pit lake is expected to meet regulatory discharge criteria without treatment.

The groundwater and surface water models that predict water quantity and quality during closure will be updated incorporating an assimilative capacity study in Moose River and included in the Final Plan to be completed 6 months prior to closure. The site water quality modeling is being undertaken based on pit water discharge to Moose River along an engineered outlet channel and a mixing zone located 100 m downstream.

3.3 WASTE ROCK STORAGE AREA (WRSA)

The slopes of the WRSA will be recontoured to a closure slope of 2.7H:1V during operations and prior to closure. Benches will be left between each lift to allow for a final overall slope from toe to crest of 3.0H:1V. The bench widths generally vary from 3.0 to 4.0 m, however, there is a 20 m bench on the southeast section at elevation 150 m. Cross sections showing planned for construction and closure of the WRSA are presented on Drawing 5.

The closure plan and cost estimate assume closure activities to include:

- Re-sloping of the final lift of the waste rock pile
- Contouring the ultimate top surface of the pile
- Providing a vegetated cover for closure
- Grading and contouring the collection ditches and ponds

Long-term geotechnical stability of the slopes within the waste rock area were assessed by Golder Associated Ltd. (Golder 2020) which confirmed the long-term stability for the above noted geometry.

The re-sloping of the final lift, placement of a soil cover and revegetation treatments will be completed following end of mining (see Sections 3.6 and 4.0). Surface water run-off from the waste rock area will continue to be directed towards the tailings pond or polishing pond until water quality meets applicable criteria. This is further outlined in Section 6 of this plan. At that point, the water can be released to the environment or potentially directed to the open pit to accelerate flooding. Collection ditches and ponds will be removed, and areas graded and vegetated (see Sections 3.6 and 4.0) once they are no longer required based on the above.

Testing completed to date on the waste rock suggests that between 13% and 21% of this material is PAG. However, the potential for onset of ARD in the WRSA is considered low (Lorax 2020A). AMNS has developed and implemented a ML/ARD Management plan (Lorax 2020B) to mitigate risk of ARD development.

3.4 TAILINGS MANAGEMENT FACILITY

The reclamation concept proposed for the Touquoy TMF generally consists of re-sloping and vegetating dam slopes and providing a layered (dry) cover over the tailings pond which allows surface drainage to the polishing pond. The polishing pond and engineered wetland will remain but will be modified for closure as outlined below.

3.4.1 Tailings Pond

3.4.1.1 Dam Slopes

The downstream slopes of the dam will be re-sloped to 3.0H:1.0V using rockfill, either hauled from the WRSA or pushed from the top of the dam crest. Final tailings beach configuration and cover details will impact the final slope details, including the potential for pushing material from the crest. For the purpose of this plan, it has been assumed that new rockfill will be placed on the downstream slope meet the above geometry. The closure slopes will extend the dam toe past the perimeter ditching onto the perimeter road in many places as shown on Drawing 6. Therefore, prior to placing the bulk of the rockfill to re-slope, the perimeter seepage collection ditches will be filled with coarse rock followed by geotextile to create a French drain. This will allow perimeter drainage to continue to be collected in the seepage collection ponds and pumped back to the tailings pond if required. The seepage ponds will be left exposed until they are no longer required. The perimeter road will be reduced to one lane to allow re-sloping and may

require some new sections to be extended. Following re-sloping with rockfill, the slopes will be covered in 0.45 m of salvaged soil material and revegetation treatments applied.

Stantec completed slope stability analyses of the tailings dam for reclamation conditions as per the Canadian Dam Association (CDA) - Technical Bulletin: Application of Dam Safety Guidelines to Mining Dams (2014) for Closure Conditions. The analysis confirmed that the proposed 3H:1V slopes meet CDA Guidelines.

It is noted, however, that the grading of the slopes to a 3H:1V is not required from a long-term slope stability perspective based on analysis completed by Stantec (Stantec 2019b). The requirement for the 3:1 slope originates from commitments made prior to 2017 by AMNS. In consideration of the above, AMNS proposes that steeper slopes of the tailings dam continue to be discussed following the results of ongoing erosion and vegetation trials at the site.

3.4.1.2 Tailings Pond Cover

Two reclamation concepts for the TMF were presented in the original Preliminary Reclamation Plan (CRA 2011), consisting of:

- Dry cover option – dewatering the tailings pond area, filling it with waste rock, placing overburden material and topsoil cap, and establishing a sustainable vegetated cover complimentary to the final cover design and land use; and
- Wet cover option – flooding the TMF to form a permanent wetland habitat.

In the 2019 Plan update (Revision 3), through consultation with NSE and NSDEM, AMNS committed to constructing a dry cover over the tailings pond and for this revision of the Plan, all references to a wet cover option have been deleted.

To advance the dry cover design, additional information and studies were outlined in the 2019 plan and are reiterated below:

- Determination of physical properties of the tailings (strength, consolidation, drainage etc.). Limited preliminary testing completed. Additional laboratory and in-situ testing of produced tailings required;
- Determination of chemical properties of the tailings.
- Chemical analysis of long-term dry cover.

The following updates are provided related to the additional studies:

- Geotechnical Characterization – Geotechnical and laboratory testing has been proposed to assess the in-situ physical properties of the tailings including:
  - In-situ investigation of tailings (Cone Penetration Testing (CPT) and Boreholes)
  - Laboratory testing of tailings to determine physical parameters for use in cover design

- Hydrogeochemical Characterization - Lab testing program on run of mine tailings has been initiated. Testing includes the following:
  - Chemical and mineralogical composition
  - Hydrogeological properties
  - Column testing of layered cover. Column testing can take 12 to 18 months to completed, however preliminary results are anticipated in 6 months
- Chemical Analysis
  - AMNS is completing ongoing chemical analysis of the tailings and supernatant of the pond
  - Anticipated geochemical modeling for long term water quality will be initiated following receipt of preliminary results from the column testing

These programs will allow the cover components and thicknesses to be better defined prior to final closure design. Ongoing monitoring of the acid generating potential of the tailings will continue to further identify and track the PAG tailings which may inform the design of the cover (percentage of PAG tailings and potential use of NAG tailings as cover material). As noted, the final design will be completed following additional studies and will be submitted with the final closure plan.

As noted above, evaluation of the potential for acid generation from the tailings is ongoing through testing of run of mine tailings. At this point, the cover concept for the tailings considers the potential for acid generation and metals leaching, however this will be confirmed through ongoing testing. The preliminary concept includes three layers: (1) a Capillary Break Layer (CBL) placed over the potentially reactive tailings; (2) a Moisture Retaining Layer (MRL) acting as an oxygen barrier; and a Drainage and Protection Layer (DPL) to control water flow and other natural side conditions at the surface. The main goal of this cover with capillary barrier effects (CCBE) is to limit the oxygen flux reaching the reactive tailings to a value of about 0.1 g/m^2/day under steady state conditions. Based on ongoing testing, it should be noted that the oxygen flux value may be subject to further refinement.

For this closure plan update and cost estimate the following system is proposed (top down):

- 0.5 m NAG rockfill protective layer (additional processing may be required to meet grain size requirements)
- 0.75 m water retention layer (NAG tailings or clay borrow, with clay borrow assumed for costing)
- 0.5 m capillary break layer (sand and gravel; processed NAG waste rock)

The materials and thicknesses are preliminary at this point based on the limited information known at this time regarding the in-situ tailings and will be updated following the completion of the testing outlined herein. Materials will be placed and spread using earthmoving equipment. Additional rockfill or coarse tailings may be required for stabilization of the cover, particularly in the centre of the pond where fine grained tailings are deposited. This will be further assessed following the field and laboratory testing proposed for geotechnical characterization.

Prior to mine closure, the tailings beach configuration will be reviewed, and the tailings discharge plan modified as required to fill in the low points in the tailings pond with tailings to create a tailings surface

that is nearly flat but drains toward the south. The cover will be designed to drain water to the south of the tailings area and excess water will be conveyed to the polishing pond via a modified spillway.

Engineering design and required construction details of the cover concept have not been completed at this time, however, Drawings 6 shows a concept for the proposed dry cover layout which is preliminary and subject to change.

The cover performance would be monitored following construction and once performance is well documented and confirmed to meet project criteria the area will be vegetated with shallow rooted vegetation.

In reference to the schedule for a dry cover scenario for the TMF, the reclamation activities could be of longer duration based on workability issues related to the tailings. To place a dry cover on the TMF, mechanical equipment will be required to travel on the tailings surface and therefore, the strength of the tailings must be sufficient to support the equipment loading. Based on information from other projects, a three-year period appears reasonable at this time, however, further evaluation of the tailings strength vs time characteristic will need to be evaluated for confirmation. This information is proposed to be collected as part of the geotechnical characterization program.

3.4.1.3 Water Quality

Water quality in the TMF is being monitored and studied during operations and will be monitored through closure as per the IA. At this time, AMNS has installed a series of perimeter monitoring wells and has committed to monitor water quality at these locations on a quarterly basis during operations. If groundwater quality concerns are identified, based on the results of monitoring, additional work will be required to identify the extent of a potential groundwater plume, and the potential for ecological and human health risk, as outlined in the Groundwater Contingency Plan (2019) prepared for the site. Based on detailed monitoring results, mitigation plans will be developed as warranted based on applicable provincial and federal regulations and guidelines. The Plan will be updated as required based on updated water quality information. The hydrogeochemical results obtained from the ongoing groundwater monitoring network around the TMF are reported to NSE in the annual reporting requirements under the IA. The results to date do not indicate any obvious exceedances of predicted conditions in groundwater, nor in surface water in Watercourse No. 4 or Scraggy Lake.

Long term water quality modeling for closure has not yet been updated as the design of the closure cover is still in development. However, it is anticipated that by covering the tailings the previously developed water quality predictions would remain similar or improve over time.

Seepage collection ponds are currently pumped to the tailings pond for treatment. During the first years of closure, the collection ponds may be pumped to the ETP for treatment, as required. Once monitoring confirms the seepage collection water no longer requires treatment, the ponds can be modified to allow drainage to the downstream environment.

3.4.2 Effluent Treatment Plant and Geobags

The treatment plant and geobags will continue to operate as required during closure until water treatment is no longer required. At this point the ETP will be decommissioned and removed from site.

Encapsulating the geobags in clay above the water table was identified as a viable closure option (Lorax 2019). It is proposed to cover the geobags in 1.5 m of clay, regrade the area and vegetate as per Section 3.6. Review of the groundwater table in the area at TMW-16A/B shows maximum groundwater level readings at that location of 116.0 m. The polishing pond levels are generally below 111.0 m. The drainage layer below the geobags is at elevation 116 to 117 m and is proposed to be left in place below the geobag as a capillary break to further enhance drainage below the geobags. The proposed concept is shown on Drawing 10.

3.4.3 Polishing Pond and Engineered Wetland

AMNS proposes to develop the polishing pond and engineered wetland as self-sustaining wetlands after closure. Developing the polishing pond as a wetland will improve the quality of the water as it flows through the polishing pond area and the inclusion of this wetland area will help to improve the overall ecological value of the area. The drainage configuration of the cover, including polishing pond and wetland final configuration still needs to be modelled and finalized in subsequent Plans, i.e., adequate wet conditions need to be maintained to allow for the sustainability of the engineered wetland area. The following reclamation activities are proposed for the polishing pond and engineered wetland area:

- Partially breach the polishing pond to reduce the water levels in the pond to support the development of wetland vegetation
- Construct a new spillway and conveyance structure from the polishing pond to the engineered wetland that will allow drainage of water from the polishing pond to the engineered wetland to maintain water levels in the engineered wetland
- Regrade the side slopes of the polishing pond to and vegetate

Additional studies and design related to water balance and the final configuration of the polishing pond dam need to be completed for the final Plan.

The current configuration of the polishing pond outlet structure and final discharge point will be maintained until it is proven through monitoring that water exiting the system will meet the regulatory requirements and will only be removed following regulatory approval.

The engineered wetland is well established and is proposed to remain in its current condition.

3.5 GENERAL SITE INFRASTRUCTURE

The following general site infrastructure will be reclaimed as outlined below.

3.5.1 Electrical Services Infrastructure

The electrical services infrastructure at the site, which will be disconnected and/or removed, includes:

- Powerline to the plant site;
- Powerline to Scraggy Lake/TMF;
- Mill Site and Admin Area site distribution powerlines;
- Main substation.

The electrical infrastructure, except for the Mill Site and Admin Area distribution powerlines, will remain on site for the duration of the post-closure ETP operations. It is currently anticipated that the ETP will be in operation for approximately 10 years post-closure to ensure water discharging to the environment from the TMF meets regulatory requirements. Once the ETP is decommissioned, the power line will be removed, after which the power line will be terminated at the tap-off point located at the intersection of Mooseland Road and the Mine haul road.

3.5.2 Pipelines

The pipelines required for the mine operation that will require removal at closure include:

- Open Pit Dewatering pipeline;
- Tailings pipeline;
- Freshwater pipeline;
- Waste rock pond dewatering pipelines;
- Reclaim Water pipeline;
- Emergency containment pond pipelines;
- Sediment pond pipelines; and
- ETP Discharge line.

All pipelines will be dismantled and removed from site within the first-year after closure with the exception of the ETP Discharge pipeline, freshwater pipeline and waste rock pond dewatering pipelines which will remain in place until treatment operations in the TMF and WRSA are deemed unnecessary based on post-closure monitoring and consultation with NSDEM and NSE.

3.5.3 Roads

Roads that require reclamation at closure will include:

- Waste Rock Haul road;
- ROM Haul road;
- TMF Access Roads
- Waste Rock Stockpile road; and
- Mill Site and Admin Area roads.

To facilitate vegetation, all road surfaces will be scarified, capped with a layer of salvaged soil, and seeded. The reclamation of all on-site roads will vary depending on the requirements for access during closure activities. It is anticipated that Mill Site and Admin Area roads will be reclaimed first upon decommissioning and removal of buildings in the area. TMF access roads may be narrowed for closure but are to remain to allow access for inspections, ETP Operations and post-closure monitoring.

Culverts along Watercourse No.4 will be removed where access along the roadway is no longer required for site operations.

Access to the TMF, Open Pit and WRSA will be maintained via existing access points.

3.5.4 Explosives

All magazine and explosive storage infrastructure will be removed from site following cessation of open pit operations.

3.5.5 Post-Closure Public Access Facilities

Upon final closure of the site, the following public access facilities developed by AMNS as part of the Touquoy Gold Mine will remain:

- Museum (pre-existing - Moose River Gold Mines Museum Society);
- Park (pre-existing – transferred to Crown);
- Pit Viewpoint;
- Western Diversion Road – transferred to Crown.

The pre-existing Museum and Park will continue, as intended, to preserve the history of the Moose River Gold Mines area for public education and use. These are now part of NSDEM park land as per recent land transfer.

The viewpoint will overlook the flooded open pit and will display the history of the area and community and the role that mining has played in its development. This will be further discussed with NSDEM and the Moose River Gold Mines Museum Society.

The Western Diversion Road will provide public access to areas west of Moose River. This has been transferred to the Crown and is a public roadway.

3.6 VEGETATION

Revegetation of areas disturbed by mine development will be integral to preventing erosion and encouraging the growth of native flora for a stable post-closure habitat. Disturbed areas will be covered with a layer of salvaged soil material and revegetation prescriptions applied. Revegetation prescriptions will be determined based on results of desktop studies, literature reviews, and vegetation monitoring trial plots which have been designed for the WRSA and scheduled to commence in 2021. The revegetation treatments will be designed to meet end land use targets for the site, which have initially identified

outdoor recreation and commercial forestry as potential options. It is noted, however, that many of the closed mine site features (TMF, WRSA, Plant Site) may not be supportive of tree growth and their deep rooting systems, and/or the traffic and disturbance associated with forestry operations. It is expected, therefore, that areas on site that will suitably support commercial forestry activities will be limited. The revegetation designs for major landforms (i.e. WRSA, TMF) will target open grassland/meadows to limit the intrusion of deep rooting into closure infrastructure (e.g., covers). It is expected that these areas will support limited non-intrusive outdoor recreation activities and provide increased habitat diversity. Preliminary work to assess the post-mining ecosystems at the different disturbed areas of the site will be completed to support eventual field trials and mapping specific targets for each mine area. The final Plan, submitted at least 6 months prior to closure for approval, will define the specific soil material capping requirements, any required soil amendments, and plant species to be used for revegetation.

A variety of resources will be used for the revegetation planning including the Nova Scotia Integrated Roadside Vegetation Management Manual, Nova Scotia Ecological Land Classification, Nova Scotia Forest Ecosystem Classification, and site surveys of historical disturbances at the site. These resources will be referenced to provide guidance on candidate native tree, shrub and forb species recommended for site reclamation. Candidate species for revegetation of disturbance sites will be selected based on a variety of criteria including:

- Native to Nova Scotia
- Capable of withstanding conditions associated with disturbed sites (e.g. low soil nutrient levels, low soil moisture levels, coarse soils, exposed conditions).
- Will establish a vegetation cover similar to adjacent undisturbed areas and develop into a pioneer or early successional vegetation cover.
- Once established, will create conditions (e.g. increased soil nitrogen levels) that will put the reclaimed sites on a trajectory to developing mid to late successional forest covers that meet the end land use objectives of recreation and commercial forestry.
- Will control soil erosion and encroachment of invasive plant species.
- Will not negatively impact the performance of any engineered structures i.e., dams, tailings cover etc.

Initial site surveys of historical disturbances at the site have been used to develop initial lists of successful pioneer species for progressive reclamation of sites. These species are proposed for the future vegetation monitoring trials at the WRSA. Table 3-1 lists the proposed species.

Table 3-1 Candidate Native Tree and Shrub Species- Touquoy Gold Project Vegetation Monitoring Trials for Forest/Shrubland Areas

Common Name	Scientific Name
downy/green alder	*Alnus viridis*
paper birch	*Betula papyrifera*
sweetfern	*Comptonia perigrina*
bayberry	*Morella pensylvanica*
white spruce	*Picea glauca*

Table 3-1 Candidate Native Tree and Shrub Species- Touquoy Gold Project Vegetation Monitoring Trials for Forest/Shrubland Areas

Common Name	Scientific Name
white pine	*Pinus strobus*
common wild rose	*Rosa virginiana*
Note: Plant stock will consist of seedlings with fully developed root plugs and above ground stems, propagated at a nursery.	

A grass and legume seed mix comparable to those approved for use in Nova Scotia for exposed highway slopes will be applied for reclamation where slopes must be stabilized quickly, and erosion or sedimentation inhibited (e.g. WRSA side slopes at 2.6H:1V). Table 3-2 lists the candidate grass and legume species for the proposed erosion control seed mix. Once revegetation treatments have been approved and project work commences, the species mix, and proportions will be determined and will be dependent on factors such as seed stock availability and seed prices. As described in Section 4.1.3, numerical modeling of runoff and potential erosion at the WRSA will be completed to identify areas of erosion concern. Based on these results, additional strategies for drainage design and/or use of commercial products may be considered for short term support of vegetation growth. At select areas, planting of native tree and shrub species is planned to encourage regrowth on these slopes.

Table 3-2 Candidate Grass and Legume Species- Erosion Control Seed Mix

Common Name	Scientific Name
tall fescue	*Festuca arundinaceae*
creeping red fescue	*Festuca rubra*
annual ryegrass	*Lolium multiflorum*
timothy	*Phleum pratense*
Kentucky bluegrass	*Poa pratensis*
alsike clover	*Trifolium hybridium*
Notes: Application Rate: 60 kg/ha Species and proportions (percent by seed weight and percent by seed count) in the mix will be dependent on availability and prices at the time of ordering. Seed mix will be ordered from a reputable supplier and will be Certified No. 1 Forage Mixture; certificates of seed analysis will be required from the supplier for each of the grass/legume species.	

3.7 CONSTRUCTED EARTH FILL SLOPES

Further to the discussion of specific earth fill slopes outlined above, AMNS confirms that for final closure all constructed or modified slopes, dams, and stockpiles will have a geotechnical assessment completed by a qualified geotechnical engineer stating the slopes will be stable over the long term as per the industry adopted guidelines such as CDA.

3.8 SURFACE WATER MANAGEMENT

The management of surface water runoff at the site, post-closure, will be based on the following objectives:

- Prevent contamination of surface and groundwater flows;
- Promote filling of the open pit;
- Prevent erosion and sedimentation; and
- Protect natural watercourses and wetlands.

AMNS commits to develop a surface water and sedimentation and erosion control plan for during and after reclamation activities. The plan will be submitted with the final Plan before closure.

In addition, detailed site drainage plans of final closure designs will be developed in subsequent plans.

3.8.1 Mill Site and Admin Area

The Stormwater Retention Pond will be backfilled and reclaimed upon closure. Site grading during reclamation will direct drainage such that it disperses from the area following the natural predevelopment flow pattern of the site. Ditches will be lined with suitable material to prevent erosion and sedimentation. All slopes will be regraded to 3H:1V or shallower in the Mill Site and Admin area to minimize erosion and encourage revegetation.

3.8.2 Open Pit

In the area surrounding the Open Pit, all surface runoff will be directed towards the pit to accelerate flooding. The proposed closure shoreline geometry will ensure all water draining through the till/bedrock interface is directed to the lake. The barrier berm may be breached in locations to allow the surface runoff from nearby site areas to similarly drain into the open pit.

3.8.3 Waste Rock Storage Area

Water quality of surface water runoff from the WRSA will be monitored post-closure. Runoff from the WRSA will continue to drain to the seepage collection ditches/ponds and be pumped to the TMF until water quality is considered suitable for discharge to the environment. Pumping the WRSA runoff to the Open Pit will also be considered to accelerate pit filling contingent on water quality meeting site requirements.

3.8.4 Tailings Management Facility

The current closure concept for water management of the TMF is to direct the surface runoff from the dry cover through grading and connected channels to a channel at the emergency spillway location which flows to the polishing pond area and then through the engineered wetland to the environment. Final design of the permanent channels and other drainage details will be updated in the final version of this plan, provided for approval prior to submission of the final Plan.

3.9 SITE SECURITY

During active closure phases of the site, the site will be staffed, with routine site security inspections being completed on a regular basis. The following additional security measures will be taken:

- Signage outlining risks to public from open pit, tailings pond, dams etc.
- Gates on main access to TMF dam to prevent public access to the TMF dam.
- Gates on access to Open Pit during filling

4.0 PROGRESSIVE RECLAMATION AND CLOSURE STUDIES

4.1 WASTE ROCK STORAGE AREA

4.1.1 Sloping

During construction of the WRSA, the side slopes and benches will be progressively re-sloped to the closure configuration resulting in only the final lift to be re-sloped at closure.

4.1.2 Vegetation

Vegetation trials on the WRSA side slopes are ongoing to confirm the soil capping thicknesses, vegetation species and erosion resistance of the assumed slope and cover materials. Following the vegetation monitoring trials, the lower sections of the WRSA will be vegetated as they are re-sloped during mine development. The exception to this would be the low to medium grade ore areas of the WRSA which will be left accessible.

4.1.3 Surface Erosion and Revegetation Studies

As part of ongoing life-of-mine planning at the Touquoy Gold Project, the design for the WRSA was updated in 2020 from initial concepts presented in the 2011 Preliminary Reclamation Plan. Feedback from DEM on the updated design has indicated a preference for catch berms in the WRSA final slopes, identifying concerns of erosion and feasibility of revegetation. Consequently, AMNS has commenced work on the design of revegetation field trials and a desktop erosion study to evaluate the updated WRSA final shape.

The primary objectives of the erosion and revegetation studies/trials include the following:

- Complete revegetation field trials on 2.7H:1V slopes at the WRSA to assess site preparation techniques and various revegetation treatments and their effects on vegetation establishment and growth, and erosion prevention. Overall viability and timelines for a vegetative cover will be assessed.
- Assess the potential erosion rates on the 2.7H:1V lift slopes considering the WRSA maximum design height and catchment volume.

The revegetation study will include completing an updated inventory and assessment of salvaged material stockpiles (e.g. topsoil, overburden, grubbed material, etc.). Vegetation planning/design will consider site preparation earthworks, revegetation treatments, and sourcing options relevant for this project scale (e.g. seedling nurseries).

Construction of field trial plots, including site preparation treatments completed on waste rock slopes, are anticipated to be conducted in spring/early summer 2021. AMNS has identified a preferred area (roughly 2000 m^2) on the southern limits of the WRSA which will provide the location for revegetation trials. Based on preliminary discussions, Stantec estimates approximately 10-12 plots may be constructed, each with 12 m by 12 m dimensions to support the trials. Plot construction is expected to begin in winter/spring 2021 for treatments in spring/summer 2021.

Stantec proposes to use erosion modelling software to develop a 3-dimensional analysis of the WRSA. Model development will focus on the updated WRSA final shape, local climate series (not including climate change scenario), soil parameters based on stockpiled material testing results, and soil cap/vegetation assumptions in consideration to the revegetation field trial design.

Model simulation results will be used to assess complementary erosion and sediment control (ESC) measures that could be used to support soil stability and reduce erosion potential on the WRSA.

4.2 OPEN PIT

Areas of the pit currently not developed to the full extent of the design may be progressively sloped during pit development to the final closure slopes including the shallow shorelines. Where appropriate, soil capping and revegetation treatments can be applied.

4.3 TAILINGS MANAGEMENT FACILITY

4.3.1 Tailings Pond

Tailings pond dam re-sloping may begin during the final years of mining to avoid rehandling of waste rock. The collection ponds will remain accessible for water sampling and pumping.

Revegetation trials will begin in the final year of operation and native vegetation species selection will be based on the results of the WRSA revegetation trials, along with information on suitable species derived from the Nova Scotia Ecological Land Classification, Nova Scotia Forest Ecosystem Classification, and site surveys of similar disturbances at the site.

In the final year of tailings deposition, trial pads of the cover will be completed to assess constructability. Field trials may require multiple years of monitoring to determine the viability of the design.

4.3.2 Polishing Pond

Polishing pond dam progressive re-sloping will begin prior to closure to avoid rehandling of waste rock. The outlet structure and wetland forebay will remain accessible for water sampling and monitoring.

4.4 MATERIAL MANAGEMENT

Responsible material management is critical to the successful progressive reclamation strategies outlined herein. Material management refers to the removal, handling, and storage of on-site materials such as organics, topsoil, and overburden. When managed with consideration of closure requirements, these materials can be used for reclamation related earthworks.

The locations for stockpiles of organics, topsoil, and overburden are noted in Drawing 2, Appendix A; where possible, their footprints will be minimized to decrease effects on wetlands and general ground disturbance. Surveys of these piles have been completed as required in the IA to define these current storage locations. The locations are re-surveyed as required to maintain ongoing records for use of this material during reclamation.

4.4.1 Organics

Marketable timber cleared during the initial project development was shipped off site and remaining large brush, stumps, and wood debris were grubbed, stripped, and stockpiled in the areas noted on Drawing 2. Grubbing of the organic layer was completed at the footprint of the Mill site and access road, Open Pit, select areas of the WRSA, and beneath the Tailings and Polishing Pond dam foundations of the TMF. Grubbing of the interior of the TMF was not completed during the initial development work.

Topsoil thickness across the site is estimated to be approximately 0.3 m, with significant variability depending on topography. Topsoil stripped during mine development is mixed and stored in salvage stockpiles with the organic material and overburden materials (e.g. till, clay).

4.4.2 Overburden

Overburden has been excavated and stockpiled from mine development activities. These materials have been stored in several stockpile areas (Drawing 2, Appendix A), for use during reclamation activities.

4.4.3 Reclamation Cover Approach

For planning purposes, it is assumed that all areas disturbed by the mine development will be covered by a layer of salvaged material to support revegetation at closure. Practically, some areas may require minor surface preparation and little to no salvaged materials due to the potential to directly seed/plant on the disturbed surface (e.g., clay borrow area). Specific thicknesses of the soil layers are to be determined through vegetation trials. At present the reclamation cover thicknesses are assumed to be 0.45 m (mixed overburden and topsoil) at all site areas excluding the Mill Site, which will target a minimum layer of 0.65 m (mixed overburden and topsoil). These covers will include a 0.15 m layer of topsoil on surface assuming this material can be accessed from the mixed material stockpiles. If accessing topsoil materials from the mixed stockpiles is not feasible for placement as the surface layer, amendments may need to be applied to the soil cover surface to improve growing conditions (e.g. fertilizers, mulch granules, organic grubbings). Revegetation field trials will investigate site-specific options to effectively use the salvaged material stockpiles.

It is projected that most post-closure landforms will be slightly drier due to replacement of the soil material over a well-drained substrate (e.g. waste rock). The soil moisture regime will also depend on site conditions of the post-closure landforms such as elevation, aspect, and slope gradient. Soil nutrient conditions will initially be deficient due to disturbance of the nutrient-rich litter layers. This situation may initially be improved through fertilizer application and the use of nitrogen-fixing legumes in the seed mix and planting of nitrogen-fixing shrub species at the reclamation sites. It is anticipated that the pre-development soil nutrient regimes will eventually re-establish once a self-sustaining pioneer/early successional vegetation cover establishes and nutrient cycles initiate on the reclaimed landscape.

There are limited opportunities for direct placement of soil covers during the active mining phase in the future based on the currently approved mine plan.

4.4.4 Material Inventory

A current inventory of available materials for reclamation activities is summarized below. At this time, additional disturbance or salvage material recovery is limited to clay borrow and/or new permitted project expansions (e.g. potential WRSA footprint expansion). It is expected that limited quantities of reject material from active clay borrow sources will continue to be deposited on the Scraggy Lake Stockpile during operations.

Table 4-1 Salvaged Material Summary

Stockpile Name	Volume (m^3)	Primary Source Areas	Dominant Source Material
Mill Site Overburden Stockpile	30,000	Mill Site and Admin Area	Sandy clay loam till, good drainage, moderately stony
WRSA Organics Stockpile	35,000	WRSA footprint and surrounding roads	Sandy loam till, imperfect drainage, excessively stony
Admin Road Grubbing Berm	12,000	Admin road and ditching east of WRSA	High organic material content, topsoil/overburden stripping minimal in this area. Sandy clay loam till, good drainage, moderately stony
TMF East Side Grubbing Berm	10,000	TMF embankment foundation footprint and construction access routes (east side)	High organic material content. Sandy loam, imperfect drainage, excessively stony
TMF Overburden Stockpile	543,000	TMF embankment foundation footprint and construction access routes (west and south areas)	Sandy loam till, imperfect drainage, excessively stony
Scraggy Lake Overburden Stockpile	762,000	Open Pit area clearing, miscellaneous areas across site during operations	Several mixed source materials: Sandy loam till, imperfect to good drainage, very to excessively stony. Sandy clay loam till, good drainage, moderately stony
Total	1,392,000		

Table 4-1 Salvaged Material Summary

Stockpile Name	Volume (m^3)	Primary Source Areas	Dominant Source Material
Note: Source materials estimated from Soils of Halifax County, Central Sheet, Soil Survey Report 13 (Agriculture Canada, 1980); and are generally consistent with site observations by AMNS staff during development.			

Based on the predicted disturbance areas, the following volumes of salvaged materials will be required at final closure:

- Mill Site and Admin Area: 102,000 m^3 total soil cover (assumes 0.65 m thickness);
- All other disturbance areas: 994,000 m^3 total soil cover (assumes 0.45 m thickness);
- Total Soil Cover: 1,096,000 m^3

The preliminary salvaged material balance suggests sufficient stockpiled materials will be available to meet the benchmark cover thicknesses at the Mill Site (0.65 m) and other site areas (0.45 m). Revegetation trials scheduled to commence in 2021 will focus on methods to effectively use the mixed organic materials, topsoil and overburden in existing stockpiles and options for enhancements to the surface materials (e.g. nutrient amendments such as applications of granular fertilizer and compost mulch granules). In preparation for trials, limited sampling of salvaged materials will be completed at all stockpiles to provide a preliminary understanding of critical soil properties (e.g. nutrient concentrations, texture, pH, EC, etc.). A more detailed baseline sampling program can be included in the revegetation trial study once a soil cover has been placed.

There is uncertainty as to the quality of some of the materials in the Scraggy Lake Stockpile, and in response, Stantec (2019) completed an intrusive borehole assessment of soil, groundwater, and seepage characteristics of the stockpile. Results of discrete soil samples suggested that concentrations of arsenic in soil may be at or above site-specific background levels in limited quantities. However, the average concentration of all composite samples analyzed was less than 5% above the background concentration threshold of 300 mg/kg for arsenic, and the material was deemed acceptable for use in reclamation (Stantec, 2019).

Additional studies are planned to evaluate the soil chemistry of the Stockpile materials, and potential risks associated with the measured soil concentrations of arsenic. The proposed approach to assessing risk will include the development of Site Specific Threshold Levels (SSTL) for arsenic, using the standardized equations developed by the CCME to derive soil quality guidelines, and site specific data related to the bioaccessibility of arsenic in soils, as well as background levels. This proposed approach will provide SSTLs protective of various ecological receptors which could be present on site into the future (post reclamation). In addition, a similar approach will be undertaken to derive SSTLs protective of future land use by humans, including potential recreational land uses involving hiking or harvesting. Using the standardized equations developed by CCME, in conjunction with additional risk-based equations to account for potential exposures related to activities such as harvesting, a site-specific SSTL for arsenic will be derived which can be used to confirm soils applied in reclamation activities will be protective of these land use activities. Salvage soil sampling is being proposed for 2020/2021, which will include ICP metals analysis to characterize metals levels. Arsenic bioaccessibility testing of soils will be undertaken

using methods accepted by Health Canada, to better understand the availability of arsenic in salvage soils. All methodology, analytical data and risk assessment outcomes will be provided to NSE in a detailed report for review.

4.5 POTENTIALLY CONTAMINATED MATERIALS

Any soil, waste rock, or concrete that has been impacted with petroleum hydrocarbons will be excavated and disposed of in an approved facility off site. Those materials that may become impacted by process reagents will be investigated as they are identified to determine an approved disposal location (e.g., TMF, off-site facility).

During operations, spills are reported to appropriate agencies in accordance with the NS Emergency Spill Regulations and the necessary follow-up completed where required in accordance with the NS Contaminated Sites Regulations under the direction of qualified site professionals. At the end of operations, a final site wide survey will be executed to identify potentially impacted areas and complete confirmatory sampling as required. If confirmatory samples suggest impacts exist, a more detailed investigation consistent with Environmental Site Assessment (ESA) methods will be completed at the area of concern in accordance with applicable NS regulations. As impacted materials will be identified and managed throughout operations, it is expected that limited areas of concern will remain at the end of mining.

4.6 HISTORIC TAILINGS MANAGEMENT

Historic tailings and impacted soils have been identified through the completion of various studies and field investigation/remediation activities from 2007 to present at the Touquoy Site. In 2018, Stantec prepared a Historic Tailings Management Plan (HTMP) (Stantec, 2018) that included a remedial options analysis that provided recommended methods for managing historic tailings at the Touquoy Site through the life of operations and closure. Since the completion of the HTMP, AMNS has continued to delineate and remediate historic tailings impacted areas at the Site where disturbance is required (AECOM 2019), primarily in the vicinity of the Open Pit.

Excavated historic tailings to date have been disposed of in the low-permeability cells constructed in the northwest corner of the TMF. This facility has been capped and is no longer available for material as the area covered in ROM tailings.

At the present time, a schedule for Open Pit spillway construction within the areas of identified historic tailings has not been proposed. Additional historic tailings or arsenic impacted soil that require removal as a result of future site development or reclamation (i.e. spillway construction) will be managed as outlined in the HTMP. AMNS expects that this plan will be updated to consider disposal options based on feasibility at the time (e.g., within the Open Pit, WRSA interior, off-site or re-processing if practical).

5.0 POST-CLOSURE MONITORING AND INSPECTION

Post-closure monitoring will initially be an extension of the current mine operation monitoring programs. These programs include monitoring physical and chemical parameters for air, surface water, groundwater, vegetation, and soils, as well as environmental effects monitoring, and are outlined in the Project IA.

As part of developing a Final Plan leading up to closure, an adaptive post-closure monitoring plan will be prepared. This monitoring program would be informed by the monitoring results compiled over operations to focus on areas of concern identified during mining, and/or aspects of closure with high uncertainty/risk.

Post-closure monitoring will include inspections of reclaimed structures such as the Mill Site, Open Pit, WRSA, and TMF for erosion or settlement and to assess whether surface water runoff has returned to near pre-development flow patterns. Adaptive management thresholds and response plans will be developed for the monitoring program to ensure that any deficiencies are addressed in a timely fashion, and reclamation measures enhanced as required. This will also prescribe a structure for monitoring efforts to increase/reduce activities based on observed trends and triggers.

5.1 PHYSICAL STABILITY MONITORING

Following final reclamation of slopes, ditches and dams, physical stability monitoring will begin as an annual program. Following a three-year period of monitoring the entire site, the requirement will be reviewed. If physical stability of the Mill Site and Admin Area, WRSA and Open Pit are stable with no evidence of instability, then monitoring frequency can be reduced or eliminated. Physical monitoring of the TMF should continue (e.g. Dam Safety Inspections) at a frequency as determined by the performance of the structures and any future changes to the dam classification.

5.2 SURFACE WATER AND GROUNDWATER

The surface water and groundwater monitoring programs are planned to continue based on a similar scope as during operations, with reduced frequency from operational monitoring for the duration of active decommissioning and earthworks closure. Once these closure activities are completed, it is expected that surface water and groundwater conditions will stabilize, and monitoring can be reduced. This is expected to occur first for the Mill Site and Admin Area, followed by the WRSA and TMF and eventually the Open Pit due to the timelines associated with passive pit flooding (approx. 18 years). Monitoring of the pit lake during flooding is expected to be much reduced from the program during mining operations and will include an in-pit location to assess water chemistry and flooding rates. Specific compliance points will be proposed in a final Plan and based on industry standards (e.g. mixing zone length at Moose River).

5.3 ATMOSPHERIC

Ambient air monitoring is planned to continue for two years, or the duration of closure earthworks and until tailings have been covered at the TMF.

5.4 VEGETATION

Following final grading and placement of the soil material cover on the mine disturbance areas, revegetation prescriptions will be applied. Vegetation monitoring will begin as an annual program, then reduce in frequency as targets for coverage and quality are reached. A minimum of three monitoring/sampling events over the post-closure monitoring program period is assumed. Vegetation monitoring may include the following:

- Vegetation survival and establishment
- Percent vegetation cover and species composition
- Growth rates
- Biomass productivity
- Plant health/condition
- Metal levels in vegetation foliage
- Soil capping material nutrient and metals levels

5.5 ENVIRONMENTAL EFFECTS MONITORING (EEM)

Mandated by the Metal and Diamond Mining Effluent Regulations, Schedule 5, the EEM Program focuses on determining if the discharge of effluent to the receiving environment results in environmental effects to fish and fish habitat in the receiving waters. The Touquoy Mine became subject to MDMER including EEM in July 2018 and EEM requirements will continue until the mine receives recognized closed mine status under MDMER (Section 32). Final EEM studies will be undertaken for effluent from all final discharge points during a three-year period after the proponent submits a notice of intent to close to the Minister of ECCC. This will include the Open Pit discharge via the constructed spillway to Moose River if this is active before the mine achieves recognized closed mine status.

At present, the Open Pit is not planned to receive PAG mine waste. Current water quality predictions and operational monitoring results suggest that when flooded, the Open Pit discharge will be suitable for release to Moose River. As reclamation planning advances an appropriate monitoring program for Open Pit discharge and receiving waters will be developed in consultation with provincial regulators and informed by ongoing monitoring data.

6.0 SCHEDULE

An overview of the reclamation and post-closure monitoring schedule is presented in Table 6-1.

Schedule
November 30, 2020

Table 6-1 Reclamation Schedule

Mine Area/Component	Progressive Reclamation	Year Following the End of Mining																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Plant/Admin																						
Admin Building		■																				
Mining Office/Changeroom/Warehouse		■																				
Truck Shop, Lab, Security Gatehouse		■																				
Reagents Building		■																				
Mill Building, Goldroom		■																				
Plant Office and Changerooms, Workshop		■																				
7 trailers (Admin Area Offices)		■																				
Crusher		■																				
Conveyor demo and disposal		■																				
Core Shed		■																				
Trailers by Mooseland Rd		■																				
Septic Tank removal			■																			
Propane Tanks			■																			
Fuel Tanks			■																			
Storm Water pond			■																			
Soil Cover, Seeding, Planting		■	■	■																		
Open Pit																						
Signage		■																				
Construct Safety Berms		■																				
Resloping for Pit Rock Slopes	■	■																				
Resloping for Pit Shoreline/Till Slopes		■																				
Scarifying Surfaces/Roads			■																			
Shape Spillway	■	■																				
Erosion Protection for Spillway		■																				
Clay Borrow			■	■																		
Soil cover, Seeding, Planting			■	■	■																	
Pit Flooding		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		

Schedule
November 30, 2020

Table 6-1 Reclamation Schedule

Mine Area/Component	Progressive Reclamation	Year Following the End of Mining																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Waste Rock Storage Area																						
Waste Rock Lift Sloping to Final Shape	■																					
Reslope Last Lift of Waste rock pile		■																				
Scarifying Surfaces/Roads					■																	
Soil Cover, Seeding, Planting	■	■	■																			
Ditching/Water Management				■																		
Culvert Removal					■																	
Tailings Management Facility																						
TMF Slopes (3:1) with French Drain	■	■																				
TMF Cover		■	■	■	■																	
Polishing Pond Breach						■																
Polishing Pond Resloping						■																
Wetland Slopes		■																				
Polishing Pond Spillway						■																
Post Cover Water Management				■																		
ETP Operation, Removal	■	■	■	■	■	■	■	■	■	■	■											
Geobags			■																			
Soil Cover, Seeding, Planting		■	■	■	■	■																
Ancillary Areas																						
Removal and disposal of culverts			■	■																		
Removal of powerlines (excluding ETP requirements)			■	■																		
Removal of explosive storage etc.		■																				
Main Roadways			■	■																		
Removal and disposal of Pipelines		■	■	■	■																	
Salvaged Stockpile Areas		■	■	■	■																	
Other Activities																						
Permitting		■																				
Confirmatory Soil Sampling, ESA	■				■																	
Physical Monitoring and Inspections	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Surface Water Quality and Quantity	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Vegetation and Soil Monitoring	■	■	■	■	■		■					■										
Ambient Air Monitoring	■	■	■	■																		
EEM Program				■	■	■																
Post Closure Maintenance / Repairs		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Dam Safety Inspections (DSI)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Dam Safety Reviews (DSR)	■	■					■					■					■				■	

Note: Costing has assumed DSI and DSR work extends for 100 years post closure. This is to be confirmed based on the results of post-closure monitoring.

7.0 PUBLIC ENGAGEMENT AND COMMUNICATION

AMNS is committed to a public, stakeholder, and Indigenous engagement program based on open, forthright, and responsive communication with the public, regulatory agencies, other stakeholders, and the Mi'kmaq of Nova Scotia. The objectives of the engagement program are to:

- Provide information about reclamation planning to members of the general public, the Mi'kmaq of Nova Scotia, stakeholders and interested parties, and seek their input;
- Identify, document, and monitor issues and concerns arising from the engagement process;
- Identify the need for planning, design and management measures that will mitigate or resolve the issues raised through the engagement process.
- Understand stakeholder concerns and requests for end land-use activities

An engagement program on reclamation issues as been ongoing with the Touquoy Community Liaison Committee (CLC) since 2016, and is an important vehicle for the identification, scoping, and resolution or mitigation of potential issues or concerns, and for the exchange of information in respect of the Project.

8.0 RECLAMATION COST ESTIMATE

As part of the Preliminary Reclamation Plan, an estimate of $3.3M was prepared by CRA for the total cost of reclamation activities (CRA, 2011). This reclamation cost estimate did not include the value of the earthworks and associate costs to potentially reclaim the TMF with a dry cover solution. Subsequently, NSDNR undertook an independent cost estimate for reclamation to establish the required value of bond to be posted for security. The value for closure and reclamation activities determined by NSDNR totaled $10.4M (including the cost for potentially reclaiming the TMF with a dry cover). Respecting the total value of $10.4M, AMNS and NSDNR came to a mutually agreeable payment schedule for the bond based on the proposed stage of development and progressive reclamation activities.

As part of this revision to the Plan, an updated cost estimate is underway and will submitted in an update to this document.

9.0 CLOSURE

This report has been prepared on behalf of, and for the exclusive use of, AMNS and its representatives, as well as Nova Scotia Environment, Nova Scotia Department of Natural Resources, and other regulatory bodies for the Touquoy Gold Project. This Report only represents the information and literature available at the time of its preparation. The recommendations presented herein represent the best judgment of Stantec Consulting Ltd. based on current knowledge and standards. Stantec attests that to the best of our knowledge, the information presented in this report is accurate.

Sincerely,

Stantec Consulting Ltd.

Jeff Gilchrist, P.Eng.,
Associate, Geotechnical Engineering

Paul Deering, P.Eng., P.Geo.
Senior Principal, Geotechnical Engineering

Reid Smith, M.A.Sc., P.Geo.
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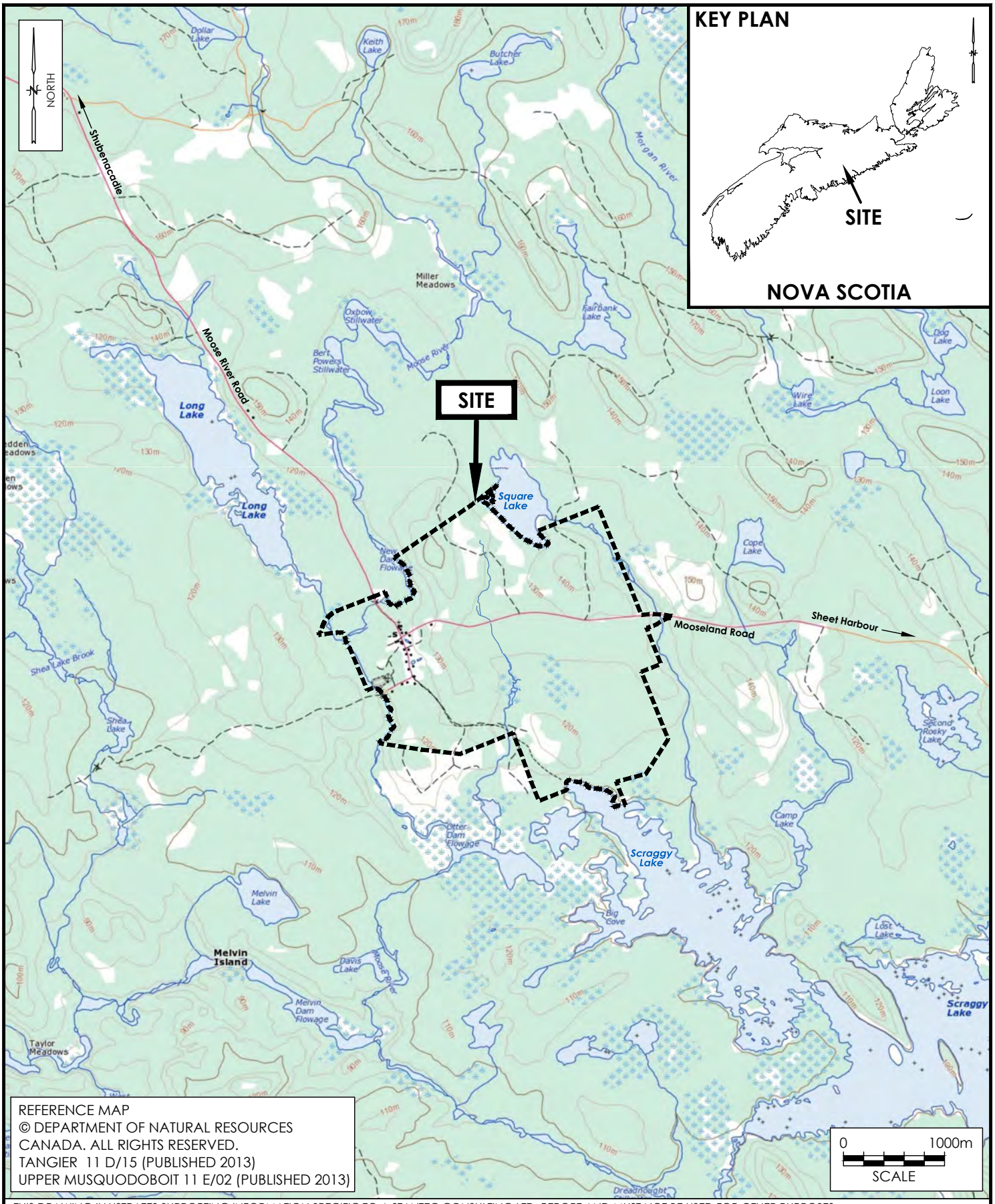
Appendix A

A.1 DRAWINGS 1 TO 10



THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

NOT FOR CONSTRUCTION

GENERAL LOCATION PLAN
TOUQUOY GOLD PROJECT RECLAMATION PLAN
HALIFAX COUNTY, NOVA SCOTIA

Client: ATLANTIC MINING NS INC.

Job No.:	121619250
Scale:	1 : 50,000
Date:	2020 11 30
Dwn. By:	JL
App'd By:	JG

Dwg. No.: 1

Stantec

V:\1216\active\121619250\1_geotechnical\3_drawings_logs\700_TOUQUOY\SHEET FILES\4_RCLM_REV4_900.300B.600\19250C-RCLM-001_R4.dwg

LEGEND
- CONTOUR, 2m (NS PROVINCIAL)
- SITE PROPERTY BOUNDARY
- EXISTING ROAD
- EXISTING WATERCOURSE
- WATERBODY
- COLLECTOR / SETTLING POND

GRID NORTH

LONG LAKE
SQUARE LAKE
MOOSE RIVER ROAD
MOOSE RIVER
FISH RIVER
MOOSELAND ROAD
SCRAGGY LAKE

MILL SITE / ADMIN AREA
MILL SITE OVERBURDEN STOCKPILE
WASTE ROCK STORAGE AREA
ADMIN ROAD
WRSA ORGANICS STOCKPILE
COLLECTION PONDS
ADMIN ROAD GRUBBING BERM
EXPLORATION OFFICES/CORE SHED
WASTE ROCK HAUL ROAD
STORM WATER RETENTION POND
HISTORIC TAILINGS CELLS (COVERED IN TAILINGS)
EQUIPMENT LAYDOWN AREA
OPEN PIT
EMERGENCY TAILINGS DUMP POND
TMF QUARRIES (COVERED IN TAILINGS)
TMF EAST SIDE GRUBBING BERM
CLAY BORROW SOURCE
WESTERN DIVERSION ROAD
TAILINGS DAM
TAILINGS POND
PERIMETER ROAD
SCRAGGY LAKE OVERBURDEN STOCKPILE
DECANT BARGE
EXPLOSIVE STORAGE AREAS
SPILLWAY
POLISHING POND DAM
POLISHING POND
TMF OVERBURDEN STOCKPILE
EFFLUENT TREATMENT PLANT
EMERGENCY SPILLWAY
GEOBAG AREA
ENGINEERED WETLAND

1:15 000
0 100 300 500m

V:\1216\active\121619250\1_geotechnical\3_drawings_logs\700_TOUQUOY\SHEET FILES\4_RCLM_REV4_900.300B.600\19250C-RCLM-002_R4.dwg

THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Reference:
1. SITE DETAILS BASED ON VARIOUS DESIGN SOURCES (STANTEC, ATLANTIC GOLD).
2. CONTOURS BASED ON DATA AVAILABLE UNDER THE NOVA SCOTIA MINISTRY OF NATURAL RESOURCES OPEN DATA LICENSE.

NOT FOR CONSTRUCTION

SITE PLAN
TOUQUOY GOLD PROJECT RECLAMATION PLAN
HALIFAX COUNTY, NOVA SCOTIA

Client: ATLANTIC MINING NS INC.

Job No.:	121619250
Scale:	1 : 15,000
Date:	2020 11 30
Dwn. By:	JL
App'd By:	JG

Dwg. No.: 2

Stantec

OPERATIONS PLAN

GRID NORTH

PARKING
ADMIN BUILDING
PROJECTS TRAILER
OFFICE TRAILERS
LABORATORY
MINING OFFICE/ CHANGE ROOMS/ WAREHOUSE
CRUSHER/ CONVERYORS
SECURITY GATEHOUSE
CRUSHER TENT
TRUCK SHOP
PROPANE TANKS
ACCESS ROAD
FUEL TANK
COLLECTOR POND
OVERBURDEN STOCKPILE
PLANT OFFICES/ CHANGEROOMS
SEPTIC FIELD (APPROXIMATE)
PLANT WORKSHOP
MANHOLE (SEPTIC TANK)
GOLD ROOM
MILL COMPLEX
MCC
ROM HOPPER
REAGENTS BUILDING
ROM STOCKPILE
CIL/DETOX TANKS
PROPANE TANKS
WATERCOURSE No. 4
MOOSE RIVER
ROM HAUL ROAD
STORMWATER RETENTION POND
MOOSELAND ROAD

1:4000 0 40 120 200m

LEGEND
- CONTOUR, 1m (LIDAR, 2010)
- PERIMETER/SITE DITCH
- EXISTING WATERCOURSE
- WATERBODY
- COLLECTOR / SETTLING POND
- RE-VEGETATED AREA (CLOSURE)
- APPROXIMATE SURFACE FLOW DIRECTION

CLOSURE PLAN

GRID NORTH

APPROXIMATE SURFACE FLOW DIRECTION
SEPTIC FIELD (APPROXIMATE)
MANHOLE (SEPTIC TANK)
PLANT SITE: INFRASTRUCTURE REMOVED, REGRADED & RE-VEGETATED
WATERCOURSE No. 4
MOOSE RIVER
MOOSELAND ROAD

1:4000 0 40 120 200m

THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Reference:

1. SITE DETAILS BASED ON VARIOUS DESIGN SOURCES (STANTEC, ATLANTIC GOLD).
2. 2010 LIDAR, CRA.

NOT FOR CONSTRUCTION

MILL SITE / ADMIN - OPERATIONS PLAN / CLOSURE PLAN
TOUQUOY GOLD PROJECT RECLAMATION PLAN
HALIFAX COUNTY, NOVA SCOTIA

Client: ATLANTIC MINING NS INC.

Job No.:	121619250
Scale:	1 : 4,000
Date:	2020 11 30
Dwn. By:	JL
App'd By:	JG

Dwg. No.: 3

Stantec

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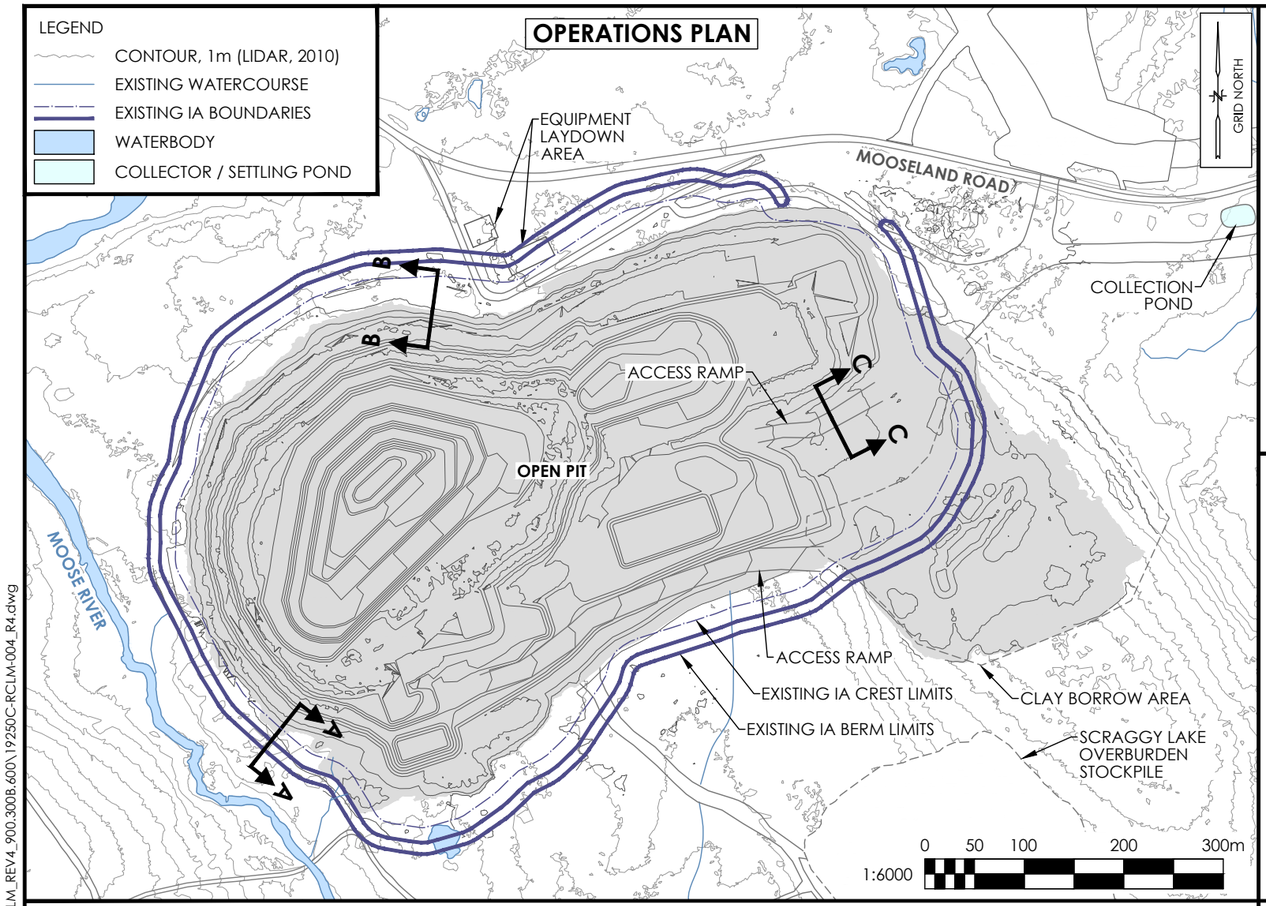
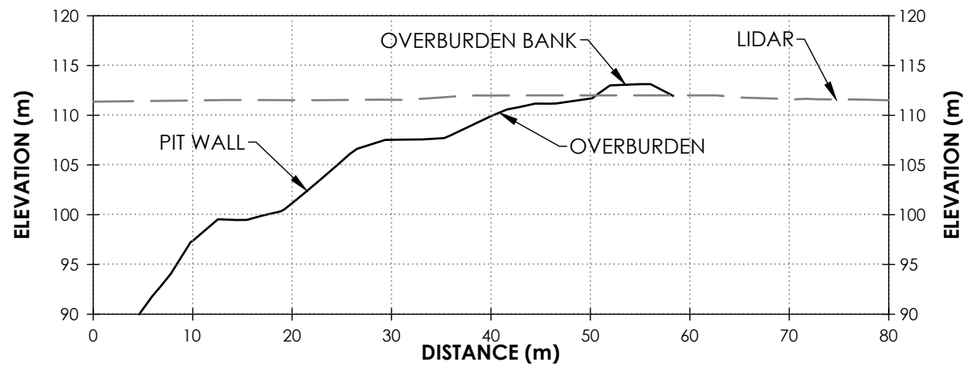
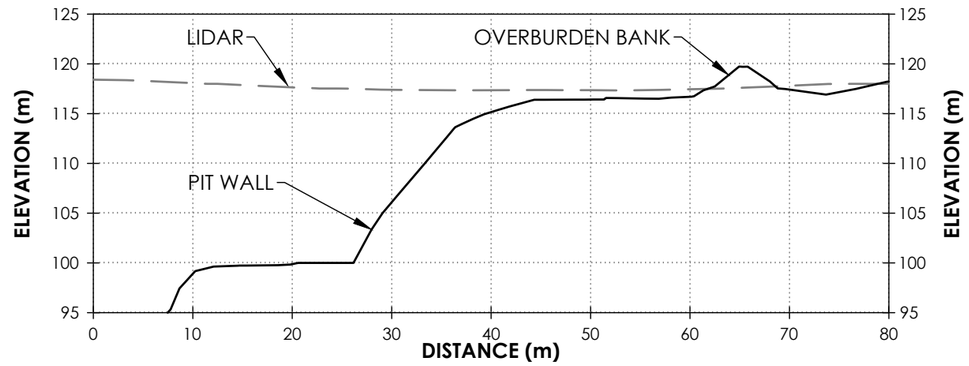
OPERATIONS PLAN



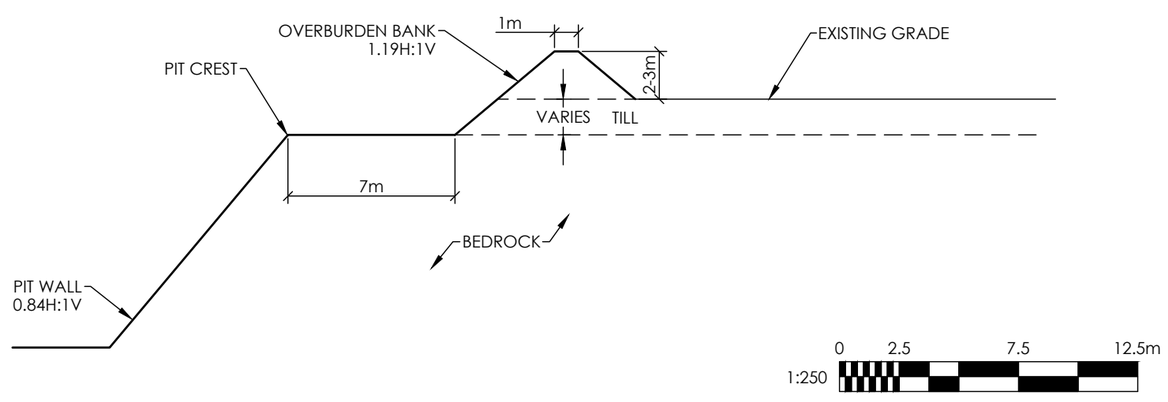
OPERATIONS - SECTION A



OPERATIONS - SECTION B



OPERATIONS TYPICAL SECTION



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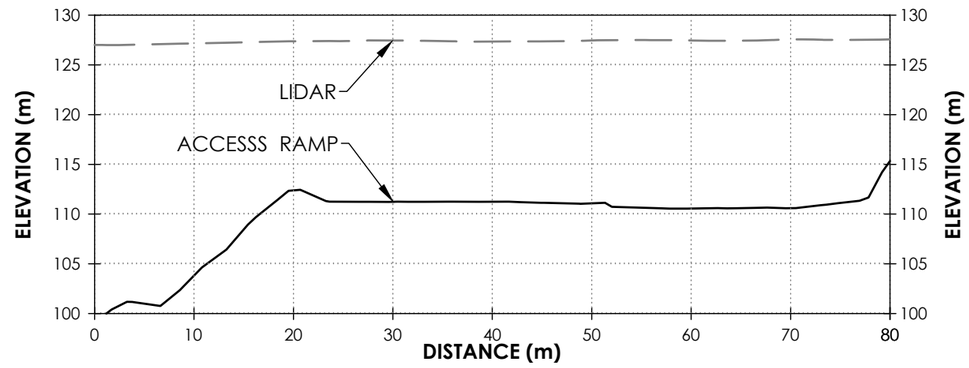


THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Reference:

1. SITE DETAILS BASED ON VARIOUS DESIGN SOURCES (STANTEC, ATLANTIC GOLD).
2. 2010 LIDAR, CRA.

NOT FOR CONSTRUCTION

OPEN PIT - OPERATIONS PLAN AND SECTIONS

TOUQUOY GOLD PROJECT RECLAMATION PLAN

HALIFAX COUNTY, NOVA SCOTIA

Client: ATLANTIC MINING NS INC.

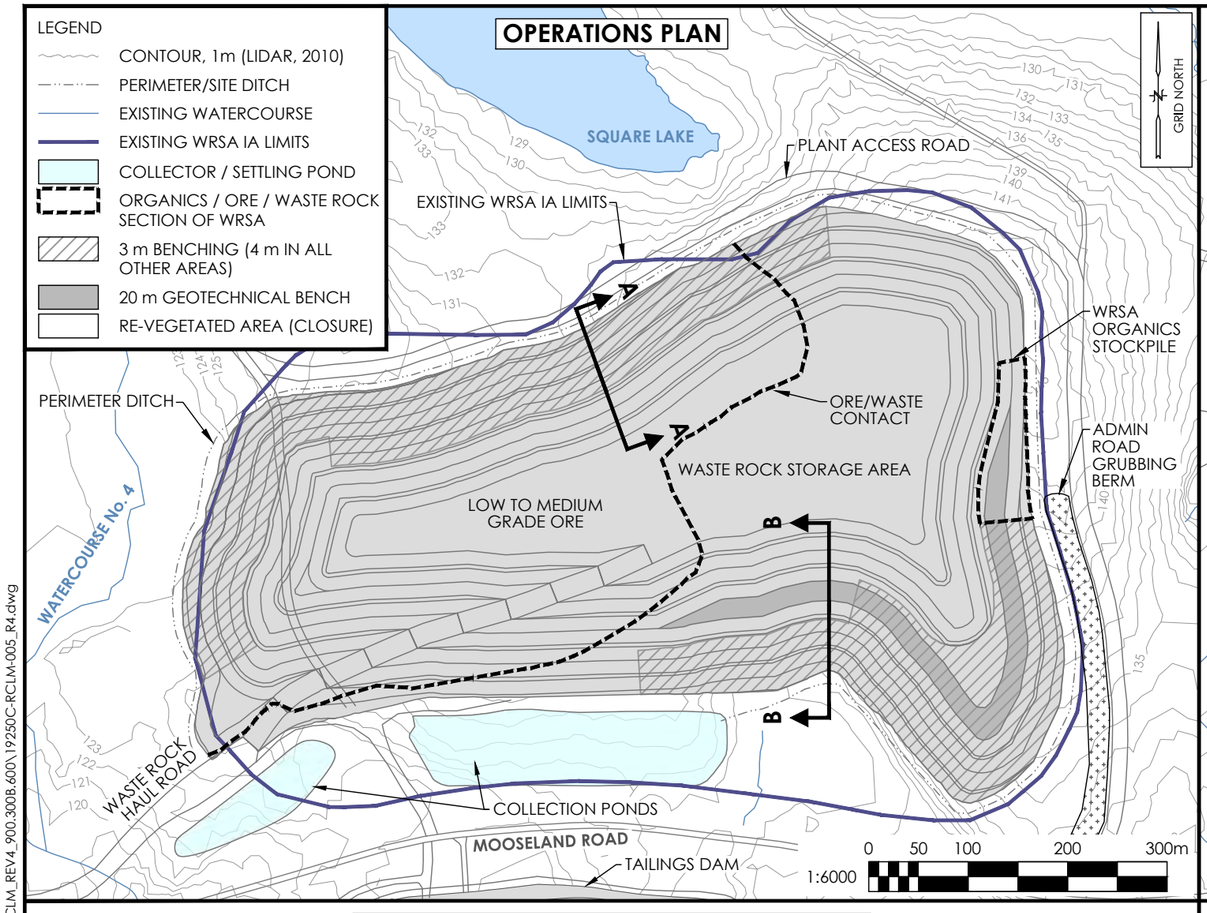
Job No.:	121619250
Scale:	AS SHOWN
Date:	2020 11 30
Dwn. By:	JL
App'd By:	JG

Dwg. No.: 4

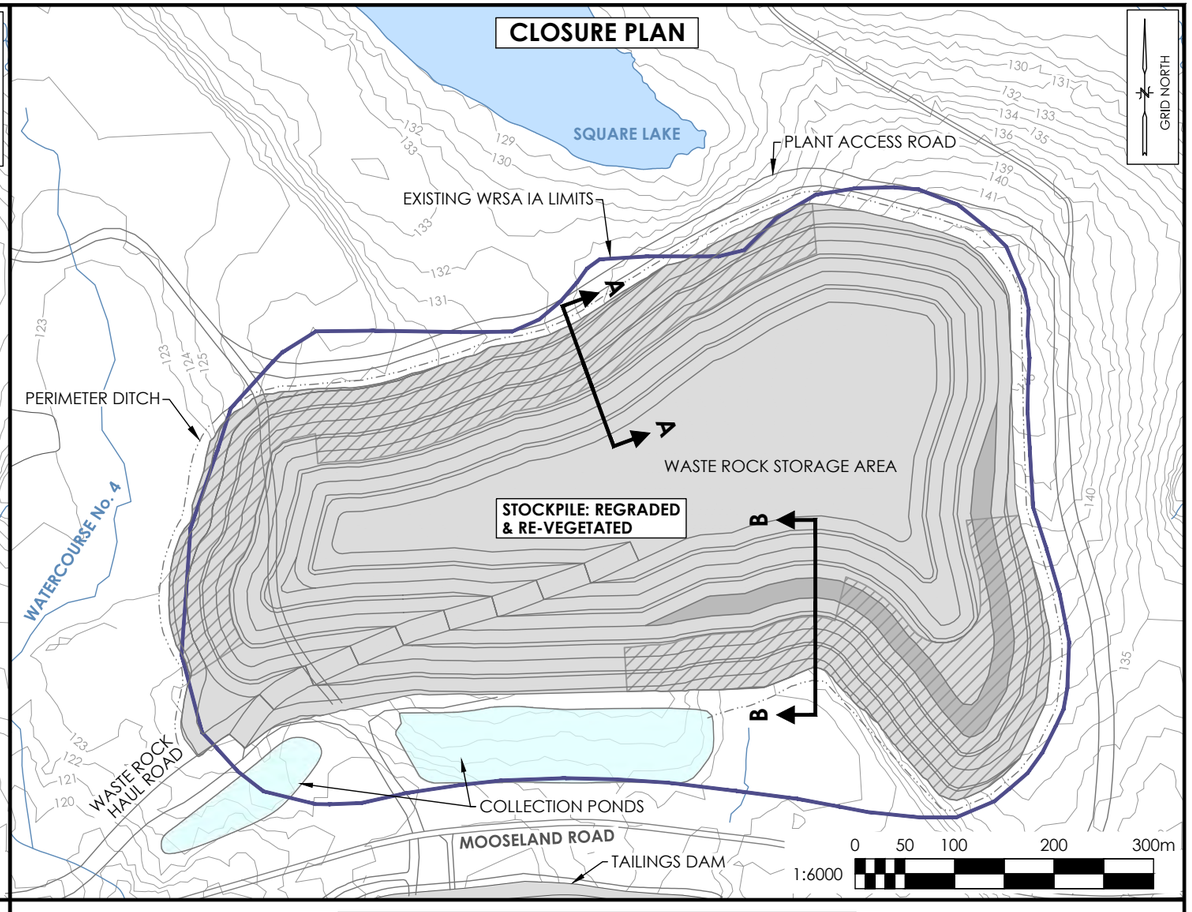
Stantec

V:\1216\active\121619250\1_geotechnical\3_drawings_logs\700_TOUQUOY\SHEET FILES\4_RCLM_REV4_900.300B.600\19250C-RCLM-004_R4.dwg

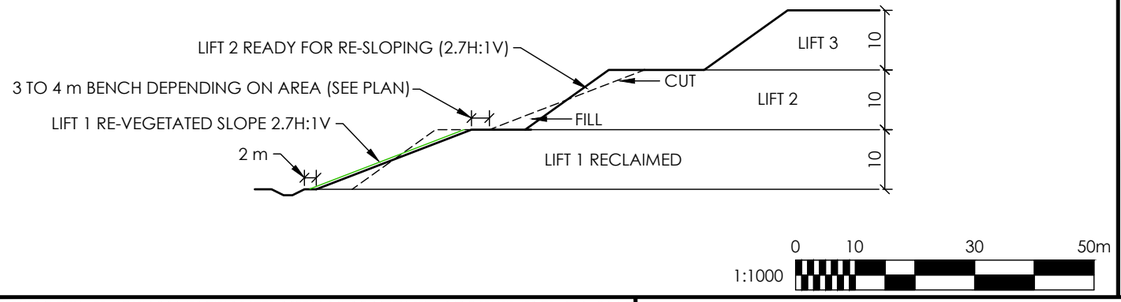
OPERATIONS PLAN



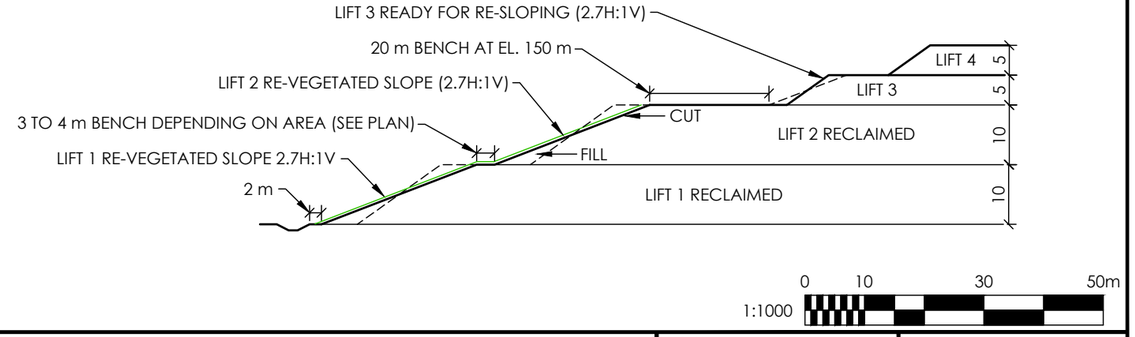
CLOSURE PLAN



PROGRESSIVE RECLAMATION - SECTION A



PROGRESSIVE RECLAMATION - SECTION B



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Reference:

1. SITE DETAILS BASED ON VARIOUS DESIGN SOURCES (STANTEC, ATLANTIC GOLD).
2. 2010 LIDAR, CRA.

NOT FOR CONSTRUCTION

WRSA - OPERATIONS PLAN / CLOSURE PLAN AND PROGRESSIVE RECLAMATION SECTIONS

TOUQUOY GOLD PROJECT RECLAMATION PLAN

HALIFAX COUNTY, NOVA SCOTIA

Client: ATLANTIC MINING NS INC.

Job No.:	121619250
Scale:	AS SHOWN
Date:	2020 11 30
Dwn. By:	JL
App'd By:	JG

Dwg. No.: 5

Stantec

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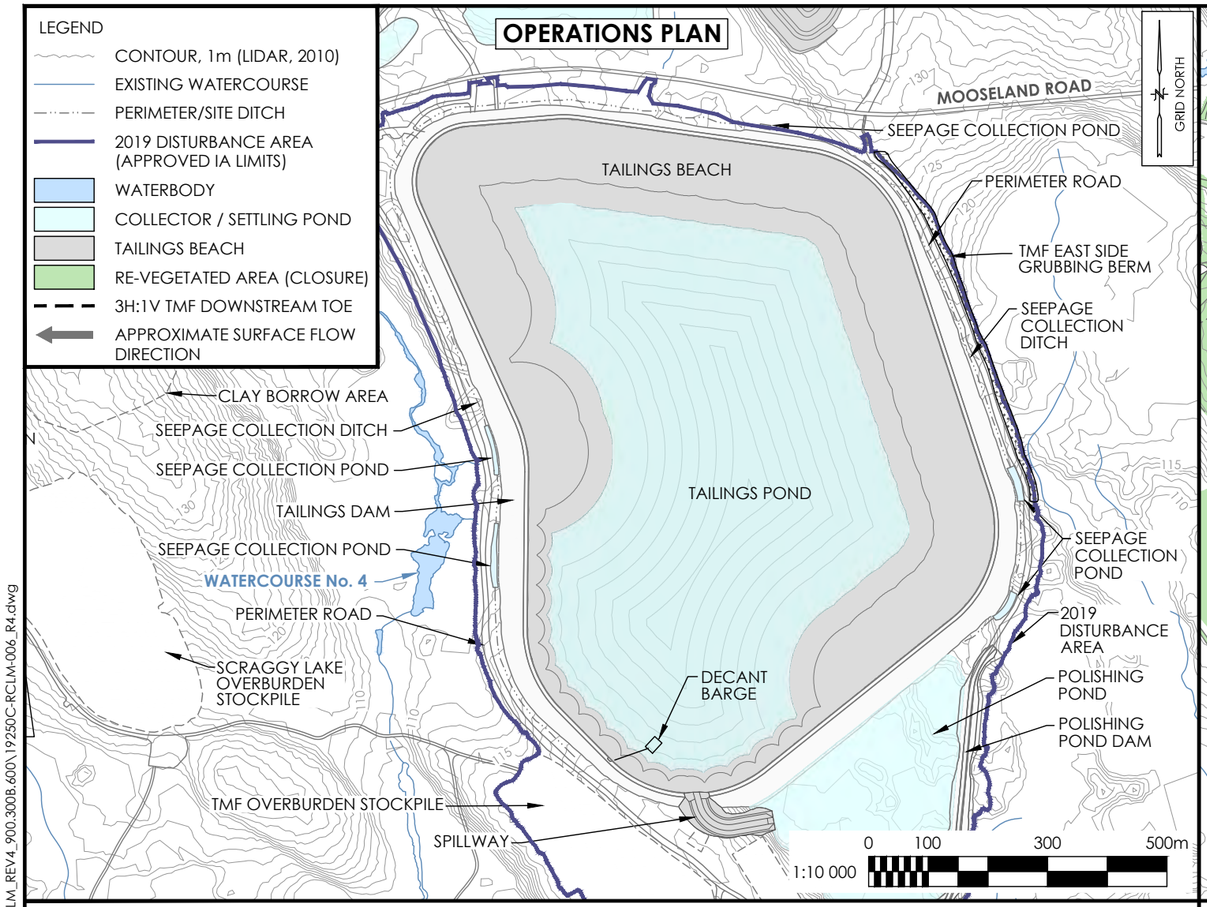
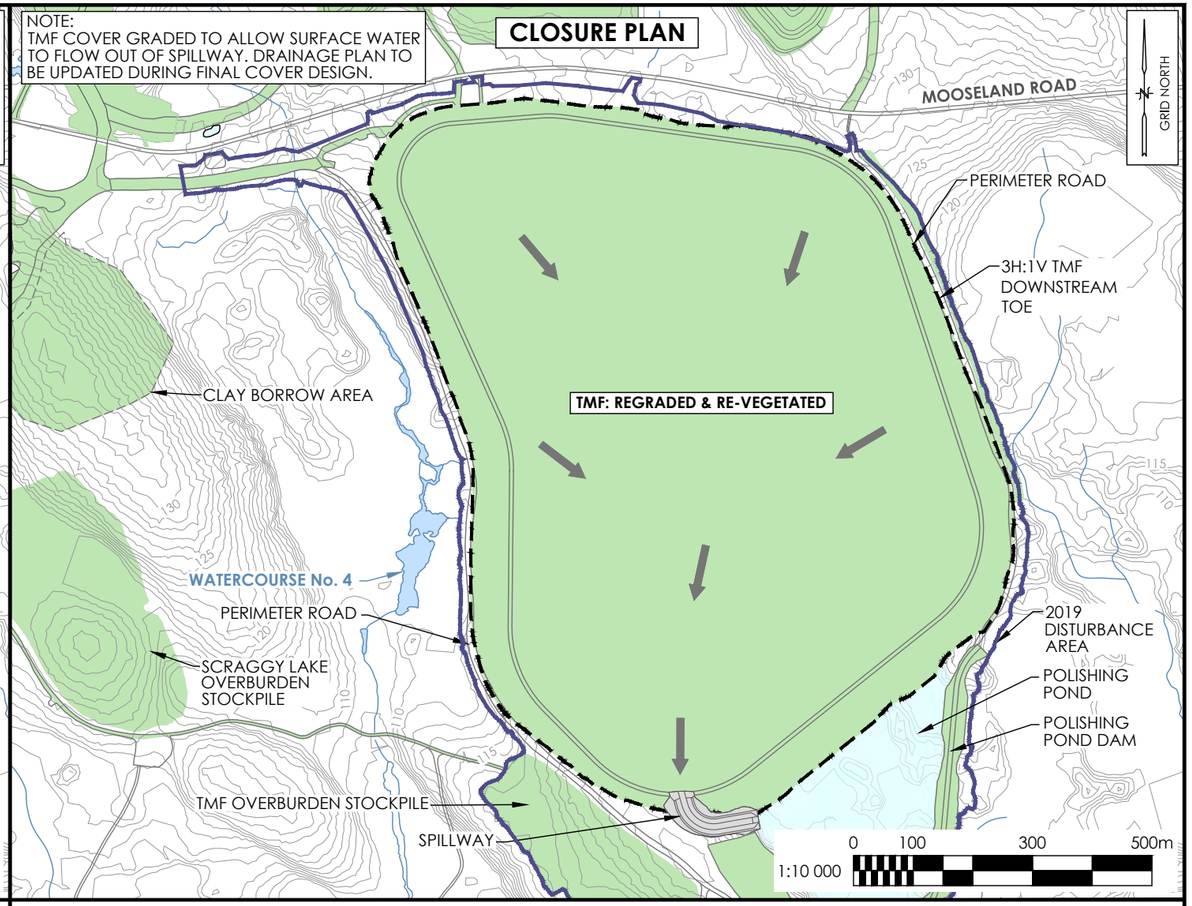
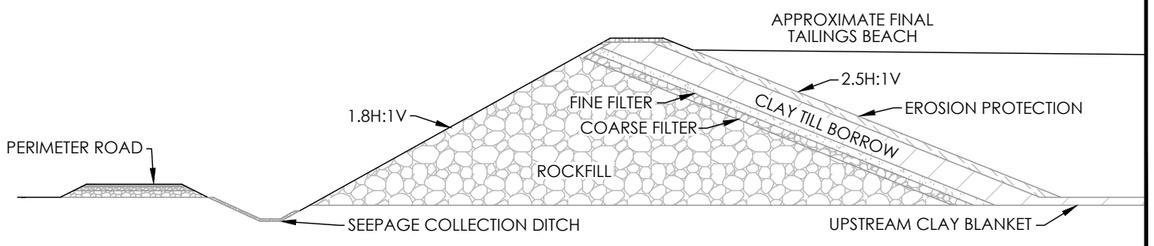
OPERATIONS PLAN



CLOSURE PLAN

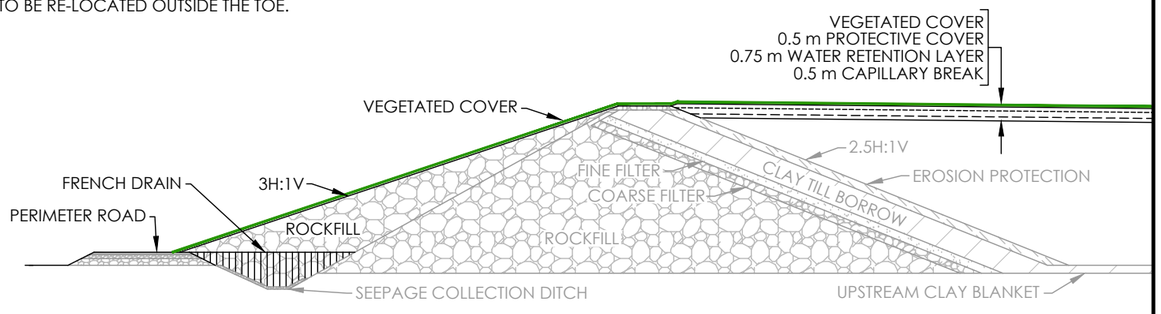


OPERATIONS SECTION



CLOSURE SECTION

NOTE:
IN AREAS WHERE 3H:1V SLOPE COVERS THE PERIMETER ROAD, THE PERIMETER ROAD IS TO BE RE-LOCATED OUTSIDE THE TOE.



THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Reference:

1. SITE DETAILS BASED ON VARIOUS DESIGN SOURCES (STANTEC, ATLANTIC GOLD).
2. 2010 LIDAR, CRA.

NOT FOR CONSTRUCTION

TMF - OPERATIONS PLAN AND SECTION / CLOSURE PLAN AND SECTION

TOUQUOY GOLD PROJECT RECLAMATION PLAN

HALIFAX COUNTY, NOVA SCOTIA

Client: ATLANTIC MINING NS INC.

Job No.:	121619250
Scale:	AS SHOWN
Date:	2020 11 30
Dwn. By:	JL
App'd By:	JG

Dwg. No.: 6

Stantec

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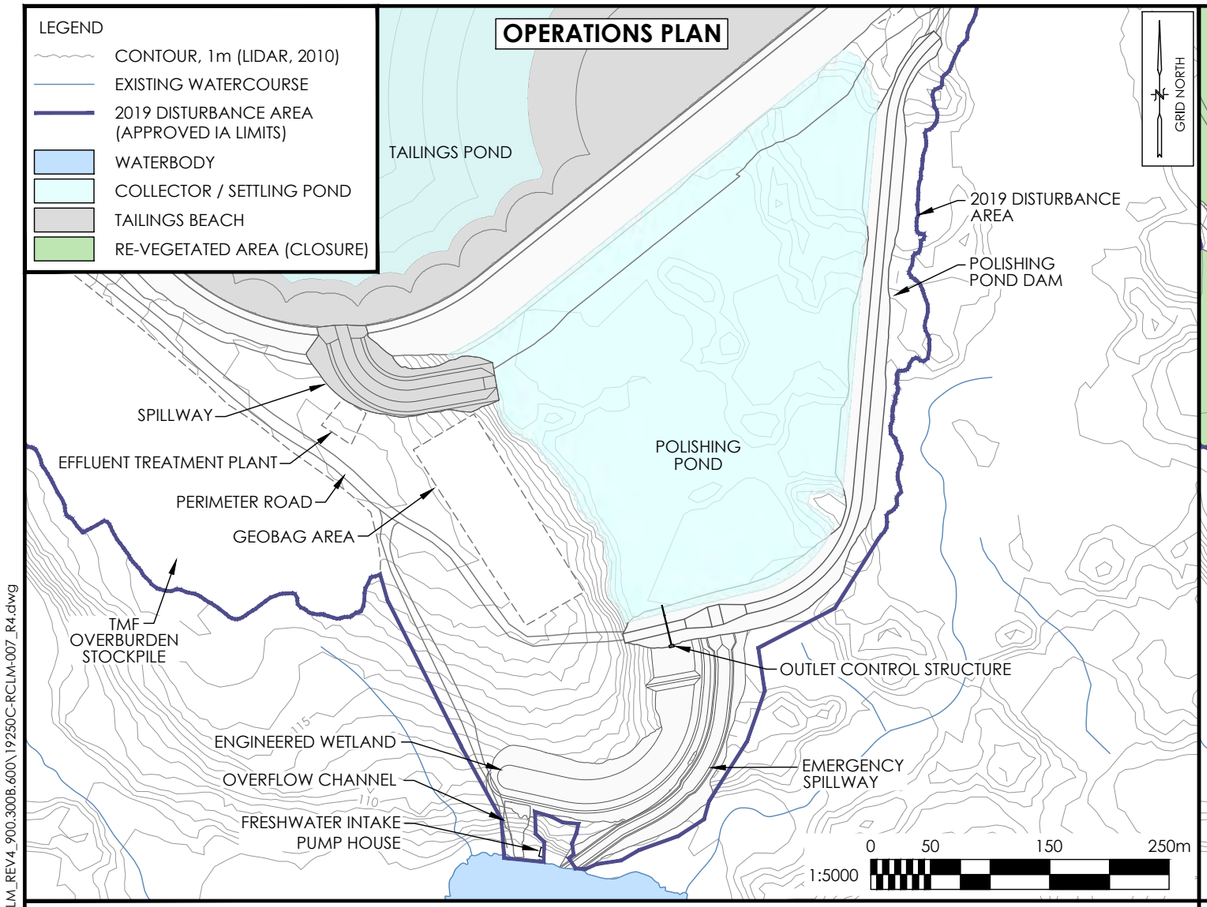

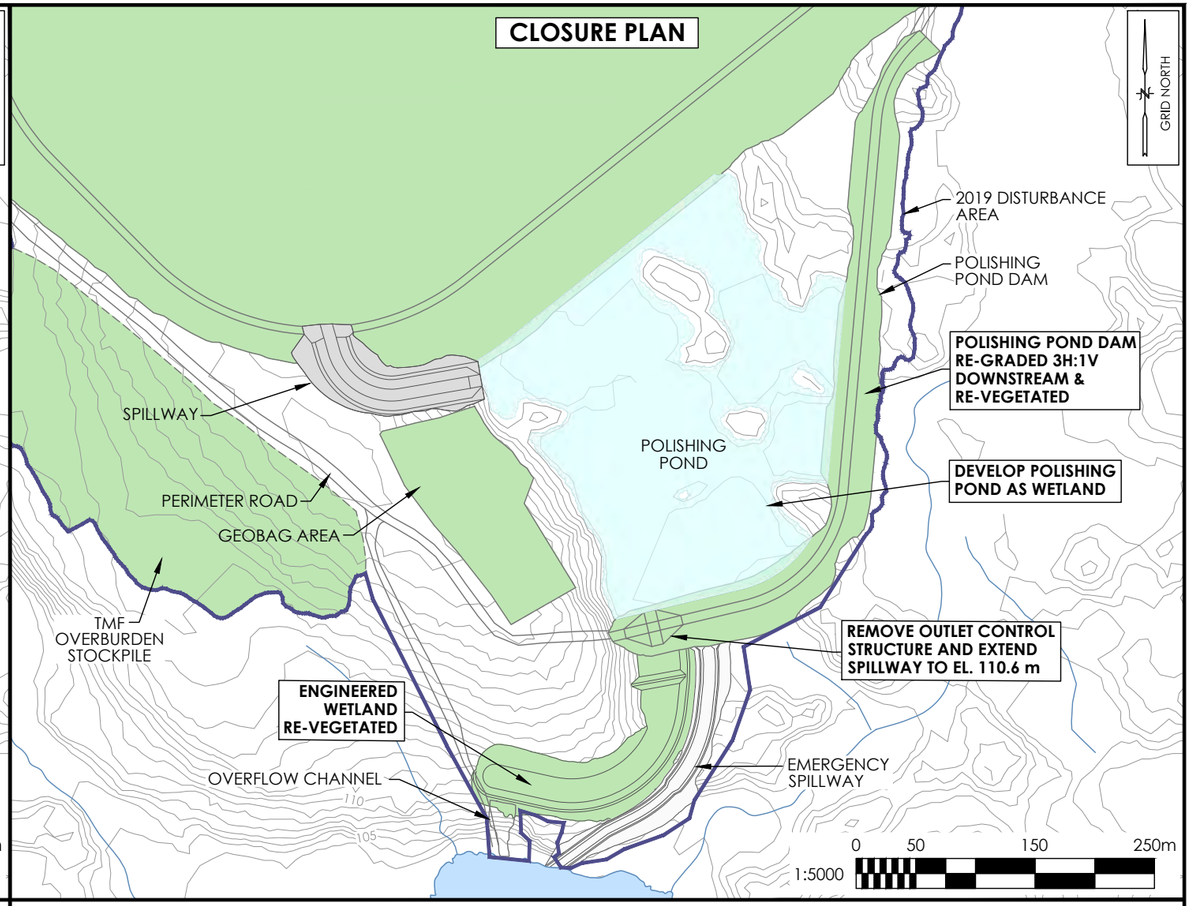

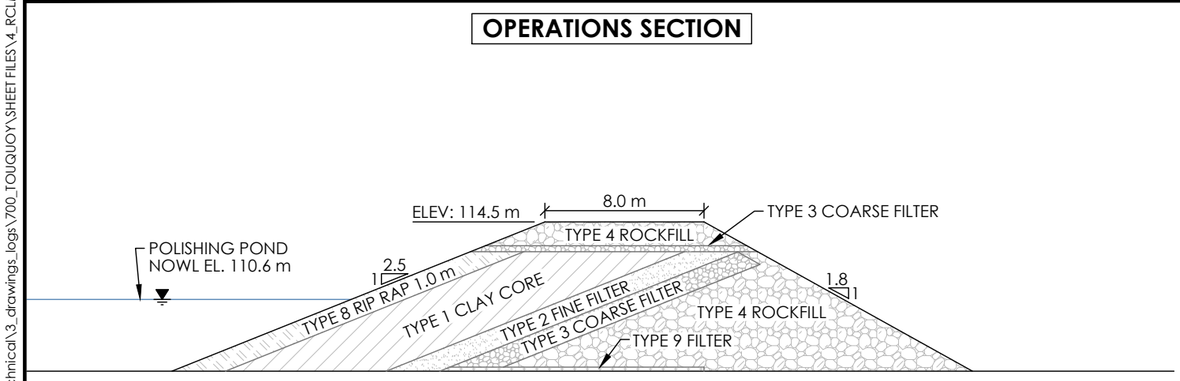

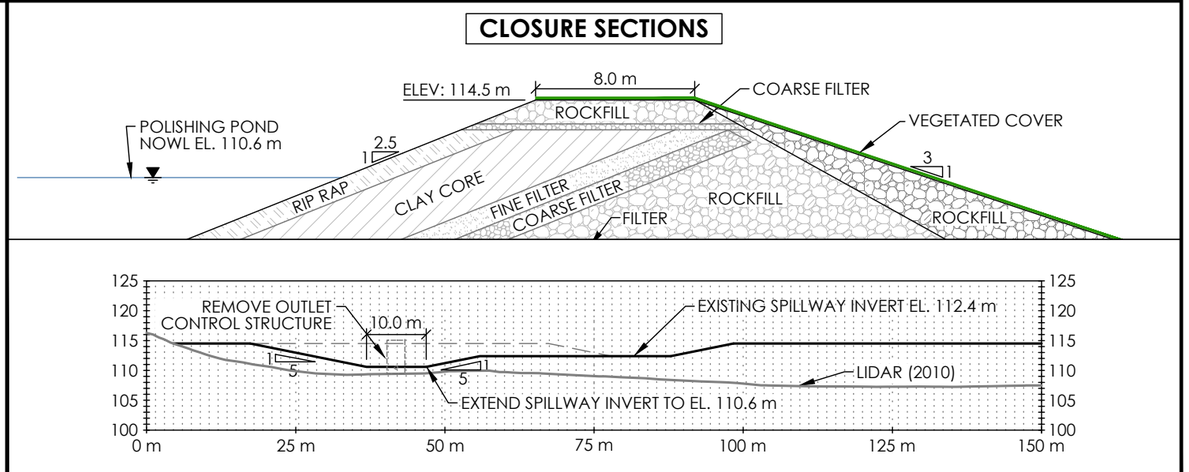

THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Reference:

1. SITE DETAILS BASED ON VARIOUS DESIGN SOURCES (STANTEC, ATLANTIC GOLD).
2. 2010 LIDAR, CRA.

NOT FOR CONSTRUCTION

POLISHING POND AND ENGINEERED WETLAND - OPERATIONS PLAN AND SECTION / CLOSURE PLAN AND SECTIONS
TOUQUOY GOLD PROJECT RECLAMATION PLAN
HALIFAX COUNTY, NOVA SCOTIA

Client: ATLANTIC MINING NS INC.

Job No.:	121619250
Scale:	AS SHOWN
Date:	2020 11 30
Dwn. By:	JL
App'd By:	JG

Dwg. No.: 7

Stantec

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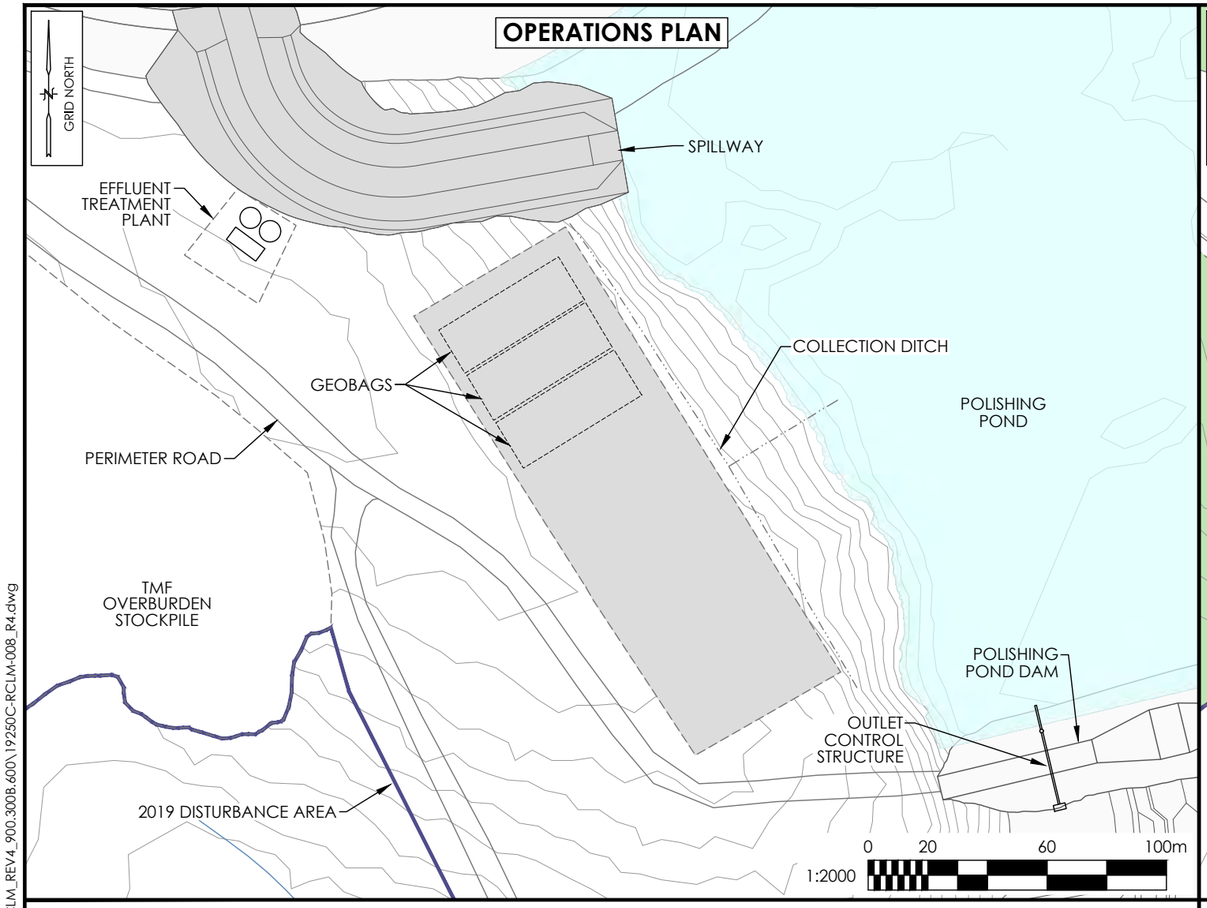
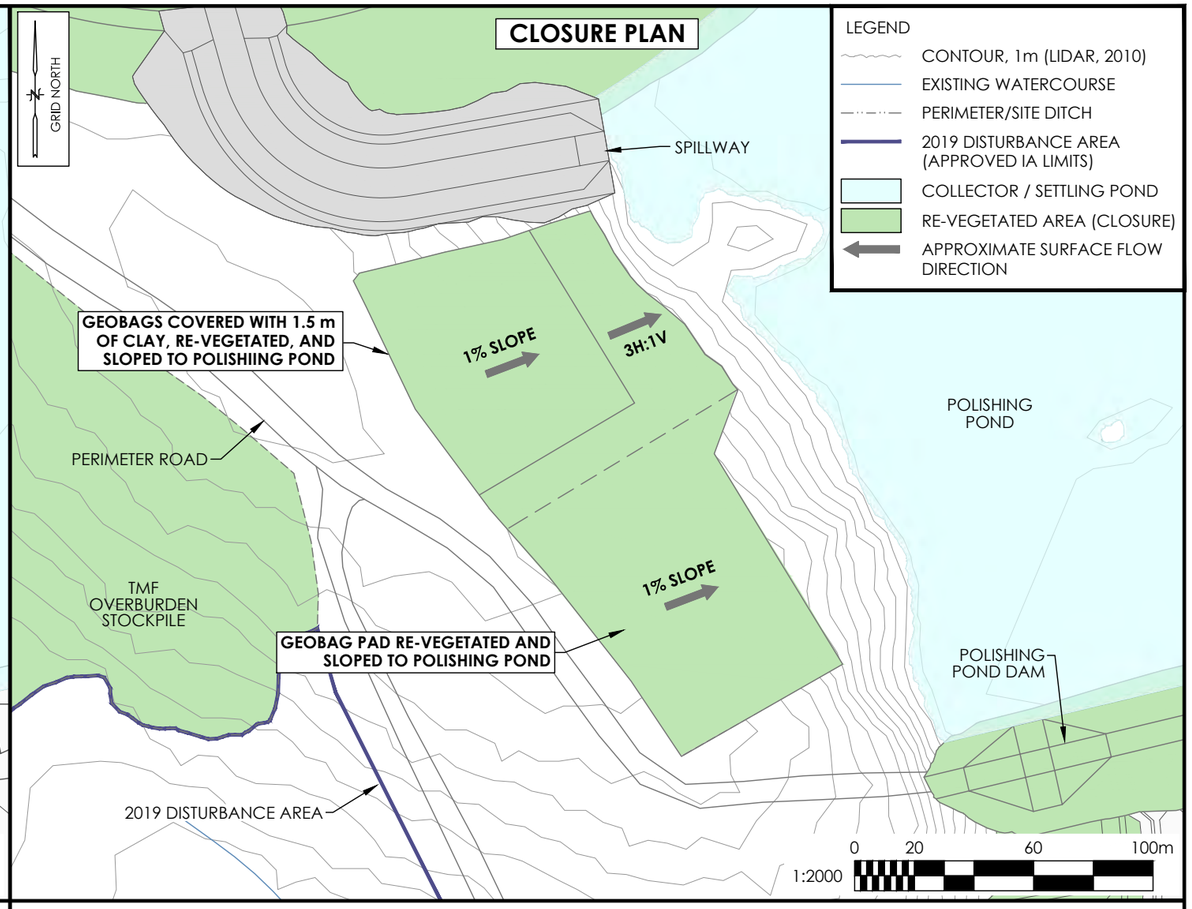
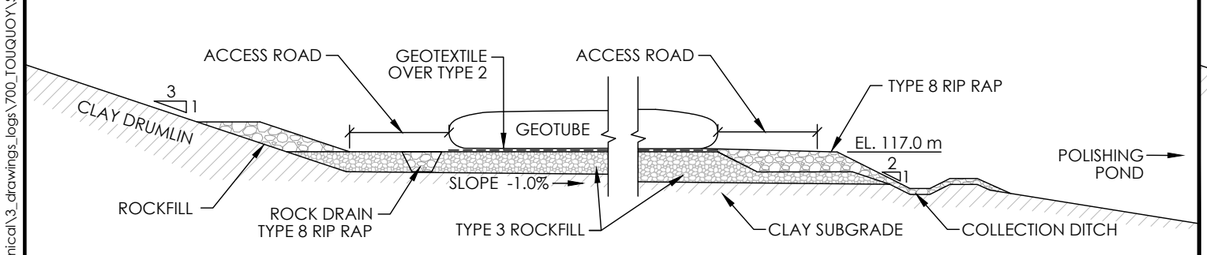
OPERATIONS PLAN



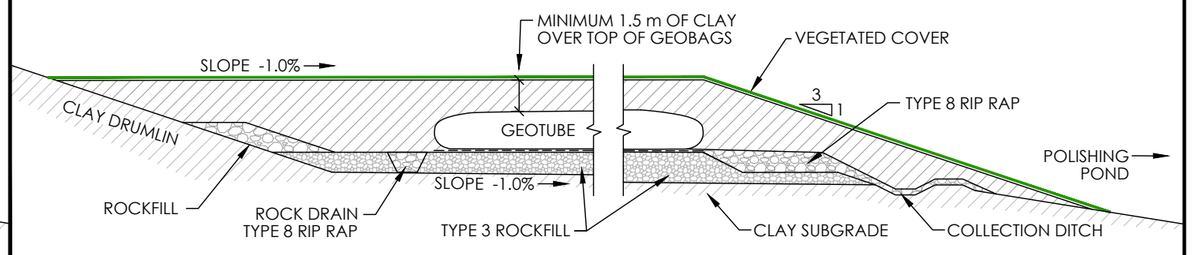
CLOSURE PLAN



OPERATIONS SECTION



CLOSURE SECTIONS



THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Reference:

1. SITE DETAILS BASED ON VARIOUS DESIGN SOURCES (STANTEC, ATLANTIC GOLD).
2. 2010 LIDAR, CRA.

NOT FOR CONSTRUCTION

GEOBAGS - OPERATIONS PLAN AND SECTION / CLOSURE PLAN AND SECTION

TOUQUOY GOLD PROJECT RECLAMATION PLAN

HALIFAX COUNTY, NOVA SCOTIA

Client: ATLANTIC MINING NS INC.

Job No.:	121619250
Scale:	AS SHOWN
Date:	2020 11 30
Dwn. By:	JL
App'd By:	JG

Dwg. No.: 8

Stantec

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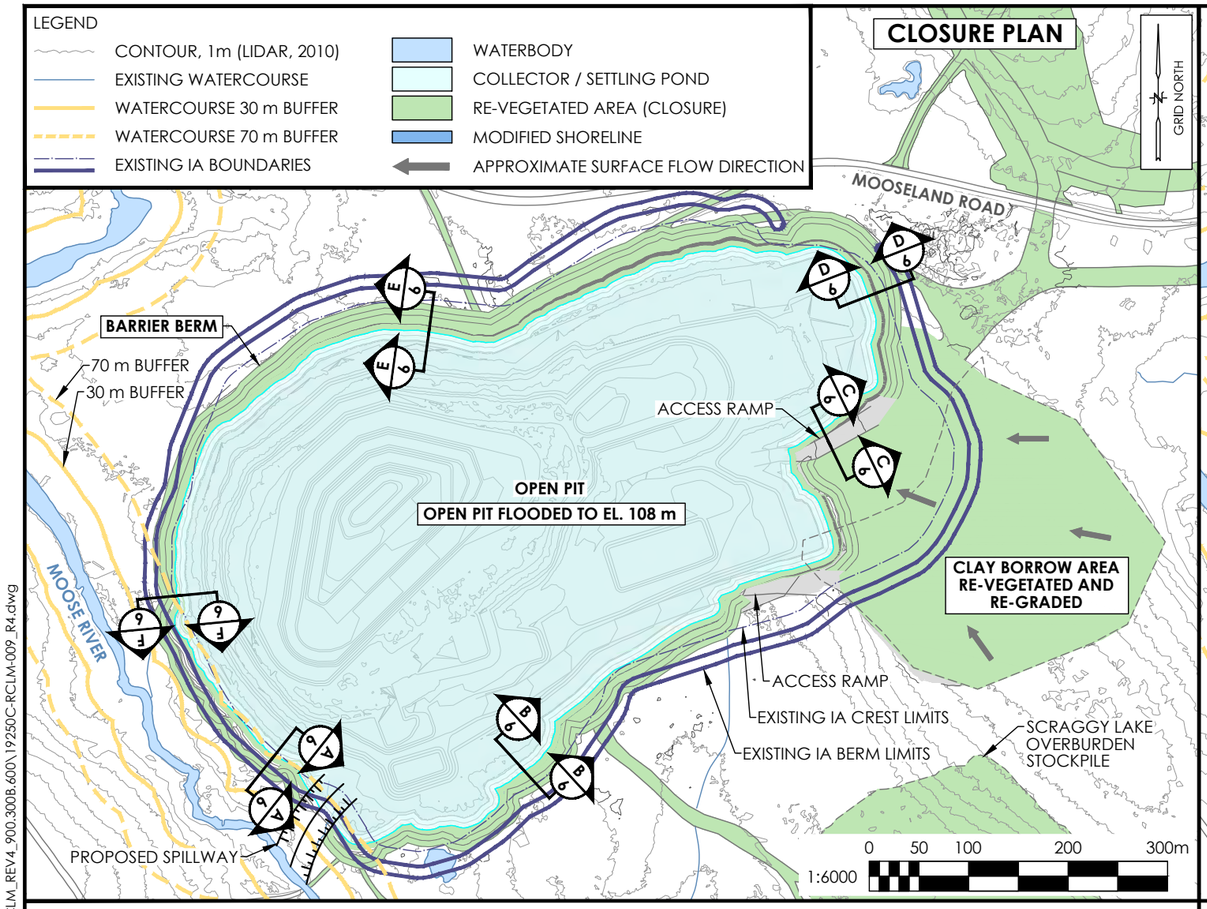
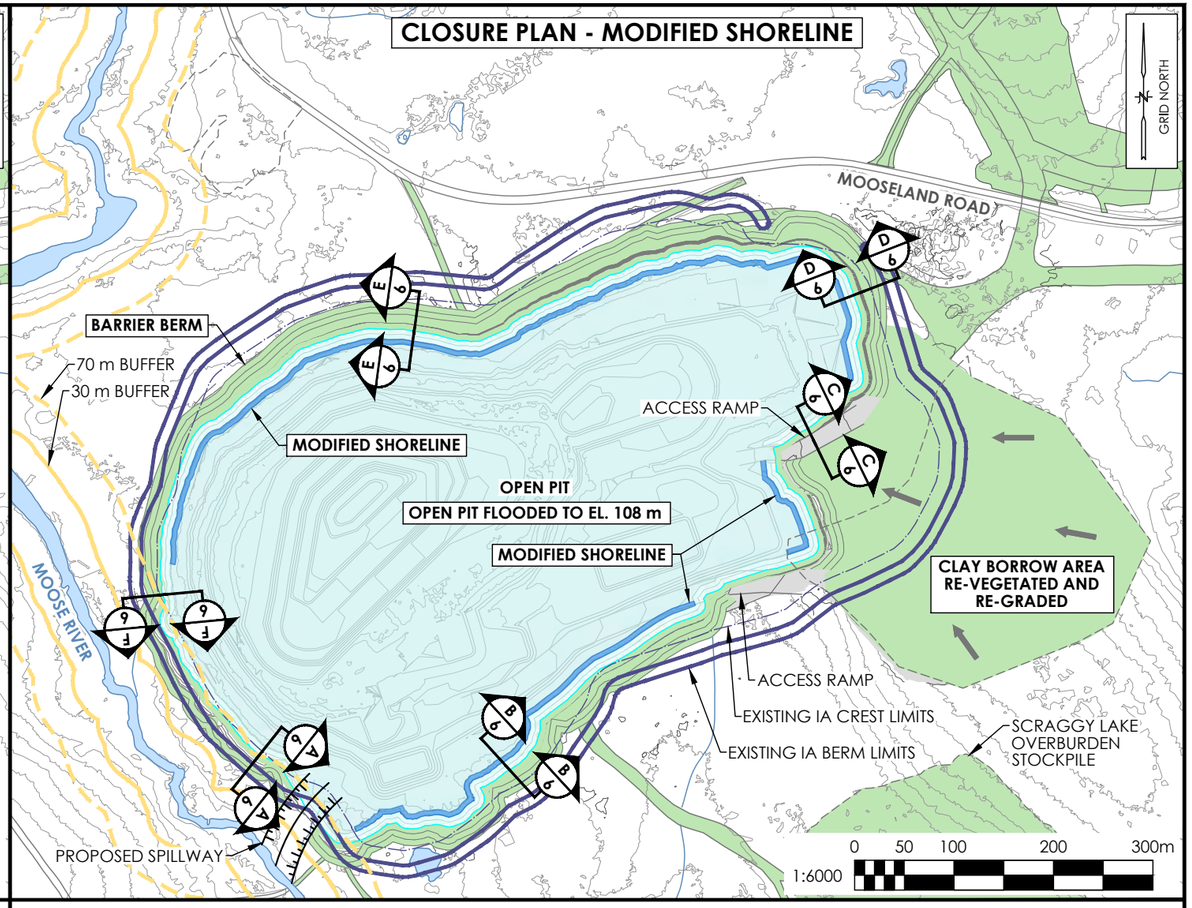
LEGEND

- CONTOUR, 1m (LIDAR, 2010)
- EXISTING WATERCOURSE
- WATERCOURSE 30 m BUFFER
- WATERCOURSE 70 m BUFFER
- EXISTING IA BOUNDARIES
- WATERBODY
- COLLECTOR / SETTLING POND
- RE-VEGETATED AREA (CLOSURE)
- MODIFIED SHORELINE
- APPROXIMATE SURFACE FLOW DIRECTION

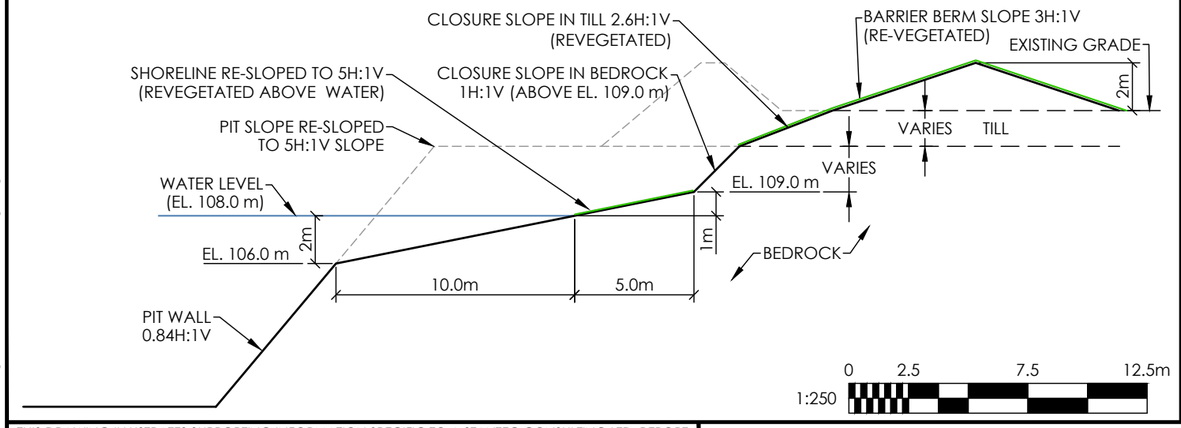
CLOSURE PLAN



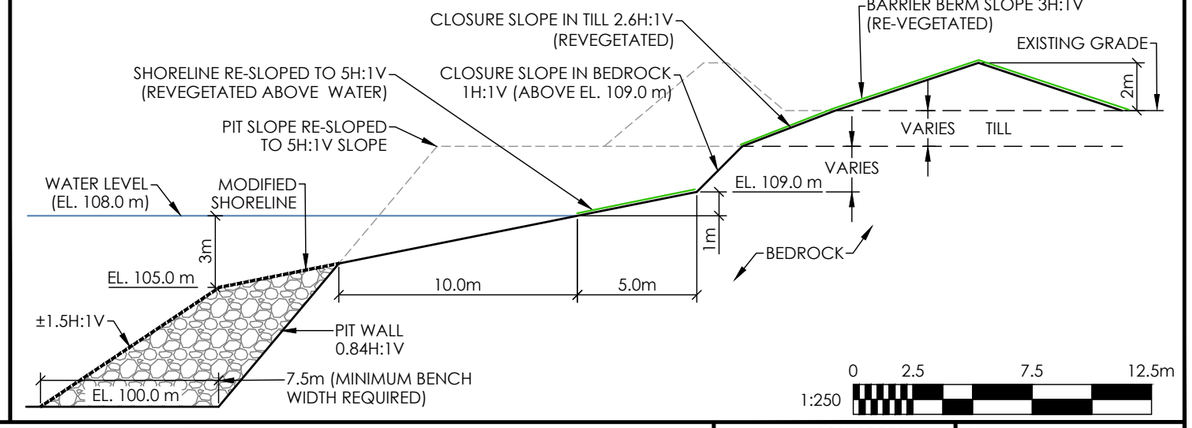
CLOSURE PLAN - MODIFIED SHORELINE



CLOSURE TYPICAL SECTION



CLOSURE - MODIFIED SHORELINE TYPICAL SECTION



THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Reference:

1. SITE DETAILS BASED ON VARIOUS DESIGN SOURCES (STANTEC, ATLANTIC GOLD).
2. 2010 LIDAR, CRA.

NOT FOR CONSTRUCTION

OPEN PIT - CLOSURE PLAN AND TYPICAL SECTION / MODIFIED SHORELINE PLAN AND TYPICAL SECTION

TOUQUOY GOLD PROJECT RECLAMATION PLAN

HALIFAX COUNTY, NOVA SCOTIA

Client: ATLANTIC MINING NS INC

Job No.:	121619250
Scale:	AS SHOWN
Date:	2020 11 30
Dwn. By:	JL
App'd By:	JG

Dwg. No.: 9

Stantec

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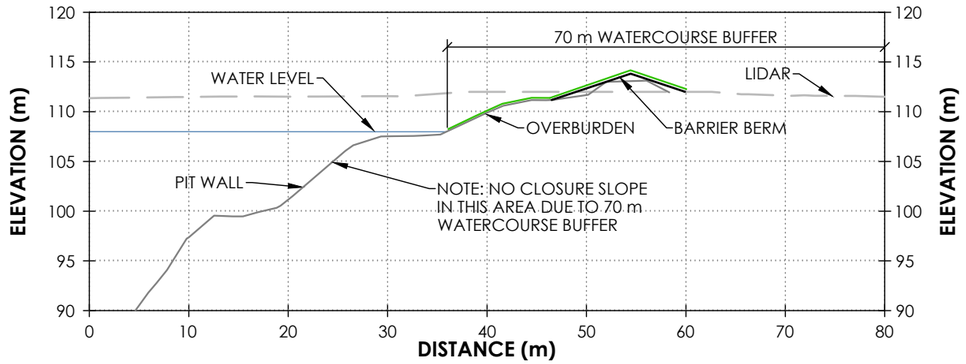
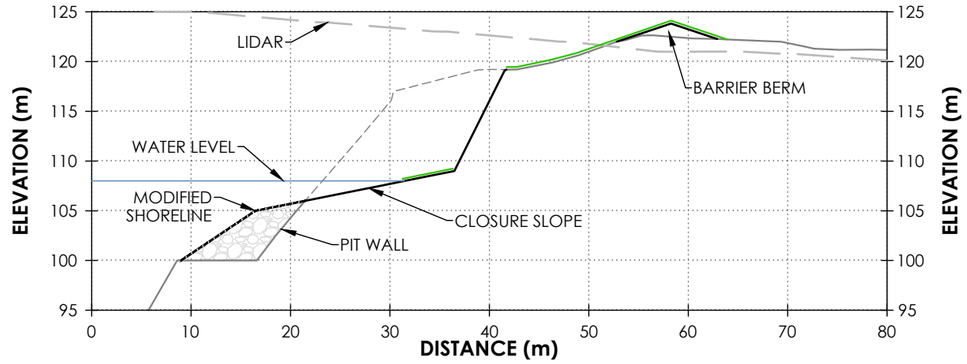
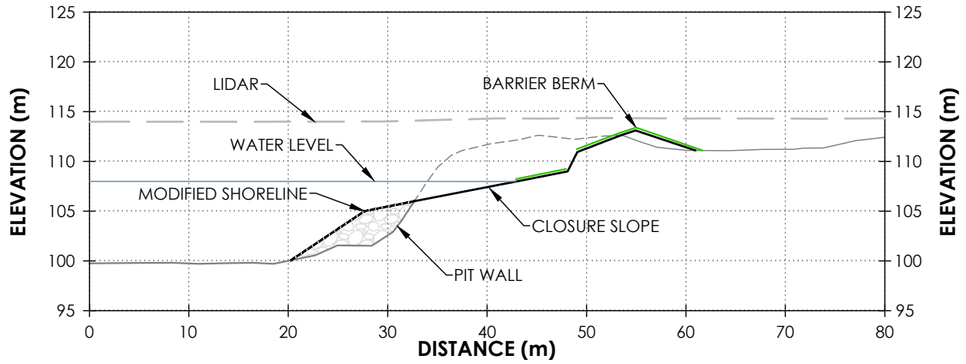
CLOSURE - SECTION A



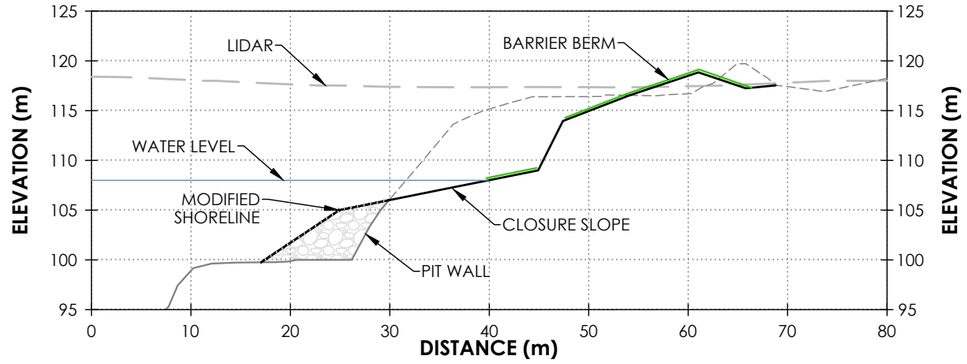
CLOSURE - SECTION D



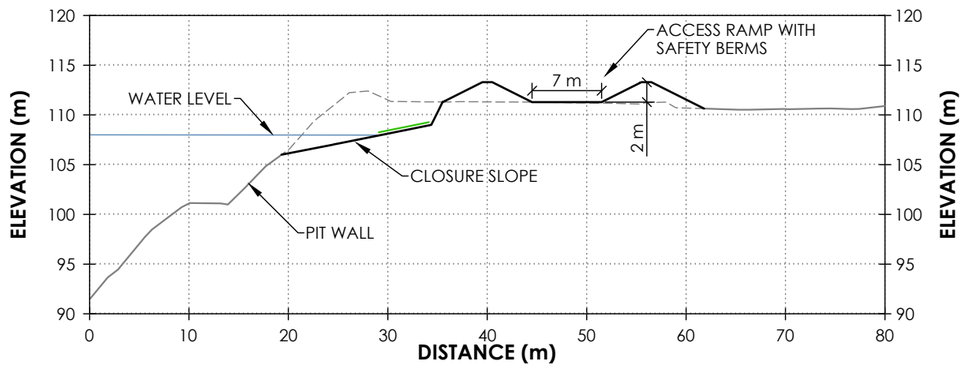
CLOSURE - SECTION B



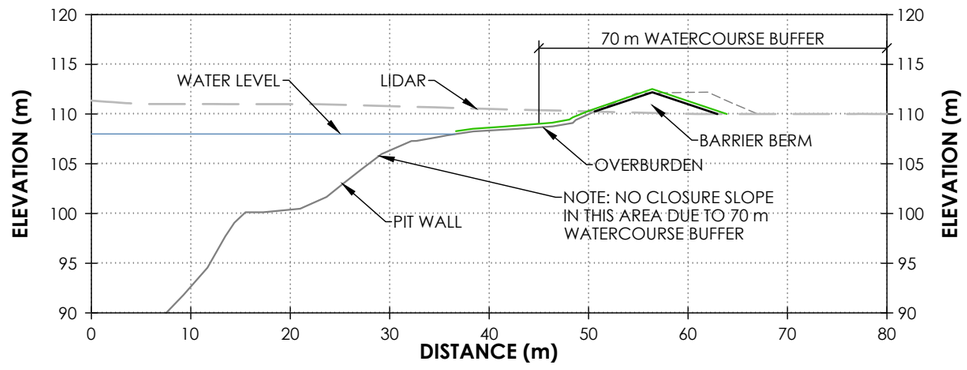
CLOSURE - SECTION E



CLOSURE - SECTION C



CLOSURE - SECTION F



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Reference:

1. SITE DETAILS BASED ON VARIOUS DESIGN SOURCES (STANTEC, ATLANTIC GOLD).
2. 2010 LIDAR, CRA.

NOT FOR CONSTRUCTION

OPEN PIT - CLOSURE SECTIONS
TOUQUOY GOLD PROJECT RECLAMATION PLAN
HALIFAX COUNTY, NOVA SCOTIA

Client: ATLANTIC MINING NS INC.

Job No.:	121619250
Scale:	1 : 600
Date:	2020 11 30
Dwn. By:	JL
App'd By:	JG

Dwg. No.: 10

Stantec

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Appendix B

B.1 CLOSURE COST ESTIMATE

In Progress - To be provided at a later Date